INNOVATION IN A PROJECT-BASED LEARNING (PjBL) MODEL SUPPORTED BY DIGITAL FLIPBOOKS FOR THE LEARNING MEDIA COURSE

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Abstract

The rapid development of digital technology requires innovation in the learning process in higher education, including in the Learning Media course. This study aims to describe the implementation of an innovative Project-Based Learning (PjBL) model assisted by digital flipbook media and to analyze its effects on learning outcomes. The PjBL model was implemented through the stages of problem identification, project planning, project implementation, product development, presentation of results, and reflection. The flipbook was utilized as a digital learning resource containing instructional materials, project guidelines, product examples, and evaluation media, thereby making learning more interactive, flexible, and accessible. The study employed quantitative and qualitative approaches, or a mixed-methods design according to the research framework applied, involving students enrolled in the Learning Media course. Data were collected through observation, questionnaires, tests, interviews, and documentation, while data analysis was conducted using descriptive and inferential techniques as required by research objectives. The findings indicate that the implementation of the PjBL model assisted by digital flipbooks increased students' active participation in every stage of learning, strengthened collaboration, communication, problem-solving, and critical thinking skills, and produced learning media products that were more creative, innovative, and aligned with the demands of 21st-century learning. Innovation of a PjBL model assisted by digital flipbooks can serve as an effective instructional strategy to improve both the quality of the learning process and learning outcomes in the Learning Media course, while also supporting the development of students' competencies as future educators who are adaptive to the advancement of digital technology.

Keywords: Project Based Learning (PjBL), flipbook, Learning Media, Learning Innovation, Students' Learning Outcomes

1. Introduction

Digital transformation has brought significant changes to the delivery of higher education across the world. The integration of information technology into the teaching and learning process is no longer regarded as a supplementary component but has become an essential requirement for creating adaptive, innovative, and student-centered learning environments. Higher education institutions are expected to produce graduates equipped with 21st-century competencies, including critical thinking, creativity, communication, collaboration, digital literacy, and problem-solving skills (UNESCO, 2023). Therefore, lecturers need to develop instructional strategies that integrate innovative learning models with digital technologies to provide students with meaningful learning experiences that are relevant to the demands of an increasingly dynamic and technology-driven era.

One of the courses that plays a crucial role in developing these competencies is the Learning Media course. This course is designed to equip students with the ability to analyze learning media needs, design, develop, implement, and evaluate instructional media in accordance with learners' characteristics. However, in practice, instruction is still predominantly characterized by lectures, group presentations, and theory-oriented assignments, providing limited opportunities for students to gain authentic experience in developing instructional media products (Guo et al., 2022). Consequently, students tend to be passive, exhibit limited creativity, and have insufficient opportunities to develop higher-order thinking skills (HOTS).

The shift in educational paradigms from teacher-centered learning to student-centered learning requires the implementation of instructional models that actively engage students in constructing

knowledge through authentic learning experiences. One of the most effective approaches is *Project-Based Learning* (PjBL). This model positions students as the primary agents in the learning process by engaging them in projects that address real-world problems, thereby fostering critical thinking, collaboration, communication, creativity, and problem-solving skills (Kokotsaki et al., 2021). Through PjBL, students not only develop a deeper understanding of theoretical concepts but also produce tangible outputs that demonstrate their academic competence and can be evaluated based on established scholarly standards.

Numerous studies have demonstrated that the implementation of Project-Based Learning (PjBL) enhances students' learning outcomes, learning motivation, creativity, and 21st-century skills. For example, the study by Guo et al. (2022) reported that PjBL has a positive impact on students' academic achievement and collaborative skills. Similarly, Almulla (2020) found that project-based learning increases student engagement by encouraging active participation throughout every stage of the learning process. Furthermore, several meta-analyses have shown that PjBL has a significantly greater effect on students' critical thinking and problem-solving skills than conventional instructional approaches (Chen & Yang, 2021).

Nevertheless, the successful implementation of Project-Based Learning (PjBL) is highly influenced by the instructional media employed. Advances in digital technology have led to the emergence of various interactive learning media that effectively support project-based instruction. One of the most rapidly evolving innovations is the digital flipbook. A digital flipbook is an interactive electronic book that integrates text, images, videos, audio, animations, and external hyperlinks, providing a more engaging and interactive learning experience than conventional instructional materials (Nurbaiti et al., 2023). Moreover, digital flipbooks enable students to access learning materials anytime and anywhere using computers or mobile devices, thereby facilitating flexible and accessible learning.

The use of digital flipbooks in learning has been shown to enhance students' learning motivation, conceptual understanding, and digital literacy (Rahmawati et al., 2022). Their interactive and user-friendly interface encourages students to engage more actively in exploring learning materials. In addition, digital flipbooks can serve as a medium for project presentations, digital portfolios, and self-directed learning resources. Therefore, digital flipbooks function not only as a means of delivering instructional content but also as an effective tool for supporting project-based learning activities.

The integration of the Project-Based Learning (PjBL) model with digital flipbook media is expected to create a more comprehensive learning experience. In this approach, students are not only required to complete project-based tasks but also to utilize digital flipbooks as learning resources, project guidelines, and platforms for presenting their final products. This combination is expected to enhance student engagement throughout the learning process, strengthen critical thinking skills, foster creativity in developing instructional media, and improve overall learning outcomes. Furthermore, this approach aligns with the concept of technology-enhanced learning, which constitutes a key component of the implementation of the Outcome-Based Education (OBE) curriculum in higher education.

Although numerous studies have investigated Project-Based Learning (PjBL) and digital flipbooks, most have examined these two variables independently. Research on the effectiveness of PjBL has generally focused on improving learning outcomes, learning motivation, or critical thinking skills without incorporating interactive digital media as an integral component of the instructional process. Conversely, studies on digital flipbooks have primarily emphasized media development and product feasibility testing rather than their integration with specific instructional models (Rahmawati et al., 2022). Furthermore, research examining the integration of PjBL with digital flipbooks in the Learning Media course within higher education remains relatively limited. In addition, few studies have simultaneously investigated student engagement, creativity, and learning outcomes as the combined effects of implementing this integrated instructional approach.

Based on these conditions, several research gaps remain to be addressed. First, studies integrating the Project-Based Learning (PjBL) model with digital flipbook media in higher education are still limited. Second, most previous research has primarily focused on improving students' cognitive learning outcomes, while aspects such as student engagement, creativity in developing instructional media, and project-based learning experiences have not been examined comprehensively. Third, research on the implementation of PjBL assisted by digital flipbooks in the Learning Media course as a means of developing the competencies of prospective educators remains scarce. Therefore, this study offers a novel contribution by integrating the PjBL model with digital flipbook media as an innovative instructional strategy to support the development of students' 21st-century competencies.

Based on the background and the identified research gaps, this study addresses the following research questions: (1) How is the Project-Based Learning (PjBL) model assisted by digital flipbooks implemented in the Learning Media course? (2) What is the effect of implementing the PjBL model

assisted by digital flipbooks on students' learning outcomes? Accordingly, this study aims to describe the implementation of the Project-Based Learning model assisted by digital flipbooks in the Learning Media course, analyze its influence on student engagement, examine its role in enhancing students' creativity in developing digital instructional media, and evaluate its impact on students' learning outcomes. The findings are expected to contribute theoretically to the advancement of project-based learning research integrated with interactive digital media and to provide practical implications for lecturers in designing innovative, effective, and technology-enhanced learning experiences that meet the demands of educational transformation in the digital era.

2. Literature Review

2.1 Project Based Learning

Project-Based Learning (PjBL) is an instructional model grounded in constructivist learning theory, which posits that knowledge is actively constructed by learners through learning experiences and interactions with their environment. In its implementation, PjBL adopts a student-centered learning approach by engaging students in projects that address authentic, real-world problems. This model encourages students to develop critical thinking, creativity, communication, collaboration, and problem-solving skills through a systematic process of investigation, planning, implementation, and evaluation of the products they create (Kokotsaki et al., 2021).

According to Guo et al. (2022), the defining characteristic of Project-Based Learning (PjBL) is its provision of authentic learning experiences that enable students to connect theoretical concepts with real-world practice**.** Through these activities, students not only acquire conceptual understanding but also develop the professional competencies required in the workplace. The PjBL process generally consists of several stages, including identifying an essential question, planning the project, developing a project timeline, implementing the project, monitoring progress, presenting the final product, and reflecting on the learning process. These stages provide students with opportunities to learn independently while simultaneously collaborating effectively within teams.

Numerous studies have demonstrated that the implementation of Project-Based Learning (PjBL) has a positive impact on the quality of learning. Through a meta-analysis, Chen and Yang (2021) found that PjBL significantly improves students' learning outcomes, critical thinking abilities, and collaborative skills compared with conventional instructional approaches. In addition, Almulla (2020) reported that PjBL enhances students' learning motivation and engagement by encouraging their active participation throughout every stage of the learning process. Therefore, PjBL is considered particularly well suited for the Learning Media course, where students are expected to develop instructional media products as a practical application of the knowledge they have acquired.

2.2 Digital Flipbooks as Learning Media

The advancement of digital technology has led to the development of various innovative instructional media that enhance the effectiveness of the teaching and learning process**.** One of the most widely adopted innovations in recent years is the digital flipbook. A digital flipbook is an interactive electronic book that presents instructional content in a digital format with a page-turning effect resembling that of a printed book, while incorporating a variety of multimedia features, including images, audio, videos, animations, and interactive hyperlinks. These characteristics make digital flipbooks more engaging than conventional instructional materials by promoting greater learner interaction with the content.

According to Hidayat et al. (2024), digital flipbooks offer several advantages, including easy accessibility through computers and mobile devices, support for self-directed learning, and the ability to integrate multiple learning resources into a single platform**.** In addition, digital flipbooks enable lecturers to present instructional content in a systematic and visually engaging manner, thereby increasing students' attention and learning motivation. Rahmawati et al. (2022) also reported that the use of digital flipbooks enhances students' conceptual understanding, digital literacy, and interest in learning, as the materials can be accessed and studied flexibly according to individual learning needs.

In the Learning Media course, digital flipbooks serve not only as a medium for delivering instructional content but also as a project guide, a platform for documenting project outcomes, and a digital portfolio for students' work. Their integration into the learning process enables students to engage with course materials independently before undertaking project activities, thereby facilitating better preparation and promoting a more effective and efficient learning experience.

2.3 Integration of Project-Based Learning Assisted by Flipbook

The integration of the Project-Based Learning (PjBL) model with flipbook media represents an innovative instructional approach that combines pedagogical strategies with digital technology. In this learning approach, the flipbook serves as a supporting medium that provides learning materials, project

guidelines, sample products, and assessment instruments. Meanwhile, PjBL offers a learning framework that emphasizes students' active engagement in producing authentic products through collaboration and problem-solving.

The integration of these two components creates a more meaningful learning experience. Students are provided with opportunities to understand concepts through interactive digital media while simultaneously applying their knowledge in the form of authentic projects. Consequently, the learning process is not only oriented toward the acquisition of theoretical knowledge but also toward the development of Higher-Order Thinking Skills (HOTS), creativity, communication, and collaboration.

Research on the integration of Project-Based Learning (PjBL) and digital media indicates that the use of interactive media enhances the effectiveness of project-based learning. Students can more easily understand project instructions, access learning resources, document project progress, and present their work in a more engaging manner. These advantages contribute to increased learning motivation, greater student engagement, and higher-quality project outcomes.

Several studies have examined the effectiveness of Project-Based Learning (PjBL) and the use of flipbooks in educational settings. Guo et al. (2022) reported that PjBL has a positive impact on students' learning outcomes, collaborative abilities, and critical thinking skills. Likewise, a meta-analysis conducted by Chen and Yang (2021) concluded that PjBL is more effective than conventional instructional approaches in enhancing students' problem-solving skills. On the other hand, studies by Rahmawati et al. (2022) and Hidayat et al. (2024) found that digital flipbooks can improve students' learning motivation, digital literacy, and conceptual understanding.

Nevertheless, most previous studies have examined the effectiveness of PjBL and flipbooks separately. Research investigating the integration of these two approaches, particularly in Instructional Media courses at the higher education level, remains relatively limited. Furthermore, prior studies have primarily focused on improvements in cognitive learning outcomes, while simultaneously examining student engagement, creativity in developing instructional media, and the quality of project outputs has received comparatively little attention.

Based on these research gaps, the present study develops a learning approach by implementing a Project-Based Learning (PjBL) model supported by a digital flipbook in the Instructional Media course. The novelty of this study lies in the integration of a project-based learning model with interactive digital media to enhance student engagement, foster creativity in developing instructional media, and improve learning outcomes comprehensively. Therefore, this study is expected to enrich the body of knowledge on digital learning innovation while offering an alternative instructional strategy that aligns with the demands of 21st-century education.

3. Research Methods

This study employed a mixed-methods approach using a sequential explanatory design, which integrates quantitative and qualitative methods to provide a more comprehensive understanding of the implementation of Project-Based Learning (PjBL) supported by a digital flipbook in the *Instructional Media* course. The quantitative approach was used to examine improvements in students' learning outcomes, while the qualitative approach was employed to describe the implementation of the learning process, student engagement, creativity in developing instructional media, and students' perceptions of the use of the digital flipbook. The study was conducted in the Primary Madrasah Teacher Education (PGMI) Program at UIN K.H. Abdurrahman Wahid Pekalongan during the second semester of the 2025/2026 academic year. The participants consisted of students enrolled in the *Instructional Media* course and were selected using purposive sampling based on the criteria that they participated in the entire project-based learning process and possessed basic competencies in the use of digital technology. All participants engaged in learning activities using the PjBL model supported by a digital flipbook over several class meetings throughout one academic semester.

The research instruments consisted of a learning achievement test, observation sheets, questionnaires, interview guidelines, and documentation. The learning achievement test was used to measure students' conceptual understanding after participating in the learning activities. The observation sheets were employed to assess student engagement throughout the learning process, including active participation, collaboration skills, communication, responsibility, and the ability to complete project tasks. The questionnaires were administered to collect data on students' perceptions of the use of the digital flipbook, learning motivation, ease of use of the instructional media, and the effectiveness of the PjBL model. The interview guidelines were used to explore the experiences of both students and instructors during the learning process, while documentation, including photographs of learning activities, project outputs, and students' portfolios, served as supporting data. All research instruments were validated by experts in instructional media, educational technology, and educational assessment to

ensure the appropriateness of their content, construct, and language. The validation results were used as the basis for revising the instruments prior to data collection, thereby ensuring that the data obtained were valid and reliable.

The research procedure consisted of four stages. The first stage was the preparation phase, which included the development of learning materials, the design of the digital flipbook, the preparation of research instruments, and instrument validation. The second stage involved the implementation of Project-Based Learning (PjBL) supported by a digital flipbook, beginning with the presentation of contextual problems, followed by project planning, collaborative project implementation, project progress monitoring, presentation of project outcomes, and learning reflection. Throughout this process, the digital flipbook functioned as a flexible learning resource containing instructional materials, project guidelines, examples of instructional media, and additional references that students could access at any time. The third stage involved data collection through observations, learning achievement tests, questionnaires, interviews, and documentation. The fourth stage consisted of data analysis and the formulation of conclusions based on the research findings.

Quantitative data were analyzed using descriptive statistics to determine the mean, percentage, and standard deviation of students' learning outcomes and responses. Subsequently, inferential statistical analysis was conducted to examine the effect of implementing the PjBL model supported by a digital flipbook on students' learning outcomes in accordance with the research objectives. Qualitative data obtained from observations, interviews, and documentation were analyzed using the interactive analysis model, which includes data reduction, data display, and conclusion drawing. Finally, the quantitative and qualitative findings were integrated through triangulation to provide a more comprehensive interpretation of the effectiveness of implementing the PjBL model supported by a digital flipbook in the Instructional Media course.

4. Results and Discussion

a. Implementation Results of the Project-Based Learning Model Assisted by a Digital Flipbook

The implementation of the Project-Based Learning (PjBL) model supported by a digital flipbook in the *Instructional Media* course was carried out systematically through learning stages aligned with the PjBL framework. These stages included defining the essential question, developing a project plan, scheduling project activities, implementing the project, monitoring project progress, presenting project outcomes, and conducting learning reflection. Each stage was supported by the use of a digital flipbook as an instructional medium containing course materials, project guidelines, examples of instructional media products, reference resources, and assessment instruments.

During the initial stage, the instructor introduced the intended learning outcomes and presented contextual issues related to the development of instructional media in the digital era. Students were then guided to identify common challenges encountered in the teaching and learning process and to discuss potential solutions that could be realized through the development of technology-based instructional media. The digital flipbook served as the primary learning resource, helping students understand the fundamental concepts of instructional media, the characteristics of various types of instructional media, instructional design principles, and the stages involved in product development.

The next stage was project planning. Students were divided into several groups and assigned to develop a project proposal involving the creation of instructional media relevant to their respective fields of study. During this stage, each group determined the learning objectives, target users, type of instructional media to be developed, and the project timeline. The digital flipbook provided step-by-step guidance on project planning procedures, giving students a clear framework to follow throughout the learning process. In addition, students were able to access a variety of examples of digital instructional media, which served as references for generating creative ideas.

Project implementation constituted the core stage of the PjBL process. Students worked collaboratively to develop instructional media based on their project plans. The instructor acted as a facilitator by providing guidance, feedback, and continuous support throughout the development of each group's project. During this process, the digital flipbook functioned as a supplementary learning resource, enabling students to access additional instructional materials, review examples of media designs, and learn effective techniques for developing instructional media. The availability of learning resources in a digital format also allowed students to revisit key concepts whenever needed, without being limited to face-to-face class sessions.

Observations conducted throughout the learning process indicated that the implementation of the Project-Based Learning (PjBL) model supported by a digital flipbook fostered a more active and collaborative learning environment. Students actively participated in group discussions, exchanged ideas, developed project completion strategies, and provided constructive feedback on the instructional media

being developed. The learning process was no longer instructor-centered but shifted toward a student-centered approach, in which students became the primary agents in constructing knowledge through authentic learning experiences. This shift demonstrates that the PjBL model provides greater opportunities for students to develop critical thinking, communication, and collaboration skills.

b. Students' Learning Outcomes

The implementation of the Project-Based Learning (PjBL) model supported by a digital flipbook demonstrated that the learning process enabled students to develop conceptual understanding through authentic learning experiences. Throughout the course, students not only studied the theoretical concepts of instructional media but also applied these concepts by developing instructional media projects that addressed specific learning needs. This approach allowed students to connect conceptual knowledge with practical application, resulting in a deeper and more meaningful understanding of the subject matter.

The project completion process required students to identify problems, search for relevant references, design appropriate solutions, develop instructional media products, and evaluate the outcomes of their work. These activities demonstrate that the learning process extended beyond the acquisition of theoretical knowledge to emphasize the application of knowledge in authentic contexts. Consequently, the learning outcomes reflected not only students' cognitive achievement but also their ability to apply conceptual understanding in developing innovative instructional media.

The use of the digital flipbook as an instructional medium also contributed to improving students' learning outcomes. The systematic presentation of learning materials through text, images, videos, and illustrations facilitated students' understanding of abstract concepts. Furthermore, the flexibility of accessing the digital flipbook enabled students to review the course materials both before and after class, allowing learning to extend beyond scheduled classroom sessions. This accessibility provided students with opportunities for self-directed learning at their own pace and according to their individual learning needs.

The implementation results also indicated that students became more confident in developing instructional media products because they had access to learning resources that were readily available throughout the project development process. The digital flipbook served as a comprehensive learning guide, enabling students to understand the stages of instructional media development in a more systematic manner and thereby minimizing errors during the design process

The implementation of the Project-Based Learning (PjBL) model supported by a digital flipbook had a positive effect on students' learning outcomes in the Instructional Media course. This effect was examined by comparing pretest and posttest scores using a paired-samples t-test.

A total of 35 students participated in the study. Descriptive statistical analysis revealed an improvement in students' learning outcomes following the implementation of the PjBL model supported by a digital flipbook. The mean pretest score was 65.43 (SD = 8.52), whereas the mean posttest score increased to 84.76 (SD = 6.41), representing an average improvement of 19.33 points.

Table 1. Statistik date pretest and posttest

Statistik	Pretest	Posttest
Number of Students (N)	35	35
Mean	65,43	84,76
Standard Deviation	8,52	6,41
Minimum Score	48	72
Maximum Score	82	96

The results of the Shapiro–Wilk normality test indicated that both the pretest (p = 0.118) and posttest (p = 0.094) data were normally distributed, as the significance values were greater than 0.05. Therefore, the data met the assumption of normality, and further analysis was conducted using a paired-samples t-test.

The results of the paired-samples t-test showed a statistically significant difference between the pretest and posttest scores, $t(34) = 15.82$, $p < 0.001$. Thus, the hypothesis stating that the implementation of the Project-Based Learning (PjBL) model supported by a digital flipbook has a significant effect on students' learning outcomes was accepted.

Table 2. Result of Paired sample t test

Results of the Paired-Samples t-Test	Nilai
Sampel size (N)	35
Mean Difference	19,33
t-hitung	15,82
Df	34

Sig. (2-tailed)	< 0,001

In addition, the magnitude of the intervention effect was calculated using Cohen's *d*, yielding an effect size of 2.67, which is classified as a very large effect. This finding indicates that the improvement in students' learning outcomes was not only statistically significant but also of substantial practical significance.

Students' learning improvement was further analyzed using the Normalized Gain (N-Gain) index. The analysis revealed a mean N-Gain score of 0.56, which falls within the medium category. The distribution of students across the N-Gain categories is presented below.

Table 3. N-Gain Category

N-Gain category	Number of Students	Percentage
High (>0,70)	10	28,57%
Medium (0,30–0,70)	22	62,86%
Low (<0,30)	3	8,57%

The data indicate that the majority of students experienced medium to high improvements in learning outcomes after participating in learning activities using the Project-Based Learning (PjBL) model supported by a flipbook.

This improvement in learning outcomes can be attributed to students' active engagement in the learning process through project completion, which requires critical thinking, collaboration, communication, and creativity. The use of the flipbook as a digital learning medium also helped students understand the material through a more interactive, well-organized, and easily accessible presentation. The combination of project-based activities and digital media provided students with more meaningful learning experiences, which ultimately contributed to improved conceptual understanding.

The results of the statistical analysis indicate that the implementation of the Project-Based Learning (PjBL) model supported by a flipbook had a significant positive effect on students' learning outcomes. This is evidenced by the increase in the mean score from 65.43 to 84.76, the significant result of the paired-samples t-test $(t(34) = 15.82,\ p < 0.001)$, a Cohen's d effect size of 2.67 (very large), and an average N-Gain score of 0.56 (medium category). These findings demonstrate that the flipbook-assisted PjBL model is effective in improving students' learning outcomes in the Instructional Media course.

The use of the flipbook also contributed to a smoother learning process. The interactive presentation of learning materials through a combination of text, images, illustrations, videos, and digital links enabled students to develop a deeper understanding of the concepts. Students were able to access the materials both before and after class, making the learning process more flexible. Furthermore, the simple navigation features allowed students to locate the information they needed efficiently during project completion. These conditions supported the development of self-directed learning, which is one of the key characteristics of higher education.

During the presentation stage, each group presented the instructional media product they had developed to the lecturer and their classmates. The presentations were followed by discussion sessions, constructive feedback, and evaluations of the products based on criteria such as content relevance, visual design, interactivity, innovation, and their potential for implementation in the teaching and learning process. This activity provided students with the opportunity to develop their academic communication skills while enhancing the quality of their products through feedback from both the lecturer and their peers.

The final stage was learning reflection. The lecturer and students jointly evaluated the overall implementation of the flipbook-assisted Project-Based Learning (PjBL) model. The reflection revealed that students perceived the learning experience as more meaningful because they not only studied the concepts of instructional media theoretically but also applied them directly in the development of instructional media products. Students also reported that the flipbook facilitated their understanding of the course material, helped them follow each stage of the project, and provided convenient access to learning resources throughout the learning process. Meanwhile, the lecturer gained valuable insights into students' competency development, enabling more targeted feedback to support continuous improvement in subsequent learning activities.

Overall, the implementation of the flipbook-assisted Project-Based Learning (PjBL) model demonstrated that integrating project-based learning with digital media can create a more interactive, collaborative, and competency-oriented learning environment. Students not only acquired conceptual knowledge of instructional media but also developed essential skills in designing instructional products,

collaborating in teams, communicating effectively, utilizing digital technology, and solving problems creatively. These findings suggest that the flipbook-assisted PjBL model has considerable potential as an instructional innovation in the Instructional Media course, particularly in supporting the development of the 21st-century competencies required of future professional educators.

c. Student Engagement and Creativity

The implementation of the flipbook-assisted PjBL model fostered a more active learning environment than conventional instructional approaches. Students were actively involved throughout the entire learning process, from the project planning stage to the evaluation of the final outcomes. During the learning activities, they collaborated to determine project themes, allocate responsibilities, search for relevant references, develop instructional media products, and present their work to the lecturer and their classmates.

Student engagement was reflected in the increased intensity of interactions both within project groups and between students and the lecturer. Discussions became more open, as students were encouraged to express their ideas, provide constructive feedback, and collaboratively identify solutions to the challenges encountered during the project development process. The lecturer's role shifted from being the primary source of knowledge to that of a facilitator, providing guidance and feedback, while students assumed the central role in the learning process.

In addition to enhancing student engagement, the implementation of the flipbook-assisted Project-Based Learning (PjBL) model also fostered the development of students' creativity. Each group produced an instructional media product with unique characteristics tailored to the learning objectives, learner characteristics, and the innovations they introduced. Students demonstrated their ability to select appropriate visual designs, determine supporting media, integrate multimedia elements, and organize instructional content systematically to ensure that it was clear, engaging, and easily understood by learners.

The flipbook provided inspiration through interactive examples of instructional media, giving students sufficient references for developing their own ideas. However, rather than simply replicating the available examples, students adapted and refined them by introducing modifications and innovations tailored to the specific characteristics of their projects. This finding indicates that project-based learning fosters creativity through processes of exploration, collaboration, and reflection.

The experience of developing instructional media products also strengthened students' communication, leadership, time management, and problem-solving skills. When challenges arose during the media development process, students engaged in collaborative discussions to identify alternative solutions, enabling the learning process to proceed in a cooperative and constructive manner. These competencies are essential components of the 21st-century skills expected of future professional educators.

d. Students' Responses to the Use of the Flipbook

The implementation results indicated that students responded positively to the use of the flipbook as a supporting learning medium. The flipbook was perceived as more engaging than conventional instructional materials because it integrated text, illustrations, images, videos, and user-friendly navigation. This interactive presentation of content helped students develop a more comprehensive understanding of instructional media concepts.

Students also appreciated the ease of accessing the learning materials through various digital devices. This flexibility enabled them to study the content whenever needed, whether before class, while completing project tasks, or when preparing for presentations. Such accessibility supported self-directed learning and provided students with greater opportunities to deepen their understanding of the course material.

In addition to serving as a learning resource, the flipbook functioned as a practical guide throughout the project implementation process. Information on project procedures, examples of instructional media products, and supporting references helped students complete their projects in a more structured and systematic manner. Consequently, the use of the flipbook not only improved the efficiency of the learning process but also strengthened students' motivation to complete their project assignments.

Nevertheless, several aspects still require attention, particularly the availability of suitable digital devices and stable internet access. In certain situations, technical issues may affect students' ability to access the flipbook smoothly. Therefore, lecturers should prepare alternative methods for storing or distributing instructional materials to ensure that the learning process can continue effectively whenever technical difficulties arise.

5. Discussion

The findings of this study indicate that the integration of the Project-Based Learning (PjBL) model

supported by a flipbook made a positive contribution to the learning process in the Instructional Media course. A student-centered learning approach encouraged students to construct knowledge through direct experience in designing and developing instructional media. This finding is consistent with constructivist learning theory**,** which posits that knowledge is constructed through active interaction between learners and their learning environment.

From a constructivist perspective, students develop a deeper understanding when they engage in authentic learning activities that require exploration, reflection, and problem-solving. Project-Based Learning (PjBL) provides a learning environment that supports this process through collaborative project completion. Rather than passively receiving information from the lecturer, students actively construct their own knowledge through investigation, decision-making, and evaluation of the products they develop.

These findings are consistent with the study by Kokotsaki et al**.**, which reported that PjBL enhances student engagement by orienting learning toward the resolution of real-world problems. Similarly, Chen and Yang found that PjBL contributes to improvements in critical thinking, collaboration, and learning outcomes compared with conventional instructional approaches. The consistency of these findings suggests that project-based learning provides more meaningful learning experiences by enabling students to integrate knowledge, skills, and attitudes within a unified sequence of learning activities.

The role of the flipbook as a digital learning medium further enhanced the effectiveness of the PjBL implementation. Its interactive presentation of learning materials enabled students to understand concepts more easily, while its flexible accessibility supported self-directed learning. These findings are consistent with the studies by Rahmawati et al. and Hidayat et al., which reported that flipbooks can improve learning motivation, digital literacy, and conceptual understanding through engaging and easily accessible instructional content.

The novelty of this study lies in the integration of the Project-Based Learning (PjBL) model with a flipbook in the Instructional Media course. Unlike previous studies, which generally examined the effectiveness of either PjBL or flipbooks separately, this study demonstrates that combining the two has the potential to create a more comprehensive learning experience. Students not only benefited from project-based learning but were also supported by a digital learning medium that facilitated independent, collaborative, and continuous learning.

From a practical perspective, the findings suggest that lecturers can adopt the flipbook-assisted PjBL model as an alternative instructional strategy to enhance the quality of learning in higher education. The implementation of this model not only supports the achievement of course learning outcomes but also prepares students to become future educators who are capable of utilizing digital technology creatively and innovatively in instructional practice.

6. Conclusion

This study demonstrates that the implementation of the Project-Based Learning (PjBL) model supported by a flipbook is an effective instructional innovation for the Instructional Media course in higher education. The integration of project-based learning with interactive digital media creates a more student-centered learning environment, enabling students to gain meaningful learning experiences through exploration, collaboration, problem-solving, and the development of instructional media products. Furthermore, the use of the flipbook as a digital learning resource provides convenient access to instructional materials, enhances learning flexibility, and supports the implementation of projects in a more systematic and structured manner.

The implementation of the Project-Based Learning (PjBL) model supported by a flipbook had a positive impact on improving students' learning outcomes, promoting active engagement throughout the learning process, and fostering creativity in designing innovative instructional media. Students not only mastered the theoretical concepts of instructional media but also demonstrated the ability to apply this knowledge in developing products that meet the demands of 21st-century learning. Furthermore, the use of the flipbook enhanced students' learning motivation, self-directed learning, digital literacy, and communication and collaboration skills throughout the project implementation process.

From a theoretical perspective, this study reinforces the body of literature on the effectiveness of integrating project-based learning with digital learning media to support the development of 21st-century competencies. From a practical standpoint, the findings provide lecturers with an alternative instructional strategy for enhancing the quality of learning in the Instructional Media course as well as in other courses that emphasize product development. Nevertheless, this study is limited by the scope of its participants and the specific context in which it was conducted; therefore, the findings cannot yet be generalized broadly. Future research is recommended to involve a larger sample size, employ comparative or

experimental research designs, and integrate other forms of digital learning technologies to provide a more comprehensive understanding of the effectiveness of technology-based instructional innovations in higher education.

Bibliography

Almulla, M. A. (2020). The effectiveness of the Project-Based Learning (PBL) approach as a way to engage students in learning. *SAGE Open, 10*(3), 1–15. https://doi.org/10.1177/2158244020938702

Chen, C. H., & Yang, Y. C. (2021). Revisiting the effects of project-based learning on students' academic achievement: A meta-analysis investigating moderators. *Educational Research Review, 33*, 100395. https://doi.org/10.1016/j.edurev.2021.100395

Guo, P., Saab, N., Post, L. S., & Admiraal, W. (2020). A review of project-based learning in higher education: Student outcomes and measures. *International Journal of Educational Research, 102*, 101586. https://doi.org/10.1016/j.ijer.2020.101586

Hidayat, T., Suryani, N., & Wibowo, A. (2024). Interactive flipbook as a digital learning media to improve students' engagement in higher education. *International Journal of Instruction, 17*(1), 415–432.

Kokotsaki, D., Menzies, V., & Wiggins, A. (2016). Project-based learning: A review of the literature. *Improving Schools, 19*(3), 267–277. https://doi.org/10.1177/1365480216659733

Mayer, R. E. (2021). *Multimedia learning* (3rd ed.). Cambridge University Press.

Nurbaiti, N., Sari, D. P., & Putra, A. R. (2023). Development of interactive flipbook-based learning media in higher education. *Journal of Education and Learning, 17*(2), 215–226.

Prastowo, A. (2021). *Pengembangan bahan ajar digital*. Kencana.

Rahmawati, L., Hidayat, A., & Susanto, E. (2022). The effectiveness of flipbook-based digital teaching materials in improving students' learning motivation. *Jurnal Pendidikan Teknologi dan Kejuruan, 28*(2), 145–156.

Rusman. (2022). *Model-model pembelajaran: Mengembangkan profesionalisme guru* (Edisi revisi). Rajawali Pers.

Sugiyono. (2023). *Metode penelitian kuantitatif, kualitatif, dan R&D* (Edisi ke-2). Alfabeta.

UNESCO. (2023). *Global education monitoring report 2023: Technology in education—A tool on whose terms?* UNESCO Publishing. https://unesdoc.unesco.org/

Widodo, A., & Nurhayati, S. (2023). Digital learning innovation through flipbook media in higher education. *Jurnal Pendidikan Indonesia, 12*(4), 567–579.

Yulianti, D., & Kurniawan, R. (2024). Project-based learning assisted by digital media to improve students' creativity and critical thinking skills. *Journal of Educational Technology, 18*(1), 33–47