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DEVELOPMENT OF A WEB-BASED ECONOMICS LEARNING SYSTEM TO INTEGRATE FINANCIAL AND DIGITAL LITERACY FOR ENHANCING CRITICAL THINKING SKILLS

N. NOFRIANSYAH1, EENG AHMAN[1,*], NETI BUDIWATI[1], RAFIKA RAHMADANI[2], ENDANG SUPRIATNA[3], CHANDRA HENDRIYANI[4], FAHMI JAHIDAH ISLAMY[1], CHIENTYA ANNISA RAHMAN PUTRIE[5]

[1] Universitas Pendidikan Indonesia, Bandung, Indonesia
[2] Universitas Nurul Huda, Palembang, Indonesia
[3]Universitas Linggabuana PGRI Sukabumi, Sukabumi, Indonesia
[4]Universitas Taruna Bakti, Bandung, Indonesia
[5] Universitas Panca Sakti Bekasi, Bekasi, Indonesia
*Corresponding Author: eengahman@upi.edu

Abstract

This study developed and evaluated a web-based economics learning system designed to integrate financial literacy and digital literacy in order to enhance students' critical thinking skills. The study was motivated by the demands of the Society 5.0 era and the limited availability of comprehensive digital learning platforms in economics education. A Design and Development Research (DDR) approach was employed, complemented by an experimental design to examine the system's effectiveness. The platform was implemented with undergraduate Economics Education students, and data were collected through critical thinking tests, validation instruments, and user feedback questionnaires. The results demonstrated a statistically significant improvement in critical thinking skills among students in the experimental group compared to those receiving conventional instruction. Students also reported positive perceptions regarding system usability and learning support. These findings indicate that integrating financial and digital literacy within a web-based learning environment can effectively foster higher-order thinking skills and support pedagogical transformation in higher education.

Keywords: Critical thinking skills, Digital literacy, EcoLearn, Financial literacy, Web-based learning.

1. Introduction

The development of information technology in the Society 5.0 era demands that higher education institutions develop economics learning models that not only transfer knowledge but also equip students with 21st-century skills such as digital literacy and financial literacy, which are crucial in facing contemporary digital economic challenges [1, 2]. Web-based learning provides opportunities for students to access materials flexibly, interactively, and contextually through various digital media, which in turn can enhance students' competence in addressing real economic issues and making rational decisions [3].

The integration of financial literacy into economics education is important because it helps students understand financial resource management and make wise personal economic decisions, while digital literacy supports students' ability to evaluate and manage digital information effectively in academic and professional contexts [4]. Educational literature indicates that combining digital learning with specific literacies can strengthen students' critical thinking skills, a crucial competency in today's higher education curriculum [5-7]. Previous studies showed relevance to the development of web-based learning, digital and financial literacy, and the enhancement of critical thinking skills, serving as the theoretical and empirical foundation for this research [8-10].

This study aims to develop and evaluate EcoLearn, a web-based economics learning system designed to integrate financial literacy and digital literacy in order to enhance students' critical thinking skills in higher education. Utilizing the Design and Development Research (DDR) approach, the research involves needs analysis, system design, development, validation, and effectiveness evaluation. The novelty of this research lies in three main aspects: (i) integrating financial and digital literacy into a unified learning platform; (ii) employing DDR to yield both a practical product and evidence-based design principles; and (iii) empirically focusing on critical thinking improvement as a primary outcome, an area underexplored in prior web-based economics education research.

2. Literature Review

The rapid advancement of digital technology has driven significant transformations in education learning systems [11], particularly in economics education. Recent studies indicate that web-based learning systems enhance flexibility, accessibility, and student-centred learning environments [12, 13]. Digital learning platforms have been shown to improve learning effectiveness through interactive content delivery, real-time feedback, and support for self-regulated learning [14]. However, most existing web-based economics learning systems remain primarily focused on content delivery and technical features, with limited explicit emphasis on fostering higher-order thinking skills, especially critical thinking [15-17].

Financial literacy and digital literacy are essential competencies for university students navigating complex modern economies and technological change [18, 19]. Financial literacy enhances the ability to analyse information and make sound economic decisions, while digital literacy involves critical thinking in using technology and evaluating digital content [20]. Integrating both into digital learning has been shown to improve analytical and decision-making skills [21]. However, research on unified web-based systems that combine both literacies in higher economics education remains limited.

Critical thinking is an important aspect [22]. Specifically, it is a core learning outcome in economics education, as it enables students to evaluate economic phenomena, interpret data, and construct logical, evidence-based arguments [23, 24]. Technology-enhanced learning environments have been proven effective in developing critical thinking when designed using problem-based learning, inquiry-oriented approaches, and reflective activities [25, 26]. Therefore, there is a growing need for web-based learning systems in economics education that are intentionally designed to integrate financial literacy, digital literacy, and critical thinking development holistically.

The EcoLearn platform employs a client-server architecture to unify financial and digital literacy within economics education (Fig. 1). This system delivers tailored learning materials, interactive activities, and assessments designed to strengthen critical thinking. User requests are processed by the server, which pulls content from a database and adapts it to individual learning objectives. The returned content fosters an engaging environment that develops students' analytical and problem-solving skills.

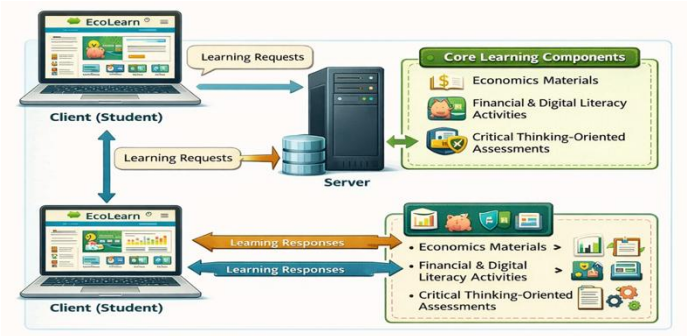

Fig. 1. A client-server system based on web-based adaptive digital learning.

3. Methodology

This study employed the DDR method to design, develop, and evaluate EcoLearn, a web-based system aimed at enhancing students' critical thinking skills through integrated financial and digital literacy. Conducted with undergraduate Economics Education students selected via purposive sampling, the research followed DDR stages: analysing student needs, designing and developing the platform around contextual economic problems, and evaluating its effectiveness, feasibility, and practicality. Data were collected using literacy questionnaires, expert validation instruments, critical thinking tests, and student feedback, then analysed through descriptive and inferential statistics to assess the system’s impact.

4. Results and Discussion

Figure 2 illustrates the development workflow for EcoLearn, a web-based economics learning platform that integrates financial and digital literacy. The process encompasses needs analysis, content preparation, design, development, feature integration, and testing, culminating in publication. Quality checkpoints at each stage ensure content integrity and system functionality before deployment.

Fig. 2. Flowchart of EcoLearn Web-Based applications.

The development of EcoLearn successfully resulted in a web-based economics learning system that integrates financial literacy and digital literacy to enhance students' critical thinking skills (Fig. 3). The system provides structured modules, contextual case studies, interactive resources, and assessments that encourage the analysis of economic phenomena and evidence-based argumentation. Evaluation results showed positive student feedback regarding ease of navigation, the system's benefits in supporting independent learning, and deeper conceptual understanding.

EcoLearn was implemented with economics education students through an experimental design involving experimental and control groups. The results showed a substantial improvement in students' critical thinking skills in the experimental group after using EcoLearn, compared to those receiving conventional instruction. Statistical analysis using a paired sample t-test revealed a significant increase in critical thinking scores within the experimental group ($p < 0.05$), while an independent sample t-test confirmed significant differences between the experimental and control groups. These findings demonstrate that EcoLearn is effective in fostering critical thinking skills by integrating financial literacy and digital literacy into web-based economics learning. The results support the notion that technology-enhanced, literacy-integrated learning environments can strengthen students' ability to critically evaluate economic issues, analyse data, and make reasoned decisions, thereby contributing to more meaningful and higher-quality learning outcomes in economics education.

The findings show that EcoLearn effectively enhances students' critical thinking skills, as reflected in improved mean scores and moderate-to-high normalized gains. Contextual, web-based economics learning that integrates financial and digital literacy promotes higher-order thinking, particularly students' analytical, evaluative, and decision-making abilities in economic contexts [27, 28].

By integrating financial and digital literacy, EcoLearn enhances students' analytical skills, risk evaluation, information credibility assessment, and rational decision-making. In line with prior studies, EcoLearn supports pedagogical transformation in higher education by fostering critical thinking skills required in the digital economy [29]. Finally, this adds new information regarding economic education as reported elsewhere [30-35].

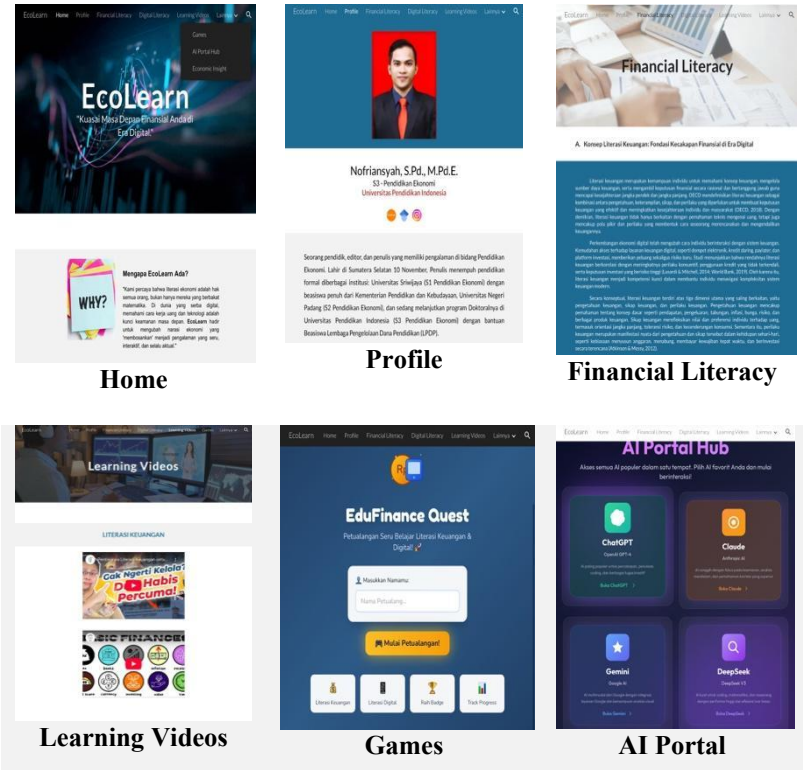

Fig. 3. EcoLearn application product.

5. Conclusion

This study designed, developed, and evaluated a web-based economics learning system that integrates financial literacy and digital literacy to enhance students' critical thinking skills. Using a DDR approach combined with an experimental design, the system demonstrated a significant improvement in students' critical thinking performance compared to conventional learning methods. Students also reported positive perceptions regarding system usability and learning support. These findings indicate that integrating multiple literacies within a technology-enhanced learning environment can effectively promote higher-order thinking skills. The developed system provides practical design insights for implementing web-based economics learning that supports analytical and decision-making competencies in higher education.

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