Moodle-Based Virtual Class to Improve Students' Metacognition and Independence in Online Learning

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ABSTRAK

Metakognisi dan kemandirian belajar merupakan aspek penting dalam pendidikan yang mempengaruhi kemampuan siswa dalam mengelola dan mengendalikan proses belajarnya. Penelitian ini bertujuan untuk menganalisis penggunaan platform pembelajaran virtual berbasis Moodle dalam meningkatkan metakognisi dan kemandirian belajar siswa. Penelitian ini merancang dan mengembangkan pembelajaran virtual yang dapat diakses oleh seluruh siswa SMP secara terbuka dan gratis yang dikemas dengan tampilan interaktif menggunakan pembelajaran Moodle lebih menarik, interaktif dan menyenangkan sehingga literasi digital dan kemandirian belajar siswa meningkat. Tahapannya mengacu pada model pengembangan ADDIE. Tahapan penelitian dilakukan dengan mengikuti model pengembangan ADDIE (Analysis, Design, Develop, Implement, dan Evaluate). Pendekatan pengumpulan data menggunakan berbagai teknik seperti angket, FGD, observasi, dokumentasi, wawancara, dan tes. Berdasarkan hasil uji praktikalitas penggunaan moodle dapat disimpulkan bahwa respon pengguna setelah menggunakan moodle dan pengisian kuisioner penilaian dengan hasil jawaban pengguna berada pada kategori nyaman. Jadi, tanggapan pengguna sangat setuju untuk menggunakan moodle dalam pembelajaran. Hasil uji kelayakan dan kepraktisan Moodle yang telah dikembangkan dapat menjadi acuan untuk dilanjutkan ke tahap yang lebih luas dan dari segi pengembangan dapat menjadi acuan untuk dikembangkan kembali baik dari segi isi/materi maupun tampilannya. Jadi, tanggapan pengguna sangat setuju dengan penerapan pembelajaran online sebagai media interaktif dalam pembelajaran.

ABSTRACT

Metacognition and learning independence are important aspects in education that affect students' ability to manage and control their learning process. This study aims to analyze the use of Moodle-based virtual learning platform in improving students' metacognition and learning independence. This research designs and develops vitual learning that can be accessed by all junior high school students openly and free of charge which is packaged with an interactive display using Moodle learning is more interesting, interactive and fun so that students' digital literacy and learning independence increase. The stages refer to the ADDIE development model. The research stages were conducted by following the ADDIE development model (Analysis, Design, Develop, Implement, and Evaluate). The data collection approach involved various techniques such as questionnaires, FGDs, observation, documentation, interviews, and tests. Based on the results of the practicality test of using moodle, it can be concluded that the user's response after using moodle and filling out the assessment questionnaire with the results of user answers is in the comfortable category. So, user responses strongly agree to use moodle in learning. The results of the feasibility and practicality test of moodle that has been developed can be a reference to be continued to a broader stage and in terms of development can be a reference to be developed again both in terms of content/material and appearance. So, the user response is strongly agree to the application of online learning as an interactive media in learning.

1. INTRODUCTION

The development of technology is getting faster day by day, especially information and communication technology. This situation makes humans seem inseparable by distance, space and time. The positive impact of the development of technology that is increasingly advanced, humans can make various kinds of equipment as tools in various activities to support productivity. In addition to the development of information technology, a lot of research is carried out in encouraging the emergence of new findings in the technological era. The rapid growth of technology today will continue to produce new patterns of learning and encourage rapid adaptation (Fatmawati et al., 2023; Pratama et al., 2023; Rawat, 2023). Higher education has undergone significant transformation in recent years, driven by the rapid development of Information and Communication Technology (ICT) (Choi et al.,

2003; Thurlow et al., 2010). Educators and students have felt the direct impact of the positives of optimizing technological developments in the learning process (Melnyk et al., 2022; Nurhikmah et al., 2021). One outcome of this progress is the utilization of online learning platforms, such as Moodle, as a primary tool to support virtual learning in higher education institutions. Moodle-based virtual education has emerged as a more flexible and efficient alternative to meet students' educational needs, particularly in situations that restrict physical access to classrooms, such as during the covid-19 pandemic. The concept of online learning during the covid-19 pandemic can be employed as a solution to enhance traditional face-to-face lectures, which have limitations such as limited duration, inadequate classroom facilities, and inflexibility in the learning process. Online learning has been viewed as the most ideal way to continue the teaching and learning process during the pandemic (Octaberlina & Muslimin, 2020; Yufrinalis & Tiring, 2022).

After the outbreak of COVID-19, many educational contexts have shifted from traditional face-to-face teaching to online and distance learning modes. This has inspired a surge of scholarly attention in various countries to reveal the status and perceptions of education-related stakeholders in implementing online learning (Suhandiah et al., 2022; Wang et al., 2023). Online learning has experienced substantial growth, especially since 2020 with the onset of COVID-19, which has limited the possibility of in-person teaching for many educational institutions globally. The conventional method of learning may potentially elicit both positive and negative responses, which would undermine the essence of conventional learning (Gamage et al., 2022; Suhandiah et al., 2022). The technology is expected to provide ease of learning for both students and educators. Current technology combines asynchronous and synchronous learning experiences. The concept of blended learning is developed to provide more autonomy while demanding increased self-reliance. Implementing blended online learning allows students to choose the location and time for assignments, plan their own study schedules, revisit learned material if necessary, but it also requires teachers to prepare high-quality learning materials and provide access to these materials for students (Makruf et al., 2022; Morze et al., 2021).

In the context of Moodle-based virtual learning, it is important to understand that besides delivering online learning content, this platform also has the potential to assist students in developing metacognitive skills and self-directed learning (Ardiansyah & Nana, 2020; Polhun et al., 2021). Metacognition refers to understanding and controlling oneself in the learning process, while self-directed learning is related to students' ability to manage time, resources, and problem-solving in the context of independent learning (Lenzo et al., 2016; R. A. A. Putra et al., 2021). This research aims to bridge the gap in understanding by investigating whether the use of Moodle in virtual learning can be effective in enhancing students' metacognition and self-directed learning (Zamora-Antuñano et al., 2022). The study will also help identify factors influencing the outcomes of Moodle implementation in the development of students' metacognition and self-directed learning. Through a deeper understanding of this relationship, we can design more effective learning strategies focused on students that can derive maximum benefits from the use of online learning technology.

The era of rapid technological development makes the world of education unable to stem changes, especially in its implementation in the learning process. However, the conditions that occur have not equalized the utilization of technology in the learning process to the evaluation stage. One of the challenges to implement blanded learning in schools is that teachers must be more innovative and creative. The application of blended learning is one solution that can be used in learning today by using various kinds of online applications, web, streaming, video, and so on (Mahrunnisya, 2022; Puspita et al., 2023; Rasyid Alwani, 2023). In addition, teachers must also take the time to organize learning, such as creating lesson materials, making learning tools, and answering questions from students who do not understand the subject matter. Currently, the implementation of learning is still done by blended learning (online and offline) (Sjafei, 2022; Thambu et al., 2021). However, for certain conditions, the implementation of blended learning is packaged in the form of synchronous and asynchronous. In short, online learning has not only changed the way we acquire knowledge, but also how we foster independence in learning (Anggraini et al., 2020; Muassomah et al., 2022). It is a journey where every student learns to take control of their own education, making them not only recipients, but also creators of their learning process.

Several studies have identified elements in Moodle that have the potential to support metacognition and independent learning, such as the use of discussion forums for self-reflection, setting timetables and assignment deadlines, and providing independent learning materials. However, these studies are often descriptive and do not provide an in-depth analysis of their impact (Marczak et al., 2016; Rahmadi & Hayati, 2020). This will provide deeper insights into effective learning design in the context of Moodle. The development of online learning platforms will have significant implications on the quality of learning in the future, especially in situations where virtual learning is increasingly necessary.

This transfer of the learning process has caused various problems, one of which is low learning awareness. Learning awareness affects students' learning independence and critical thinking skills. Learning awareness is related to metacognition skills. So learning awareness can be improved through empowering metacognition skills (Lalang, 2021; Rokhman et al., 2019; Van Der Horst & Albertyn, 2018). The use of online learning media can

trigger and empower students' metacognition skills in this day and age. The contribution of online learning, among others, for educators is expected to be more effective in empowering metacognition in the learning process. This is done as an effort to improve metacognitive skills that lead to student learning success. The learning success in question is learning independence and critical thinking skills.

This study aims to analyze the use of Moodle-based virtual learning platform in improving students' metacognition and learning independence. One of the novelty in this research is a more detailed approach in analyzing the impact of virtual learning on students' metacognition development and learning independence, as well as the identification of factors that influence the outcome. In addition, this research will also focus on the interaction between certain elements in Moodle (such as discussion forums, self-evaluation modules, or task setting) with the development of metacognition and learning independence.

2. METHOD

This research is a type of development research. The accuracy of the selection of the development model makes the right product (Sa'adah & Wahyu, 2020). One of the media that takes into account the basic stages of media development design that is simple and easy to understand is the ADDIE model (Atiaja & Proenza, 2016; Baturay, 2015). The ADDIE model is used to describe a systematic approach to learning development. The developer chose the ADDIE research model because the product developed is learning media not software engineering, so the ADDIE method is suitable for the product development process (Branch, 2010; Stapa & Mohammad, 2019). The ADDIE model provides systematic phases to guide instructors in ideating and developing instructional systems (Nadiyah & Faaizah, 2015; Yu et al., 2021). The ADDIE model is a generalized learning model that is appropriate when used for development research. The term is almost synonymous with instructional system development. The research procedure on the ADDIE model is as (1) Analysis, the first stage is the Analysis stage. This stage is carried out using observation and interview methods. (2) Design, this stage is known as creating a product design (blueprint). This stage will produce the user interface of the product design. (3) Development, the stage where the design that has been made is realized in real form. The products made are arranged in accordance with the design that has been made in the previous stage. (4) Implementation, the fourth stage is implementation. This stage tests the product that has been made in terms of product appearance or functionality, and (5) Evaluation Stage, evaluation is a process where the product developed is successful and as expected based on existing needs. If there are things that need to be improved, they need to be identified and then refined. The goal is to produce a quality product. ADDIE development model is show in Figure 1.
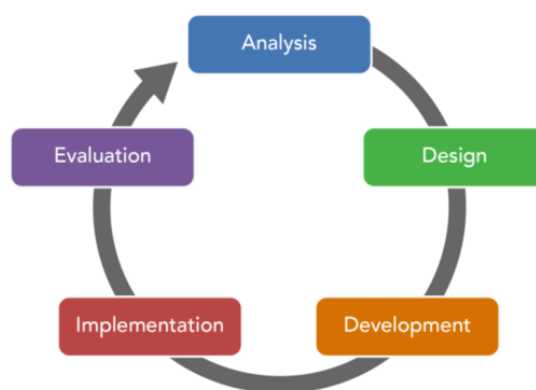

Figure 1. ADDIE Development Model

One of the characteristics of the developed product is that the product can be applied properly and provide benefits to its users. This feasibility and practicality test is carried out to produce an online learning platform that can later be used by users according to learning needs. The subjects of this study were ninth grade students in the 2023/2024 school year at SMPN 1 Naggala. Valid research data is obtained from research instruments that have been measured for validity (Puspitasari & Febrinita, 2021). This research instrument consists of questionnaires for media experts, material/content experts, and users (students and teachers). The instrument used in this research is a questionnaire. In addition to using instruments in the form of questionnaires, researchers also used instruments in the form of interviews instrument in the form of an interview.

3. RESULT AND DISCUSSION

Result

The purpose of the study on virtual learning environment development is to increase students' metacognition and self-awareness in online learning. The study has a significant advantage in enhancing more active and dynamic learning through the utilization of information technology that is rapidly developing so that students can access information at any time and anywhere. Duration of device usage is show in Table 1.

Table 1. Duration of Device Usage.

How often do you use a computer or mobile device in a day?	Count(n)
10 minutes	3.45%
More than 4 hours	20.69%
More than 5 hours	3.45%
About 1-2 hours	48.28%
About 3-4 hours	24.14%

Table 1 shows that the majority of respondents, 48.28%, use computers or mobile devices for 1-2 hours. On the other hand, there are 24.14% of respondents whose duration is longer, namely for 3-4 hours. Most respondents who access or use computer or mobile devices for more than 5 hours with a percentage of 20.69%. while for access duration of 10 minutes and more than 4 hours as much as 3.45%. Tools used by students is show in Figure 2.
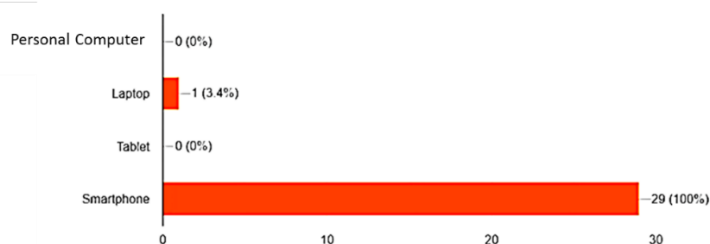

Figure 2. Tools Used by Students.

Base on Figure 2, almost all students use smartphones in accessing online learning, this condition is confirmed by the results of the questionnaire given to students with a percentage of 96.6%. In addition, the percentage of using laptop devices with a percentage of 3.4%, on the other hand there are no students who access online learning using tablets and desktop computers/personal computer (PC). Internet access is show in Figure 3.
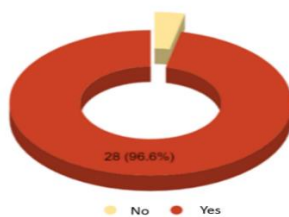

Figure 3. Internet Access.

Base on Figure 3, internet access is one of the conditions that must be met to create online learning. This condition is proven by the percentage of internet access owned by students at 96.6%, in other words, internet access owned by students has been fulfilled. Used an e-learning platform before is show in Figure 4.
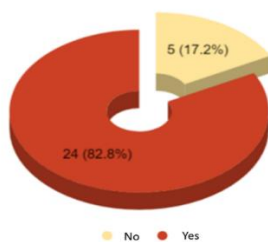

Figure 4. Used an E-Learning Platform Before.

Base on Figure 4, the experience of using online learning by students with a percentage of 82.8% has had experience in using online learning platforms before. E-learning platform used is show in Figure 5.
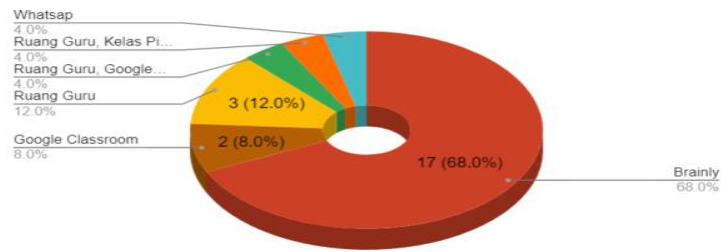

Figure 5. E-Learning Platform Used.

Base on Figure 5, brainly is the application that dominates as an online learning application, with around 68% of respondents choosing to use it, this is a sign of the popularity and wide acceptance of branly applications. The use of the teacher's room is also still one of the choices of students in accessing online learning with a percentage result of 12%. On the other hand, the use of whatsaap and google classroom is also still an option that is still often used by students in online learning and its role is no less than other online learning platforms with a percentage of 4%. The result of access the platform is show in Figure 6.
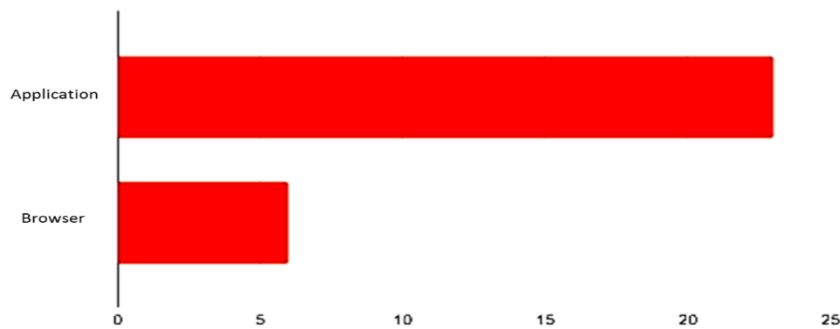

Figure 6. Access The Platform

Base on Figure 6, the variety of students in accessing online learning has a varied percentage where 80% of students access online learning using applications while 20% of students access using browsers. The display of moodel development at SMPN 1 Nanggala is show in Figure 7.
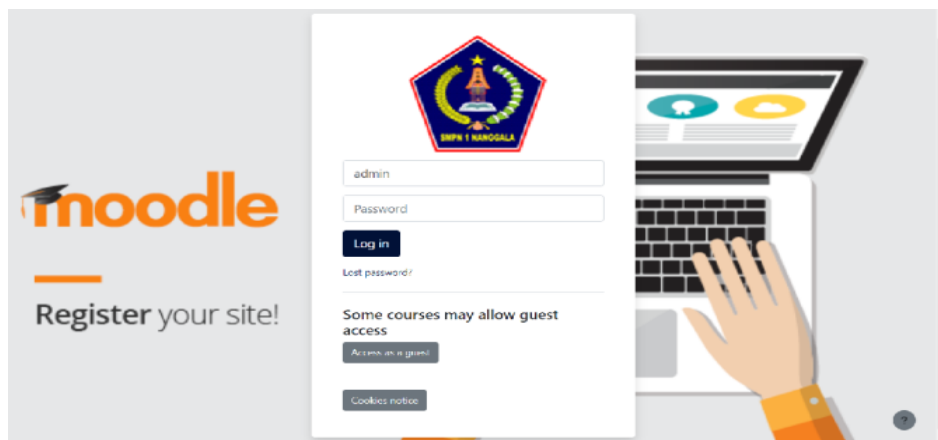

Figure 7. Moodel Development at SMPN 1 Nanggala.

Base on Figure 7, evaluation of the results of this development, It was found that the introduction of the moodle platform had a positive impact on the learning process compared to the learning process using the traditional platform. Crossword puzzles, interactive tasks, as well as animated videos if students completed the test correctly were also added to encourage students to complete additional tasks after the lesson. The positive response of the school, both students and teachers, is greatly helped by the development of the moodle platform into an online learning media that they can access anytime and learn anywhere. Student response result is show in Figure 8.

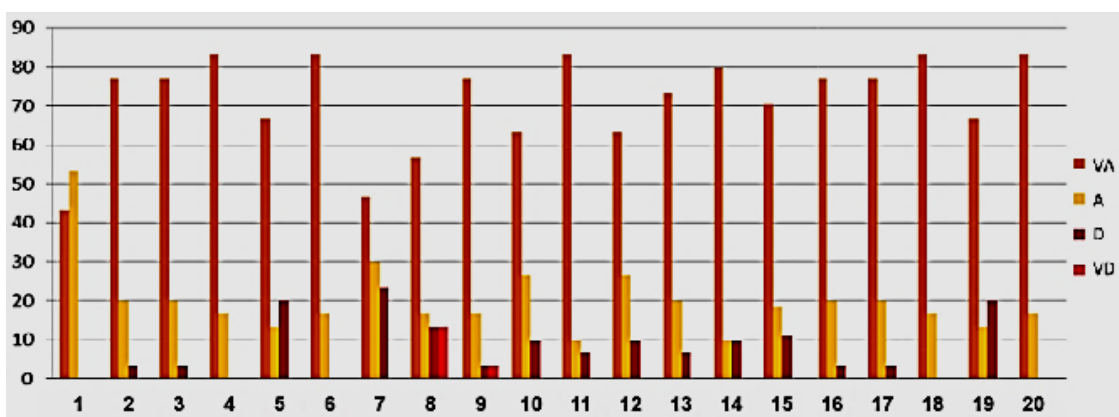**Figure 8**. Student Response Result

Base on Figure 8, after analyzing the results obtained from the two validators, user trials were then carried out to obtain assessment data on the interactive media that had been developed. At this stage, students of the educational technology study program were involved. Based on Figure 8, it can be concluded that the student response after using the moodle platform and filling out the assessment questionnaire obtained an average score of 3.56, meaning that the user's answer is efficient. So, the user response is strongly agree (VA) to the use of interactive media in learning.

Discussion

In this digital era, online learning has become a broad canvas to paint various educational paths. Amidst the hustle and bustle of an increasingly dynamic life, the presence of online learning is not just an alternative, but also a revolution in the way we access and absorb knowledge (Mayevskaya, 2018; Ningtyas & Sihombing, 2023). Online learning is not only about its accessibility that allows us to learn from anywhere and anytime, but furthermore, it becomes a catalyst in building learning independence among students (Nair et al., 2022; Tussadiah & Febriyana, 2021). Online learning not only opens the door for wider access to education but also plays an important role in developing learning independence among students. By combining flexibility, personalization, and access to diverse resources, online learning not only prepares students with knowledge but also with essential skills for lifelong learning (Li & Lalani, 2020; Rahmatsyah & Dwiningsih, 2021). In the future, the ability to learn independently will become more important, and online learning will be key in shaping a generation of resilient and independent learners. This condition is in line with research state online learning has become a promising technique for learning from continuous streams of data in many real-world applications (Hoi et al., 2021).

Online learning that can be accessed anytime and anywhere is one of the main advantages of this technology-based education. With an online learning system, students have greater flexibility in organizing their learning schedule, which can be very beneficial for different types of learners and situations. online learning has a positive impact on learner motivation and the understanding of the educational content (Kusumawardani et al., 2018; Park & Kim, 2021). Online learning has an important role in building learning independence in students. In an increasingly digitized educational environment, learning independence is an important skill that must be developed. On the other hand, there are many barriers experienced by students in adjusting to accessing online learning. Students' biggest challenges are related to their learning environment at home, while their smallest challenges are technological literacy and competence (Barrot et al., 2021; Koltay, 2011). The results of the effectiveness test of using the moodle platform can be concluded that the student response after using the moodle platform and filling out the assessment questionnaire obtained an average score of 3.56, meaning that the user's answer is efficient. So, the user response is strongly agree (VA) to the use of interactive media in learning.

This type of development research uses the ADDIE model (Analysis, Design, Development, Implementation, and Evaluation). This research is only focused on testing the effectiveness of the moodle platform that has been developed. This research is a development research with results in the form of an online learning

platform, which then conducted several trials to determine the level of feasibility and practicality of interactive media that has been developed (Boonprasom & Sintanakul, 2020; Rustandi & Rismayanti, 2021). This feasibility and practicality test is carried out to produce an online learning platform that can later be used by users according to learning needs. The subjects of this study were ninth grade students in the 2023/2024 school year at SMPN 1 Naggala. This research instrument consists of questionnaires for media experts, material/content experts, and users (students and teachers) (A. Putra et al., 2023; Saputri et al., 2020).

Questionnaires are given to media experts and material/content experts to determine the feasibility of interactive media, questionnaires are also given to users (students) to determine user responses to interactive media that have been developed. Based on the results of the practicality test of using moodle, it can be concluded that the user's response after using moodle and filling out the assessment questionnaire means that the user's answer is in the comfortable category. So, the user response strongly agrees to use moodle in learning. The results of the feasibility and practicality test of moodle that have been developed can be a reference to be continued to a broader stage and in terms of development can be a reference to be developed again both in terms of content/material and appearance (Al Mamun et al., 2022; Anggraeni & Sole, 2018). The results of the effectiveness test of using the moodle platform can be concluded that the student response after using the moodle platform and filling out the assessment questionnaire obtained an average score of 3.56, meaning that the user's answer is efficient. So, the user response is strongly agree (VA) to the use of interactive media in learning.

This research is important to understand the extent to which SMPN 1 Naggala has adopted online learning technology and how the adaptation process can be improved. By understanding the effectiveness of online learning methods implemented at SMPN 1 Naggala, this research can identify strengths and weaknesses in the learning process. This paves the way for improvement and enhancement of learning quality tailored to students' needs by presenting an online learning system that can make it easier for them to access learning. The research can uncover the extent to which this personalization can be implemented at SMPN 1 Naggala to enhance students' learning experience. This research also provides students' learning experience through an online learning platform that can help them in improving their metacognition and self-learning.

4. CONCLUSION

This research uses the ADDIE (Analysis, Design, Develop, Implement, and Evaluation) development research model. This type of development research uses the ADDIE model (Analysis, Design, Development, Implementation, and Evaluation). The quality of interactive media based on an assessment by a learning material expert lecturer shows that online learning media with very feasible criteria, not much different from the material expert, the quality of interactive media based on an assessment by a media expert lecturer shows very feasible criteria. Based on the results of the practicality test of using moodle, it can be concluded that the user's response after using moodle and filling out the assessment questionnaire with the results of user answers is in the comfortable category. So, user responses strongly agree to use moodle in learning. The results of the feasibility and practicality test of moodle that has been developed can be a reference to be continued to a broader stage and in terms of development can be a reference to be developed again both in terms of content/material and appearance.

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