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Development of Hyper-Content E-Modules for the "Script and Storyboard" Course Based on Project-Based Learning

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Abstract

The transformation of digital education demands innovative learning resources to foster student independence. This study aims to develop and test the feasibility of a *Hyper content E-Modul*e based on Project Based Learning (PjBL) in the Script and Storyboard course to overcome the limitations of teaching materials and increase learning independence. This study uses the Research and Development (R&D) method with the ADDIE model which includes the stages of Analysis, Design, Development, Implementation, and Evaluation. Data collection was carried out through validation questionnaires from media and material experts, as well as questionnaires on student independence and reflection on learning experiences. The results showed that the developed *E-Modul*e was categorized as "Very Feasible" with a feasibility percentage from media experts of 90.3%. Product implementation showed that the *E-Modul*e was effective in increasing learning independence, which was characterized by high student initiative in finding solutions independently. In addition, the implementation of PjBL through this *E-Modul*e was proven to be successful in encouraging active involvement, critical thinking, creativity, and providing meaningful learning experiences for students. This development resulted in a feasible and effective teaching material product to support independent learning in the digital era.

Abstrak

Transformasi pendidikan digital menuntut adanya sumber belajar inovatif untuk menumbuhkan kemandirian mahasiswa. Penelitian ini bertujuan untuk mengembangkan dan menguji kelayakan *E-Modul Hyper content* berbasis *Project Based Learning* (PjBL) pada mata kuliah Naskah dan Storyboard untuk mengatasi keterbatasan bahan ajar dan meningkatkan kemandirian belajar. Penelitian ini menggunakan metode Research and Development (R&D) dengan model ADDIE yang mencakup tahapan *Analysis, Design, Development, Implementation, dan Evaluation*. Pengumpulan data dilakukan melalui angket validasi ahli media dan materi, serta angket kemandirian dan refleksi pengalaman belajar mahasiswa. Hasil penelitian menunjukkan bahwa *E-Modul* yang dikembangkan berkategori "Sangat Layak" dengan persentase kelayakan dari ahli media sebesar 90.3%. Implementasi produk menunjukkan *E-Modul* efektif dalam meningkatkan kemandirian belajar, yang ditandai dengan tingginya inisiatif mahasiswa dalam mencari solusi secara mandi. Selain itu, penerapan PjBL melalui *E-Modul* ini terbukti berhasil mendorong keterlibatan aktif, berpikir kritis, kreativitas, serta memberikan pengalaman belajar yang bermakna bagi mahasiswa. Pengembangan ini menghasilkan produk bahan ajar yang layak dan efektif untuk mendukung pembelajaran mandiri di era digital.

Kata Kunci: E-Modul hyper content; mata kuliah naskah dan storyboard, pembelajaran berbasis proyek; pembelajaran mandiri

Introduction

The era of digital transformation has fundamentally changed the learning paradigm in higher education. In the 21st century, students are required to master critical thinking, collaboration, creativity, and communication skills, which are key to success in facing global challenges (World Economic Forum, 2020). In the context of higher education, self-directed learning is an essential competency that students must develop to prepare for a dynamic and unpredictable world. Student self-directed learning encompasses three features: the use of self-directed learning strategies, responses to self-oriented feedback regarding learning effectiveness, and interrelated motivational processes (Zimmerman, 1990).

The Department of Educational Technology at the Faculty of Teacher Training and Education, Lambung Mangkurat University, is committed to preparing professionals in the field of educational technology and is required to innovate in the world of education to keep pace with the current disruptive era (Educational Technology, 2025). The script and storyboard course is a core course that serves as a crucial foundation for the sustainable development of learning media. Therefore, this course requires a learning approach that emphasizes not only theoretical aspects but also practical aspects, particularly in designing and developing scripts and storyboards for various learning media formats. Based on a preliminary study conducted among students in the Educational Technology Program at FKIP ULM, several issues were identified in the script and storyboard course, namely, a lack of comprehensive teaching materials that integrate theory and practice, as well as students' difficulties in applying their understanding to real-world project-based learning.

A real-world project-based learning approach has proven to be an effective method for enhancing students' learning autonomy and achievement of learning competencies. According to Safitri et al. (2022), innovative learning resources that implement project-based learning significantly encourage students to engage in self-directed learning, enabling them to master the learning outcomes of specific courses. Hulu (Hulu et al., 2024) adds that project-based learning creates relevant learning experiences, facilitates collaborative learning, and utilizes learning resources that support a deep understanding of the material. Furthermore, Abdurrahman (Abdurahman, 2024) emphasizes that project-based learning not only enhances academic understanding but also develops essential skills, such as collaboration, communication, and problem-solving. Interactions among students within project-based learning groups strengthen their ability to work together and respect differing viewpoints. Finally, Sutisnawati (Sutisnawati et al., 2022) observed that the project-based learning approach plays a crucial role in character development and fostering a spirit of independent learning. The readiness for learning at every stage of the learning process, from preparation to implementation, has demonstrated that the effectiveness of project-based learning can create a self-structured learning environment.

Previous research has proven that the use of hyper-content E-Modules as an innovative learning resource can enhance the effectiveness, appeal, and variety of the learning process. These advantages stem from the features integrated into hyper-content E-Modules, such as links and QR codes, which enable direct access to various digital sources via the internet. These sources include cloud computing platforms, YouTube, and similar platforms, thereby expanding the scope of learning materials. Thus, the development of these hyper-content E-Modules can provide a broader range of references, encouraging students to explore the material independently and in depth (Mulyadi et al., 2023). On the other hand, the implementation of project-based learning has been proven to significantly facilitate the development of higher-order thinking skills, foster creativity, and enhance students' learning autonomy. Through practical activities implemented within the framework of project-based learning, students demonstrate improvements in their learning autonomy. Furthermore, this

method also trains students to adapt to modern learning principles relevant to the demands of the 21st century (Churiyah et al., 2023).

Advances in digital technology in education have driven various innovations in the development of electronic learning materials (E-Modules). The integration of hyper-content E-Modules and project-based learning offers a potential solution to address learning challenges in scriptwriting and storyboarding courses. Hyper-content E-Modules based on project-based learning are an innovation that combines the advantages of digital technology with constructivist pedagogy. The development of these hyper-content E-Modules aligns with the Merdeka Belajar-Kampus Merdeka policy, which emphasizes student-centered learning and flexible learning experiences (D. Diktiristek, 2024). Previous research has explored the development of hyper-content E-Modules for college courses. The development of hyper-content E-Modules has also proven effective in training students' argumentation skills (S. Raihan, 2023). Furthermore, project-based learning hyper-content E-Modules can effectively enhance students' critical thinking skills (Pujiati et al., 2022). Additionally, findings from other studies indicate that compared to conventional learning models, project-based learning models utilizing electronic instructional materials can significantly improve student learning outcomes and positively contribute to academic achievement, enhance affective sensitivity toward problem-solving situations, and develop students' critical thinking skills (Zhang & Ma, 2023).

The novelty of this study lies in the systematic integration of hyper-content E-Modules with a project-based learning approach to enhance students' self-directed learning. Unlike previous studies that focused on only one aspect of the research, this study integrates all three aspects to identify and summarize existing knowledge on the research topic, as well as provide a theoretical framework for future research, specifically considering the characteristics of the script and storyboard course, which emphasizes theoretical and technical aspects, as well as practicality and creativity in self-directed learning (Zein & Utama, 2022) .

Based on this, the intention is to conduct a study titled "Development of Hypercontent E-Modules for Scriptwriting and Storyboarding Courses Based on Project-Based Learning."

Method

This study employs a qualitative descriptive research method using the ADDIE research and development (R&D) model. The researcher selected this research method and development model to conduct the research process systematically and continuously, while also incorporating the pedagogical aspects of constructivism and digital technology in the development of the innovative E-Module hyper-content learning resource. The development process follows the ADDIE model framework, which includes the following stages: Analysis, Design, Development, Implementation, and Evaluation (Amir, 2018). ADDIE is a development model with more rational and in-depth steps than other development models, and is suitable for the development of E-Module hyper-content teaching materials/learning resources for the script and storyboard course (Mulyatiningsih, 2015). The evaluation stages in each phase of the ADDIE development procedure are illustrated in Figure 1 as follows:

Figure 1. The ADDIE Model Development Process

The process is described as follows:

1. Analysis Phase

Conduct a literature review related to hyper-content e-modules using a project-based learning approach, and their relevance to student self-directed learning, as well as analyze the characteristics of course materials and storyboards that emphasize theoretical, technical, practical, and creative aspects in self-directed learning.

2. Design Phase

This stage involves designing a product concept based on the final product to be developed and identifying relevant learning materials. Collecting relevant themes and infographic images, creating a flowchart design for the interactive multimedia interface, and developing a hyper-content storyboard design.

3. Development Stage

Creating an initial product using Canva and Kvisoft Flipbookmaker Pro. Conducting subject matter expert validation and interactive multimedia hyper-content validation by faculty members. To ensure the credibility and validity of the validation results for both the instructional materials and the interactive multimedia hyper-content, the research team collaborated with external faculty members from the Indonesian Association of Educational Technology Study Programs (APS-TPI) in conducting the validation testing of the research instruments.

4. Implementation Phase

This phase involves a pilot study by observing students' independent learning during the use of the hyper-content E-Module in the learning process.

5. Evaluation Phase

Evaluation is conducted at every stage of the ADDIE development procedure, not just at the end of the process. Evaluation in the analysis phase focuses on learning needs analysis and theoretical reviews relevant to the research variables. Evaluation in the design phase focuses on the proposed design of the hyper-content E-Module learning resource; the process includes reviewing objectives, strategies, and the development of learning materials, as well as reviewing the design of interactive multimedia flowcharts and hyper-content storyboards. Evaluation in the development stage involves media expert testing; additionally, evaluation in the implementation stage focuses on student learning autonomy and reflections on learning experiences (Gusvita et al., 2022).

The data type for this study is quantitative data obtained from two questionnaires: media and material validation, learning autonomy, and student reflections on learning experiences. This study uses three instruments: a media validation questionnaire, a learning autonomy questionnaire, and a student learning experience reflection questionnaire. Data analysis techniques were used to analyze the results of media expert validation, the learning autonomy questionnaire, and the student learning experience reflection questionnaire.

The validation sheets containing statements were completed by media and content experts using a Likert scale as follows:

Table 1. Likert Scale Expert Validation Assessment

Category	Score
Poor	1
Sufficient	2
Good	3
Excellent	4

The validation results were analyzed using the following formula:

$P = F/n \times 100\%$

P = Percentage result

F = Total frequency obtained

n = Maximum possible score

After obtaining the results, they were tested against the following validation categories:

Table 2. Validity Categories

Assessment	Criteria
81 - 100%	Very Feasible
61 - 80%	Feasible
41 - 60%	Fairly Feasible
21-40%	Less Feasible
21-40%	Not Feasible

The questionnaire on learning autonomy and reflection on learning experiences contains statements presented to students using the following Likert scale:

Table 3. Likert Scale for Learning Autonomy and Reflection on Learning Experiences

Category	Score
Strongly Disagree	1
Disagree	2
Agree	3
Strongly Agree	4

Results of the self-directed learning survey to measure the extent to which the hyper-content E-Module contributes to self-directed learning. Student learning experience reflections measure the effectiveness of the implementation of the hyper-content E-Module in the Script and Storyboard course, which utilizes the PjBL framework. This analysis aims to identify the strengths and areas requiring improvement in the implementation of this learning model, as well as provide data-driven academic interpretations and recommendations.

Result and Discussion

The development of hyper content E-Modules in the Script and Storyboard course using the PjBL framework was carried out in five stages. The analysis stage was carried out by identifying student needs in the script and storyboard course, students agreed to develop modules for independent learning. The assignment of the script and storyboard course requires modules that not only contain material but also other accessible learning resources. Hyper content E-Modules provide ease of learning using digital learning materials where the module content itself allows students to move from one section to another through links, images and/or other interactive materials. The design stage creates hyper content E-Modules in the Script and Storyboard course using the PjBL framework. The E-Modules are rich in content created using the Canva application and then integrated using Kvisoft Flipbookmaker Pro. The appearance of the hyper content E-Modules in the Script and Storyboard course using the PjBL framework is as follows:

Gambar 2. Cover *E-Modul Hyper content*

Figure 3. Example of module content containing hypercontent in the form of multimodal text.

The development stage conducted media expert validation of the hypercontent e-module. This was based on assessments provided by two expert validators. This evaluation covered four crucial aspects: (1) Visual Design and Readability, (2) Functionality and Interactivity, (3) Support for Project-Based Learning (PBL), and (4) Support for Independent Learning.

Table 4. Quantitative Data on the Feasibility Level of the Hypercontent E-module

Assessment Aspect Percentage Validity Category	Assessment Aspect Percentage Validity Category	Assessment Aspect Percentage Validity Category
Visual Design & Readability	92.5%	Very Adequate

Assessment Aspect Percentage Validity Category	Assessment Aspect Percentage Validity Category	Assessment Aspect Percentage Validity Category
Functionality & Interactivity	90.0%	Very Adequate
Support for PjBL	93.8%	Very Adequate
Support for Independent Learning	84.4%	Adequate
Overall Total	**90.3%**	Very Adequate

Overall, this e-module was rated Very Feasible with an average score of 90.3%. This score indicates that, from the perspective of media and materials experts, this product is highly feasible and well-designed. This stage also measures aspects of learning independence. The following is the average aspect of students' learning independence:

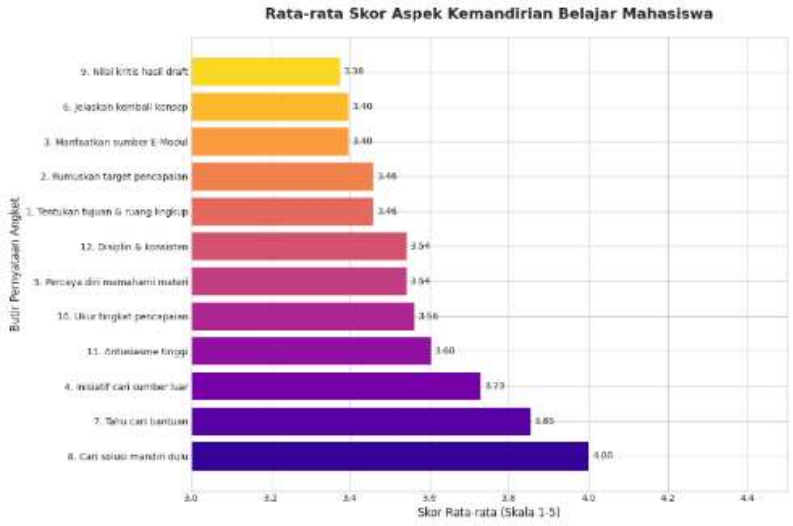

Figure 4. Graph of Average Scores for Student Learning Independence

Students demonstrated the highest level of independence in the aspect of trying to find solutions independently before asking the lecturer. This is a very strong indicator of independence. This was followed by knowing how to seek help when struggling and taking the initiative to seek resources outside the e-module. These points indicate that students are not simply passive recipients of material, but are active, take initiative, and have strategies for learning. Although all scores were very high, the aspects with the lowest average scores were the ability to formulate targets and the ability to critically evaluate work results. This does not mean students are weak; rather, among the various strong aspects of independence, detailed planning and self-evaluation are the areas most likely to be improved. The final step in the development phase was to measure reflection on learning independence. The results of the data analysis are as follows:

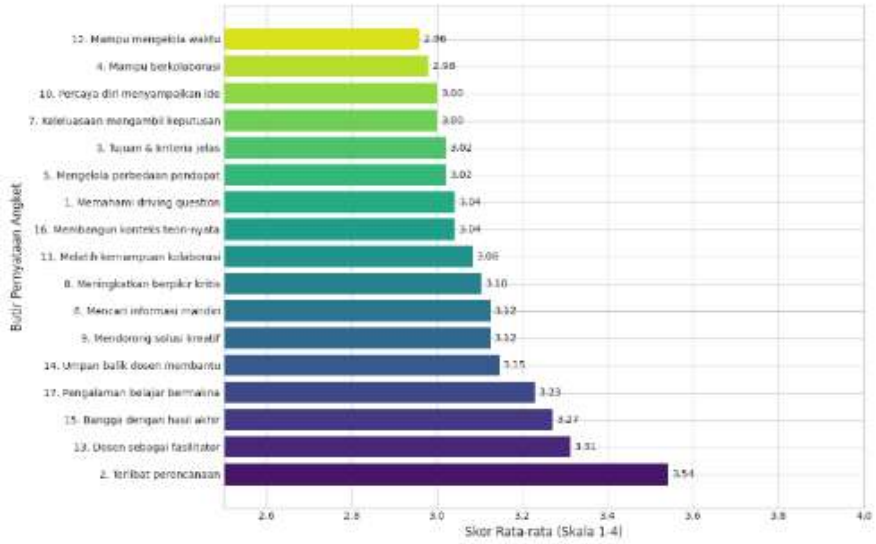

Figure 5. Graph of Average Scores for Student Learning Experience Reflections

The aspect most positively rated by students was their involvement in the initial project planning. This was followed by the perception that the lecturer acted effectively as a facilitator and a sense of pride in the final project outcome. These findings confirm that the key elements of PjBL—engagement, facilitation, and an authentic final product—were successfully implemented. While still in the positive category, the aspects with the lowest average scores were time management skills, confidence in expressing ideas, and collaboration skills. This clearly signals that students may need additional support in developing soft skills related to project management and group dynamics.

The analysis can be grouped into several central themes within the PjBL framework and the use of educational technology.

1. Effectiveness of PjBL Design and Implementation

In the Early Phase of the Project, students demonstrated very high levels of active involvement in the initial planning. However, understanding the driving question and clarity of objectives, while positive, were not as high as their engagement, a crucial finding. In PjBL theory (Guskey, 2002), the driving question is the anchor of the entire project. Slightly lower scores here may indicate that students focused more on what needed to be done than on the essence of the problem. Students felt they had sufficient autonomy. This aligns with the PjBL principle of emphasizing student-centered learning.

2. Development of Collaboration and Interpersonal Skills

Students felt the experience significantly fostered collaboration. However, the ability to collaborate and communicate ideas was the second lowest among all items. This indicates that students acknowledged that PjBL fostered collaboration, but they rated their actual collaboration skills slightly lower. This suggests that even though a collaborative platform was provided, the process may still be challenging for some students.

3. 21st Century Skills Development

E-Modules in PjBL have proven highly effective in fostering higher-order thinking skills. This is one of the greatest successes of this learning model. The ability to search for information independently was also highly rated, indicating that this model successfully encourages students to become autonomous learners.

4. The Role of Lecturers and E-Modules

The lecturer's role as a facilitator and provider of constructive feedback received the highest scores. This confirms that the lecturer's role has effectively shifted from "sage on the

stage" to "guide on the side," which is key to the success of PjBL. Students take pride in their work and find the experience meaningful. This directly relates to the theory of intrinsic motivation, where a sense of ownership and achievement increases engagement and learning satisfaction.

Conclussion

The implementation of the Hypercontent e-Module within the PjBL framework was generally very successful. This was demonstrated by consistently positive responses across almost all aspects, particularly in enhancing critical thinking skills and creativity, and providing meaningful learning experiences. This success was strongly supported by the effective role of lecturers as facilitators and providers of quality feedback. There was little gap between process and outcome in terms of collaboration. Furthermore, the emphasis on in-depth understanding of the driving question at the beginning of the project could have been further optimized.

While already effective, the self-reflection phase could be strengthened. Lecturers could introduce tools such as structured self-evaluation rubric or formal peer-review sessions to accustom students to assessing their work more objectively and critically. Given the high level of student initiative in seeking sources outside the e-Module, lecturers could transform this into a formal learning activity, for example by assigning students to curate and present relevant sources they find.

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