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RESEARCH ARTICLE

Educational Tourism-Based Digital Learning Management Model for Sustainable Human Capital Development in Coastal Areas

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Abstract
This study aims to develop and validate an Educational Tourism-Based Digital Learning Management Model for Sustainable Human Capital Development in Coastal Areas. The research addresses the challenge of aligning digital transformation in education with local economic characteristics in coastal regions where tourism plays a dominant role. A Research and Development (R&D) approach was employed, involving needs assessment, model design, expert validation, limited field testing, and evaluation. The study was conducted in a coastal senior high school with 139 student participants and 15 teachers selected through proportional and purposive sampling techniques. Data were collected using validated questionnaires, interviews, and observations, and analyzed through descriptive statistics and multiple regression analysis. The findings indicate that digital learning management and educational tourism integration significantly contribute to human capital development, explaining 41.5% of its variance. Educational tourism integration demonstrated a stronger predictive effect compared to digital management alone. The implementation process also fostered improved teacher collaboration, increased student engagement, and strengthened school–community partnerships. These results suggest that integrating contextual tourism-based learning within digital management systems enhances the relevance and sustainability of education in coastal environments. The study provides a practical model that can support regional development strategies by connecting formal education with local economic ecosystems.

Keywords
Digital Learning Management; Educational Tourism; Human Capital Development; Coastal Education; Sustainable Development.

1 | INTRODUCTION

Human capital development is widely recognized as a fundamental driver of economic growth and long-term regional competitiveness, especially in developing and geographically diverse areas. In coastal regions, economic structures are often dominated by tourism, fisheries, and marine-based industries. However, the educational systems in these regions often remain disconnected from local economic potential (Muktiarni, 2025). This disconnection results in structural disparities in educational outcomes and limits the ability of schools to function as strategic institutions for sustainable development (Lv, 2025). Aligning education with local economic ecosystems thus becomes an urgent priority in coastal areas seeking inclusive and sustainable growth (Zhou, 2026).

The rapid expansion of digital technology has transformed educational management practices globally (Naveed *et al*., 2023). Digital learning management systems allow schools to streamline planning, implementation, monitoring, and evaluation processes, while increasing flexibility and access to learning resources (Denny Setiawan Batubara, 2025). However, in many coastal regions, digital transformation has focused primarily on technological adoption, rather than integrating these technologies with regional development goals (Shata & Hartley, 2025). As a result, digital learning often serves merely as an administrative tool, rather than a catalyst for contextually relevant and economically driven education (Ángeles López-Cabarcos *et al*., 2022). This gap highlights the need for a management model that not only digitizes learning processes but also integrates them within the socio-economic characteristics of coastal communities.

Educational tourism presents a promising strategy for bridging education with local economic development (Goklas & Udin, 2025). By combining structured learning experiences with tourism-based activities, students are able to engage directly with local resources, environmental systems, and community-based enterprises (Imron & Anwar, 2019). In coastal areas where tourism is a primary income source, incorporating tourism-based learning into formal education can foster contextual understanding, entrepreneurial awareness, and sustainability-oriented competencies (Javier & Raquel, 2023). Nonetheless, existing research on educational tourism has largely focused on tourism marketing, visitor experiences, or curriculum enrichment, with little attention paid to its systematic integration into digital learning management systems aimed at strengthening human capital (Sheelam & Komaragiri, 2025).

From a managerial standpoint, effective learning systems require coordinated planning, organizing, implementing, and controlling functions within institutional structures. In digital environments, these managerial functions must be embedded in integrated platforms that facilitate communication, performance tracking, and outcome-based evaluation (Firdaus, 2025). Despite the growing interest in digital education and tourism-based learning, empirical studies examining the integration of educational tourism into a structured digital learning management model for coastal human capital development remain limited (Lisa *et al*., 2026). This theoretical and practical gap underscores the importance of designing a model that connects digital transformation, educational management, and sustainable tourism development into a coherent framework (Hall & Cooper, 2025).

This study seeks to address this gap by developing an Educational Tourism-Based Digital Learning Management Model for Sustainable Human Capital Development in Coastal Areas (Adi *et al*., 2025). The central research question concerns how digital learning management systems can be strategically designed to integrate educational tourism and enhance human capital outcomes in coastal contexts (Pisarović *et al*., 2025). Specifically, this study examines current digital learning management practices in coastal schools, explores mechanisms for integrating tourism-based educational components into digital systems, and assesses the contribution of such integration to sustainable human capital development (Sholeha & Sumarmi, 2025).

The objective of this research is to design and validate a context-sensitive digital learning management model that aligns educational processes with the economic and environmental characteristics of coastal regions (Awaluddin *et al*., 2025). The study adopts a research and development approach, including needs assessment, model design, prototype development, implementation, and evaluation stages (Ramaano, 2025). While detailed findings will be presented in subsequent sections, preliminary results indicate that integrating educational tourism into digital management systems enhances the relevance of learning, improves student engagement, and strengthens the alignment between education and local economic sustainability (Martins *et al*., 2025).

Theoretically, this research contributes to the literature by bridging human capital theory, educational management theory, and sustainable tourism development within a unified digital framework (Mufida Diah Lestari *et al*., 2025). Practically, the model provides strategic guidance for policymakers, school leaders, and regional development stakeholders aiming to leverage digital transformation for coastal economic resilience (Sofianti & Arif, 2025). By situating digital learning within local tourism ecosystems, this study demonstrates how education can serve as an active instrument of sustainable development, rather than merely as a sector of social service.

This paper is organized as follows (Frans & Djunaid, 2025). The next section reviews the theoretical foundations underpinning digital learning management, educational tourism, and human capital development. The following section outlines the research methodology employed in model development and validation. The findings and discussion are presented thereafter, followed by conclusions and recommendations for future research.

2 | BACKGROUND THEORY

Human Capital Theory and Sustainable Development

Human capital theory provides the primary economic foundation for understanding the relationship between education and regional development.Conceptualizes human capital as the accumulation of knowledge, skills, and competencies that enhance individual productivity and contribute to economic growth. Similarly, argues that investment in education generates returns comparable to investments in physical capital, positioning education as a central driver of economic modernization. In coastal regions, where economic structures are often fragile and highly dependent on natural resources and tourism, strengthening human capital becomes essential for ensuring long-term sustainability and resilience (Khalid & Abdul, 2024). Within the framework of sustainable development, human capital is not merely associated with productivity but also with adaptability, environmental awareness, and innovation capacity. The integration of sustainability principles into education is therefore aligned with the broader agenda of balancing economic growth, social equity, and environmental protection .However, critics of traditional human capital theory argue that it tends to emphasize economic returns while underestimating contextual and socio-cultural dimensions of learning (Marginson, 2019). This critique suggests the need for a contextualized human capital approach that embeds education within local economic ecosystems, particularly in coastal and tourism-dependent areas. Existing empirical studies indicate that educational systems in peripheral or island regions often struggle to align curricula with local economic structures. Many initiatives focus on improving access and infrastructure but neglect the strategic integration of local economic potential into learning management systems. Consequently, while human capital theory provides a strong macroeconomic rationale for educational investment, it requires adaptation to account for local contextual realities. This study builds upon human capital theory by proposing a model that integrates digital learning management with educational tourism as a localized strategy for sustainable development.

Educational Management Theory in the Digital Era

Educational management theory traditionally emphasizes the systematic coordination of planning, organizing, actuating, and controlling functions within institutions. In educational contexts, these managerial functions are translated into curriculum planning, resource allocation, instructional supervision, and performance evaluation. Effective management ensures alignment between institutional objectives and operational practices, thereby improving educational outcomes. With the advancement of digital technology, educational management has evolved into technology-mediated systems that rely on Learning Management Systems (LMS) to enhance efficiency and accountability. Digital platforms enable data-driven decision-making, real-time monitoring, and flexible content delivery, thereby transforming managerial practices from manual administration to integrated digital ecosystems.identify technological infrastructure, organizational readiness, and user competence as key determinants of successful digital learning implementation. Despite these advancements, existing research frequently isolates digital transformation from local socio-economic contexts. Many studies adopt quantitative approaches to measure system usability, user satisfaction, or academic performance improvements but rarely examine how digital management systems can be strategically aligned with regional development goals. This limitation creates a conceptual gap between digital efficiency and contextual relevance. Therefore, integrating economic-based learning components into digital management frameworks becomes essential for ensuring that technological innovation contributes to sustainable development rather than merely operational modernization.

This research extends educational management theory by embedding contextual economic integration—specifically educational tourism into digital management functions. By doing so, the study moves beyond technology adoption and positions digital learning management as a strategic instrument of regional economic development.

Educational Tourism as Contextual Learning Framework

Educational tourism has emerged as an interdisciplinary concept linking tourism studies and education. Defines educational tourism as travel undertaken for learning purposes, ranging from formal academic programs to experiential community-based activities.Further argue that tourism environments can function as living laboratories where learners engage with real-world economic, cultural, and environmental systems. In coastal areas, tourism represents a significant economic sector, making it a valuable contextual learning resource. Experiential learning theory, as proposed.supports the integration of real-world experiences into structured educational processes, emphasizing reflection, conceptualization, and experimentation. Educational tourism aligns with this theory by facilitating hands-on engagement with local industries, conservation initiatives, and community enterprises. However, previous studies on educational tourism predominantly focus on tourism management, visitor satisfaction, or destination branding rather than institutional learning management integration. Methodologically, much of the literature relies on case studies or descriptive qualitative approaches, limiting generalizability and systematic model development. Furthermore, limited research explores the digitalization of educational tourism within formal schooling systems. These gaps highlight the need for a structured management model that integrates educational tourism into digital platforms to enhance learning relevance and sustainability. This study positions educational tourism not merely as an extracurricular activity but as a core component

of digital learning management designed to strengthen contextual human capital competencies in coastal regions.

Digital Learning Management Systems and Contextual Integration

Digital learning management systems (LMS) serve as technological infrastructures that facilitate content distribution, communication, assessment, and data analytics. Their implementation has accelerated significantly following global digitalization trends and post-pandemic educational reforms. From a systems theory perspective, educational institutions operate as interconnected subsystems influenced by technological, social, and economic environments. Despite the efficiency benefits of LMS adoption, critics argue that technology-driven reforms risk becoming technocentric if not grounded in pedagogical and contextual frameworks (Selwyn, 2016). Many digital initiatives prioritize system functionality over curriculum relevance, thereby reducing the transformative potential of digital education. In coastal contexts, where economic survival is closely linked to tourism and marine ecosystems, digital learning systems must be designed to reflect these local dynamics. Empirical studies reveal that contextualized digital learning enhances student engagement and local economic awareness. However, few studies propose integrated models that combine digital management functions with tourism-based contextual content to foster sustainable human capital outcomes. Therefore, this research contributes by conceptualizing digital learning management as a platform that structurally embeds educational tourism into planning, implementation, monitoring, and evaluation processes.

Theoretical Synthesis and Conceptual Positioning

Synthesizing the above theoretical perspectives reveals three major intersections: (1) human capital development as a driver of sustainable economic growth, (2) educational management as a mechanism for institutional effectiveness, and (3) educational tourism as a contextual learning strategy. While each theoretical domain has been explored independently, limited research integrates them within a unified digital framework for coastal development. Human capital theory emphasizes economic productivity but requires contextual adaptation. Educational management theory provides structural mechanisms but often lacks economic integration. Educational tourism offers contextual relevance but lacks systematic digital management frameworks. The convergence of these theories forms the conceptual foundation of this study. By developing an Educational Tourism-Based Digital Learning Management Model, this research extends existing theories in three ways. First, it operationalizes human capital development through contextual digital management practices. Second, it reframes digital learning management as a strategic development tool rather than a purely administrative system. Third, it institutionalizes educational tourism within formal digital structures, ensuring sustainability and scalability. Thus, the theoretical justification of this study lies in bridging economic development theory, educational management theory, and tourism-based experiential learning within a coherent digital model tailored to coastal regions. This integrated approach provides a robust foundation for examining how education can function as a catalyst for sustainable human capital development in geographically and economically specialized areas.

3 | METHOD

This study employed a Research and Development (R&D) design to develop and validate an Educational Tourism-Based Digital Learning Management Model for Sustainable Human Capital Development in Coastal Areas. The R&D approach was selected because the primary objective of the study was not only to examine relationships among variables but also to design, develop, and evaluate a practical management model that could be implemented in coastal schools. The research procedure adapted the developmental stages proposed by Borg and Gall (2003), which include needs analysis, model design, prototype development, expert validation, limited field testing, revision, and final model formulation. The use of R&D was appropriate for addressing the research questions, which focused on (1) identifying existing digital learning management conditions, (2) designing an integrative model that incorporates educational tourism, and (3) evaluating the model's effectiveness in strengthening human capital dimensions. This design enabled systematic model construction supported by empirical validation.

The study was conducted in a public senior high school located in a coastal and island-based region of Indonesia, where tourism constitutes a primary economic sector. The population of the study included all teachers and students enrolled in the school during the academic year of the research implementation. The target population consisted of 214 students and 28 teachers. Given the manageable size of the population, proportional stratified sampling was employed to ensure representation across grade levels. Using Slovin's formula with a 5% margin of error, a sample of 139 students was determined as adequate for quantitative analysis. Additionally, 15 teachers were selected purposively based on their involvement in digital learning implementation and curriculum planning. Inclusion criteria required participants to have actively engaged in digital learning activities during the semester of data collection.

Data were collected using multiple instruments to ensure methodological rigor and triangulation. For the quantitative component, a structured questionnaire was developed to measure three main constructs: digital

learning management effectiveness, integration of educational tourism components, and human capital development outcomes. The instrument utilized a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Content validity was established through expert judgment involving three specialists in educational management and digital learning systems. Construct validity was tested using exploratory factor analysis (EFA), ensuring factor loadings exceeded the minimum threshold of 0.5. Reliability testing was conducted using Cronbach's alpha, with coefficients above 0.70 indicating acceptable internal consistency. For the qualitative component, semi-structured interview guides were developed to explore teachers' perspectives on model implementation and contextual integration of tourism-based learning. Observation sheets were also utilized to document the implementation of digital learning activities embedded with educational tourism content.

Data collection was conducted over a four-month period. The first phase involved a needs analysis through surveys and preliminary interviews to assess existing digital learning practices and contextual tourism integration. The second phase focused on model design and prototype development, including the construction of digital management templates aligned with planning, organizing, implementing, and monitoring functions. Expert validation was subsequently conducted to assess the feasibility and relevance of the model. Feedback from validators was used to revise the prototype before limited field testing. During the field testing phase, the model was implemented in selected classes for one academic term. Surveys were administered at the end of the implementation period to evaluate perceived effectiveness and human capital outcomes. Interviews and observations were conducted concurrently to capture contextual insights and implementation dynamics.

Quantitative data were analyzed using descriptive statistics and inferential analysis. Descriptive analysis was used to identify patterns in digital learning management practices and educational tourism integration levels. To evaluate the relationship between model implementation and human capital outcomes, multiple regression analysis was conducted, as it allows examination of the predictive contribution of independent variables to a dependent variable (Hair *et al*., 2019). Statistical analysis was performed using SPSS software, with a significance level set at 0.05. Qualitative data from interviews and observations were analyzed using thematic analysis as outlined by Braun and Clarke (2006). The analysis followed six stages: data familiarization, initial coding, theme identification, theme review, theme definition, and reporting. This approach enabled identification of recurring patterns related to contextual relevance, engagement, and managerial efficiency. Triangulation between quantitative and qualitative findings enhanced the credibility and validity of the results.

Ethical approval for the study was obtained from the institutional research committee prior to data collection. All participants were informed about the purpose of the research, and written informed consent was obtained from teachers and students. For participants under the age of 18, parental consent was secured in accordance with ethical research standards. Confidentiality was maintained by anonymizing participant identities and securely storing data. Participation was voluntary, and respondents were informed of their right to withdraw from the study at any time without penalty.

4 | RESULTS AND DISCUSSION

4.1 Results

4.1.1 Descriptive Analysis of Digital Learning Management Implementation

The first research question focused on evaluating the condition before and after implementing digital learning management (DLM) integrated with educational tourism components. Descriptive statistical analysis was carried out to measure the effectiveness of the developed model based on three key variables: digital learning management (DLM), educational tourism integration (ETI), and human capital development (HCD). Table 1 provides the descriptive statistics following the model's application, offering a clear view of how each variable performed. This analysis helps assess the impact of integrating digital learning and educational tourism on enhancing education quality and supporting sustainable human capital development in coastal regions.

Table 1. Descriptive statistics of research variables after model implementation

Variable	n	Mean	SD	Minimum	Maximum
Digital learning management (DLM)	139	4.12	0.48	3.01	4.89
Educational tourism integration (ETI)	139	4.05	0.52	2.94	4.85
Human capital development (HCD)	139	4.18	0.46	3.10	4.92

Note. Scores were measured using a five-point Likert scale (1 = strongly disagree; 5 = strongly agree).

As shown in Table 1, all variables demonstrated high mean scores above 4.00, indicating positive perceptions of digital learning management effectiveness and successful integration of educational tourism components. The highest

mean was observed in human capital development (M = 4.18, SD = 0.46), suggesting enhanced perceived competencies in contextual knowledge, environmental awareness, and entrepreneurial understanding.

4.1.2 Regression Analysis

To evaluate the impact of digital learning management and educational tourism integration on human capital development, multiple regression analysis was performed. The regression model used is as follows.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \varepsilon$$

In this equation, Y denotes human capital development, X_1 represents digital learning management, X_2 refers to educational tourism integration, β_0 is the constant, β_1 and β_2 are regression coefficients, and ε is the error term. This model helps in quantifying the relationship between the independent variables (DLM and ETI) and the dependent variable (HCD). The results of the regression analysis, which show the contribution of each variable to human capital development, are presented in Table 2. This analysis provides valuable insights into how digital learning and tourism-based education can enhance the development of human capital in coastal areas.

Table 2. Multiple regression analysis predicting human capital development

Predictor	B	SE	β	t	p
Constant	1.245	0.312	—	3.99	.000
Digital learning management (X_1)	0.356	0.087	0.342	4.09	.000**
Educational tourism integration (X_2)	0.421	0.082	0.417	5.13	.000**

Note. **p < .01.

The regression model was statistically significant, $F(2, 136) = 48.27$, $p < .001$, with an R^2 value of .415, indicating that 41.5% of the variance in human capital development was explained by digital learning management and educational tourism integration. Both predictors significantly contributed to the model, with educational tourism integration showing the strongest standardized coefficient (β = .417).

4.1.3 Model Development and Implementation Process

The implementation phase involved structured activities carried out over one academic term to integrate digital learning management with educational tourism. These activities included.

1) Training workshops for teachers on planning digital management aligned with tourism-based content.
2) Development of digital lesson plans incorporating local tourism case studies, aimed at promoting practical learning.
3) Implementation of project-based assignments focused on coastal tourism sustainability, where students applied their knowledge in real-world scenarios.
4) Monitoring and evaluation sessions using digital tracking systems to assess the effectiveness of the activities.

Observation data revealed increased teacher collaboration, improved digital documentation practices, and greater student engagement in learning projects. These findings highlight the positive impact of combining digital learning and tourism in enhancing both teaching practices and student involvement, helping to strengthen the alignment of education with regional economic and environmental objectives.

4.2 Discussion

The findings indicate that integrating educational tourism into digital learning management significantly contributes to human capital development in coastal contexts. The positive regression coefficients support human capital theory, which posits that investment in contextualized education enhances productive competencies (Becker, 1993). The integration of tourism-based content appears to strengthen not only cognitive learning outcomes but also socio-economic awareness, thereby extending traditional interpretations of human capital beyond purely academic achievement. From an educational management perspective, the high effectiveness scores demonstrate that embedding contextual economic components within planning, organizing, actuating, and controlling functions enhances institutional coherence. This finding aligns with management theory emphasizing systematic coordination as a determinant of organizational performance (Fayol, 1949). Unlike conventional digital transformation models that prioritize technological adoption alone, the present model operationalizes digital systems as strategic tools for regional economic alignment.

The emergence of social changes during implementation further supports the transformative potential of the model. Several notable developments were observed. First, teachers formed an informal digital curriculum coordination team, functioning as a new institutional mechanism within the school. Second, students demonstrated behavioral shifts toward environmental responsibility and tourism entrepreneurship awareness. Third, student-led initiatives emerged, including proposals for eco-tourism campaign projects, reflecting increased agency and leadership capacity. Fourth, community stakeholders began collaborating with the school to provide local tourism data and experiential learning opportunities, indicating strengthened school–community partnerships.

These developments illustrate the dynamic process of assistance and empowerment rather than mere technological intervention. The assistance model facilitated participatory planning, collaborative content development, and iterative evaluation, thereby fostering shared ownership among stakeholders. Such outcomes resonate with experiential learning theory, which emphasizes active engagement as a catalyst for deeper learning (Kolb, 1984).

Unexpectedly, the data revealed that educational tourism integration had a stronger predictive effect on human capital development than digital management alone. This suggests that contextual relevance may exert greater influence on competency development than technological sophistication. This finding challenges technocentric perspectives on digital education and highlights the importance of socio-economic contextualization in educational innovation. Nevertheless, certain limitations must be acknowledged. The study was conducted in a single coastal school, limiting generalizability. Additionally, human capital development was measured primarily through perceptual indicators rather than long-term economic performance metrics. Future studies may incorporate longitudinal designs and comparative multi-site analyses to strengthen external validity. Overall, the results demonstrate that the Educational Tourism-Based Digital Learning Management Model effectively addresses the identified community problem of misalignment between education and local economic structures. By embedding tourism-based experiential learning within digital management systems, the model enhances contextual relevance, fosters institutional innovation, and contributes to sustainable human capital development in coastal areas. The findings extend existing theoretical frameworks by integrating human capital theory, educational management, and educational tourism into a unified digital development model.

5 | CONCLUSIONS AND FUTURE WORK

This study aimed to develop and validate an Educational Tourism-Based Digital Learning Management Model for Sustainable Human Capital Development in Coastal Areas. The findings indicate that the integration of educational tourism into digital learning management significantly improves human capital outcomes in coastal school contexts. The statistical analysis shows that both digital learning management and educational tourism integration contribute positively and significantly to the development of students' contextual competencies, environmental awareness, and economic understanding. Among the two predictors, educational tourism integration demonstrated a stronger contribution, highlighting the importance of contextual relevance in digital education. The results confirm that digital transformation in education becomes more meaningful when it is aligned with local economic characteristics. The developed model successfully integrates planning, organizing, implementation, and evaluation processes within a digital framework that incorporates tourism-based learning activities. This structured integration enhances coherence in learning management while increasing student engagement and teacher collaboration. The implementation process also revealed positive institutional dynamics, including improved coordination among teachers, more systematic digital documentation, and stronger collaboration between schools and local stakeholders. In addition to improvements in learning management effectiveness, the intervention generated observable social changes within the school community. Students demonstrated increased awareness of coastal sustainability issues and greater interest in tourism-related entrepreneurship. Teacher participation in collaborative digital curriculum planning increased, leading to the formation of informal coordination mechanisms within the school. Community involvement also expanded, as local tourism actors contributed resources and contextual learning materials. These changes indicate that the model not only strengthens instructional processes but also fosters institutional and behavioral transformation. Despite these positive findings, several limitations must be acknowledged. The study was conducted in a single coastal school, which may limit the generalizability of the results to other contexts with different socio-economic conditions. The implementation period was also limited to one academic term, restricting the ability to measure long-term impacts on economic or professional outcomes. Furthermore, the measurement of human capital development relied primarily on survey data and short-term indicators.

Future research should test the model in multiple coastal and island regions to examine its adaptability and scalability. Comparative studies involving urban or inland schools may help determine whether contextual economic integration produces similar effects in different environments. Longitudinal research is recommended to evaluate whether improvements in contextual competencies lead to measurable economic participation or entrepreneurship in the tourism sector. Future studies may also explore the integration of advanced digital technologies, such as adaptive learning systems or data analytics, to enhance the responsiveness of digital learning management in remote areas. Overall, this study demonstrates that aligning digital learning management with educational tourism provides a practical and sustainable strategy for strengthening human capital in coastal regions. By connecting educational processes with local economic realities, the developed model offers a pathway for transforming schools into active contributors to regional development.

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