

DEVELOPMENT OF A HYPERMEDIA LEARNING MODEL TO IMPROVE STUDENT ENGAGEMENT AND LEARNING OUTCOMES

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Abstract

This study aims to develop and evaluate a hypermedia-based learning model designed to improve student engagement and learning outcomes in the context of legal education at the IBLAM Law School, Jakarta, using a Research and Development (R&D) approach, adapting the Borg and Gall, Dick & Carey, Allesy & Trollip, and Rowntree models, which include the stages of needs analysis, design, development, expert validation, limited testing, and field implementation. Participants consisted of undergraduate law students in their fourth to sixth semesters. Data were collected through questionnaires, learning achievement tests, expert validation forms, and observation checklists. Quantitative data were analysed using descriptive statistics and paired sample t-tests, while qualitative data were analysed thematically. The results of the study show that the developed hypermedia learning model, which integrates text, video lectures, interactive simulations, and links to legal resources, achieved a high level of validity according to media and content experts. Empirical results show a significant increase in student engagement (from moderate to high) and a 30.98% increase in learning outcomes after implementation.

Keywords: Hypermedia Learning, Student Engagement, Learning Outcomes, Digital Pedagogy, Tax Law

INTRODUCTION

In recent years, higher education institutions around the world have undergone profound changes driven by digital technology, evolving student expectations, and the demands of a rapidly changing professional environment. Traditional teaching approaches in legal education, often characterised by didactic lectures, limited interaction, and passive student roles, have been increasingly criticised for their lack of support for deep learning, low levels of student engagement, and suboptimal learning outcomes. (Caroline Coles, 2009)

On the other hand, educational technology, particularly multimedia and hypermedia learning environments, offers new opportunities to transform pedagogy. According to the Cognitive Theory of Multimedia Learning (CTML), learners process verbal and visual information through separate channels, and meaningful learning occurs when they are guided to select, organise, and integrate these representations (Richard E. Mayer, 2017).

In the Indonesian context, and more specifically at the IBLAM College of Law (Jakarta), there is an increasingly urgent need to modernise teaching methods in law faculties. The shift towards digital learning has been accelerated by external factors such as the COVID-19 pandemic, student expectations for flexibility, and institutional goals to improve the quality and relevance of education. Student engagement is widely recognised as a critical component of effective learning at the higher education level. Engagement is often conceptualised as comprising behavioural, emotional/affective, and cognitive dimensions (Julie A. Fredricks, Blumenfeld & Paris, 2004). The behavioural dimension includes participation in learning activities, effort, and persistence. The emotional dimension includes interest, enjoyment, sense of belonging, and motivation. The cognitive dimension includes investment in learning, self-regulation, and higher-order thinking (Fredricks et al., 2004; Kahu, 2013).

In the field of legal education, Coles (2009) found that students appreciate the flexibility of technologies such as wikis and recorded lectures, but technological skills and emotional factors (e.g., fear of posting) limit their full engagement. Technology alone does not guarantee engagement; alignment with pedagogy, student readiness, and gradually structured activities also play an important role. (Kocaoglan, 2023). Although engagement is a predictor of better outcomes, design features (non-linear navigation, branching scenarios, embedded quizzes) are particularly important in the context of hypermedia (Cassano et al., 2022).

Problem Statement

1. How to develop a website-based learning model for Tax Law courses using hypermedia at STIH IBLAM?
2. What is the feasibility of a website-based Tax Law course learning model using hypermedia at STIH IBLAM?

3. How effective is the website-based Tax Law course learning model using hypermedia at STIH IBLAM?

DISCUSSION

Learning Design

This study follows ten stages adapted from Borg & Gall (1983), with the integration of the Dick & Carey design model and the Alessi–Trollip–Rowntree principles at the relevant stages:

1. Needs Analysis and Problem Identification, conducted through interviews with lecturers and surveys among law students to identify learning difficulties, engagement issues, and digital readiness. The needs analysis showed that students required case-based interactive materials that supported independent learning.
2. Literature Review and Model Conceptualisation: A comprehensive literature review on hypermedia learning, engagement theory (Fredricks et al., 2004), and learning outcome frameworks formed the basis of the conceptual model.
3. Initial Product Design Development (Instructional Design Stage), adopting the Dick & Carey (2005) model to design learning objectives, instructional strategies, and assessment tools. This includes task analysis, learner analysis, performance objectives, and instructional activity sequences.
4. Prototype Development (Hypermedia Structure Design), the hypermedia model structure includes text, video lectures, a legal document database, case simulations, discussion forums, and interactive quizzes. Navigation follows non-linear logic to support independent exploration.
5. Expert Validation (Content, Media, and Pedagogy), Validation is carried out by three experts in instructional technology, legal education, and multimedia design. Each expert evaluates the accuracy of the content, the appropriateness of the instructional design, and usability aspects.
6. First Revision (Based on Expert Input), revisions are made to improve interactivity, navigation flow, and content integration consistency.
7. Hypermedia Web Development and Testing, Using the Alessi & Trollip (2001) and Rowntree (1994) frameworks for the digital production process. Alessi & Trollip: using their three phases of Planning, Design, and Development to manage media creation, user interface layout, and interactivity.
8. Rowntree: emphasises content mapping, user flow design, and formative evaluation during the writing process. Tools such as HTML5, PHP, and multimedia installation are used to build an adaptive web interface that is compatible with mobile and desktop devices.
9. Limited Field Trial (Pilot Study), the prototype was implemented in one law course with one-to-one instruction, followed by small groups of nine students for two weeks. Data collected included engagement observations, user experience feedback, and pre-test and post-test learning scores. Product Revision (Based on Pilot Study Results), adjustments included improving load times, adding discussion prompts, and refining the visual layout based on user feedback.
10. Final Field Test and Evaluation, conducted on a larger group of 30 students in three courses. Data analysis used paired sample t-tests and descriptive statistics to measure effectiveness in improving engagement and learning outcomes.

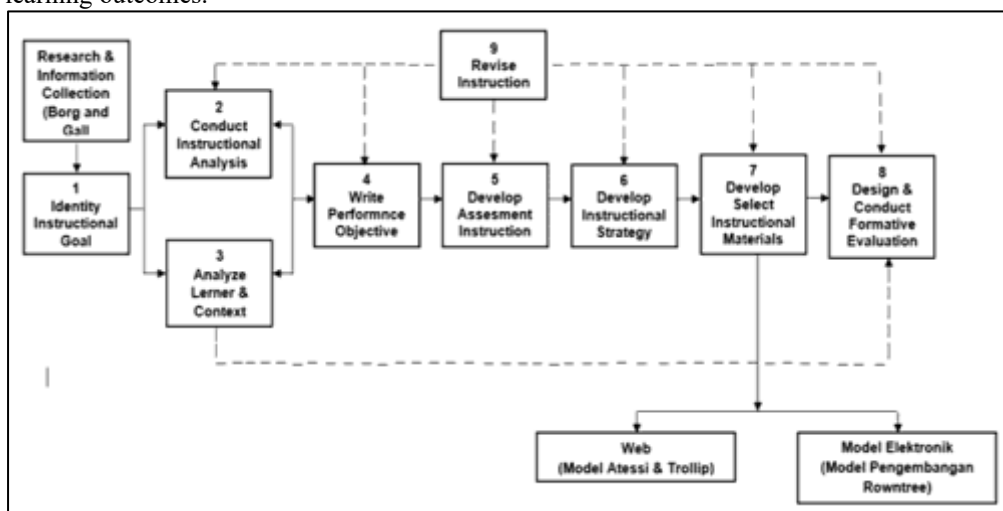


Figure 1. Developed Learning Model

RESULTS

The Hypermedia Learning Model (HLM) developed underwent three stages of validation: content, instructional design, and multimedia. Content validation resulted in an average score of 4.45/5.00 (highly valid), indicating strong alignment with the legal education curriculum and case-based pedagogy. Instructional design validation achieved 4.85/5.00, confirming that the model follows solid pedagogical principles based on the Dick and Carey

system. Multimedia validation, evaluated through usability and interface design (Alessi & Trollip criteria), scored 4.77/5.00, reflecting high functionality, intuitive navigation, and attractive visuals.

Qualitative comments from experts suggest that the inclusion of legal case simulations, integrated links to national legal databases, and scenario-based assignments provide an authentic and meaningful learning experience for law students. These results are consistent with the findings of Mousa and Radif (2024), who reported that a multimedia-rich simulation-based hypermedia environment significantly improves students' motivation and problem-solving skills in higher education.

The involvement of nine students was measured using a 20-item questionnaire adapted from Fredricks, Blumenfeld, and Paris (2004), obtaining an average score of 4.79/5.00, while the field trial obtained a learning score of 93.85/100.00, an increase of 30.98%. To evaluate effectiveness, an effectiveness test was conducted using a t-test. The results showed that the calculated value was 14.13 with a p-value of 0.00000000156 (highly significant), so that $p < 0.05$. Thus, it can be concluded that there was a significant increase in students' understanding of tax law after they used the Web Hypermedia-based Tax Law Course learning model. These findings reinforce previous meta-analyses by Nkomo et al. (2021) and Getenet et al. (2024), who observed that learner interaction and self-confidence in technology-mediated learning environments are strong predictors of engagement.

The integration of Borg & Gall's R&D process, Dick & Carey's instructional design system, and Alessi & Trollip–Rowntree's web development framework resulted in a technologically advanced, pedagogy-based hypermedia model. Three key findings emerged: (1) Pedagogical Effectiveness. This model facilitates active and independent learning in line with constructivist principles. Students are engaged in solving authentic legal problems, consistent with Goodyear's (2023) findings, which highlight that interactivity and control over learning enhance higher-order thinking; (2) Technological Impact and Ease of Use. The application of Alessi & Trollip and Rowntree's principles ensures high-quality multimedia integration, intuitive interface design, and adaptive web navigation. Similar to Kim et al. (2024), the use of responsive hypermedia improves accessibility and maintains learners' attention. (3). The Relationship Between Behavioural and Cognitive Engagement. The strong correlation between engagement and achievement supports the findings of Fredricks et al. (2004) and confirms that emotional and cognitive engagement act as mediators between technology use and performance outcomes.

CONCLUSION

These findings emphasise that the hypermedia learning environment is not merely a digital enhancement, but rather a transformative pedagogical tool that changes the way legal education can be delivered. By enabling students to navigate complex case materials interactively, this model promotes analytical reasoning and engagement simultaneously.

This study successfully developed and validated the Hypermedia Learning Model (HLM), which integrates pedagogical design principles and multimedia technology to enhance student engagement and learning outcomes at IBLAM Law School. By combining the research and development framework of Borg & Gall (1983), Dick & Carey's (2005) systematic instructional design, and Alessi & Trollip's (2001) web-based design framework together with Rowntree (1994), the resulting model has pedagogical reliability, technological adaptability, and contextual relevance in legal education.

Empirical results reveal three main conclusions. First, HLM proved to be highly valid and reliable, with strong expert validation scores in content accuracy, instructional coherence, and multimedia quality. Second, this model significantly increased student engagement in behavioural, emotional, and cognitive dimensions, confirming that interactive and independent digital learning environments encourage deeper engagement and motivation. Third, this model resulted in a 30.98% increase in learning outcomes, particularly in legal reasoning, case analysis, and conceptual understanding, indicating that hypermedia design supports both understanding and higher-order thinking skills.

The integration of non-linear navigation, embedded legal databases, and simulation-based case learning creates a learning ecosystem that reflects real-world legal analysis and decision-making. These findings support previous research (Fredricks et al., 2004; Mayer, 2009; Getenet et al., 2024) emphasising the synergy between engagement, cognitive processing, and multimedia-supported learning.

Overall, this study affirms that hypermedia is not merely a technological tool, but rather a transformative pedagogical approach that redefines how law students learn, interact, and construct knowledge. The Hypermedia Learning Model can serve as a scalable blueprint for other higher education institutions seeking to modernise their teaching and learning strategies through digital transformation.

Further Research

Further studies should examine: (1) Long-term retention and transfer of knowledge acquired through hypermedia learning; (2) Comparative analysis between hypermedia and other technology-based learning models (e.g., gamification, augmented reality); (3) The role of digital literacy and technology effectiveness as mediating factors in student engagement and achievement.

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