

The Construction of an AI-Driven Interdisciplinary PBL-SDBL Teaching Model: Enhancing College Students' Information Literacy and Emotional Intelligence in the Context of "Intangible Cultural Heritage Music and Cultural Tourism

Fang Liu*

School of Industrial Education and Technology, King Mongkut's Institute of Technology
Ladkrabang, Bangkok, Thailand, 10520.
ORCID iD: <https://orcid.org/0009-0003-1859-779X>
Email: 63603158@kmitl.ac.th

Kanyarat Sriwisathiyakun

School of Industrial Education and Technology, King Mongkut's Institute of Technology
Ladkrabang, Bangkok, Thailand, 10520.
ORCID iD: <https://orcid.org/0000-0002-4533-6400>
Email: kanyarat.sr@kmitl.ac.th

Sirirat Petsangsri

School of Industrial Education and Technology, King Mongkut's Institute of Technology
Ladkrabang, Bangkok, Thailand, 10520.
ORCID iD: <https://orcid.org/0000-0002-4828-1740>
Email: sirirat.pe@kmitl.ac.th

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Abstract: The accelerating digitalization of higher education and the fast integration of artificial intelligence (AI) technologies have heightened the necessity of the pedagogical models that would balance the aspects of digital competence with humanistic and cultural levels. Even though previous studies have explored AI literacy and project-based learning (PBL) in isolation, little research has synthesised AI-based pedagogy and emotional intelligence growth, and contextualised learning, especially in the context of Intangible Cultural Heritage (ICH) music and cultural tourism. To fill this gap, the proposed study involves the development of an AI-based interdisciplinary Project-Based Learning and Subject-Based Deep Learning (PBL-SDBL) teaching model that will help to equip college learners with a higher level of information literacy and emotional intelligence. The study follows the principles of PRISMA, which is a Systematic Literature Review (SLR), and summarizes 16 peer-reviewed articles published between 2015 and 2025 on major academic databases. The results indicate that the PBL-SDBL model facilitated by AI improves higher information literacy and emotional intelligence. PBL reinforced by AI supports critical assessment, ethical thinking, and cooperation, whereas SDBL supports self-control, conceptual and learning structure. They ensure that they spread algorithmic awareness, responsible AI usage, empathy, teamwork, and cultural sensitivity. The paper finds that a redefinition of AI as a cognitive tool, but not an epistemic one, will allow integrating technological innovation, constructivist pedagogy, and cultural sustainability, and this approach can be used to offer a transformative model of holistic higher education development.

Keywords: Artificial Intelligence, PBL-SDBL Teaching Model, Emotional Intelligence, Culture, Music.

1. Introduction

The overall literature on AI in higher education suggests that the application of AI in higher education is transforming the pedagogical design, placing more emphasis on digital and AI literacy, task-based learning, and humanistic competencies (e.g., emotional awareness and collaboration). Research shows that project-based learning (PBL) classrooms aided by artificial intelligence can enhance higher-order thinking, digital skills, and reflectivity and increase the ethical and socio-emotional motivation of technology-enhanced learning (Parwoto et al., 2025).

The high pace of digitalization of higher education makes the development of information literacy and emotional intelligence as key competencies among college students significant in the age of artificial intelligence. Since the integration of generative AI and other data-driven technologies into the university curriculum is progressively becoming a standard, students will not just learn to use computers but learn to critically analyze information, build collaborative relationships, and operate in the environment of complex socio-emotional dynamics (George, 2023). Among these new methods, interdisciplinary models like project-based learning (PBL) have become potent models of promoting real-world problem solving, creativity, and problem solving (Brassler & Dettmers, 2017).

At the same time, the restoration of intangible cultural heritage (ICH), especially traditional music in cultural tourism platforms, offers educational opportunities, while they have challenges in preservation. ICH music represents the historical memory, locality and aesthetic value, but the music is pressured by the forces of globalization, commercialization, and the falling interest among the young people. The establishment of ICH music as a part of interdisciplinary education can bridge the gap between cultural preservation and digital innovation, although the models that organize the systematic integration of AI, PBL, and subject-based deep learning (SDBL) have not been developed.

Although AI literacy and digital competence have become an increasing research topic in the context of higher education, current literature mainly addresses technological skills or cognitive outcomes, without paying much attention to the issue of emotional intelligence and cultural-contextual learning (Zhao, Pinto Llorente & Sánchez Gómez, 2021). Furthermore, there is little literature on how AI-based instruction models can foster interdisciplinary learning in a real cultural industry like cultural tourism in the form of music.

Empirical data indicate that task-focused learning with the aid of AI will positively influence the analytical performance and level of engagement in students, and the collaborative project-based environment will lead to the development of socio-emotional skills and reflective thinking (Feng & Wei, 2025). It is based on these findings that this research will attempt to develop an AI-based interdisciplinary PBL-SDBL instructional framework based on Intangible Cultural Heritage Music and Cultural Tourism. The aims are to (1) develop a systematic framework of combining AI tools with project-based and deep learning approaches, (2) analyze its efficacy in increasing the information literacy and emotional intelligence of the students, and (3) offer a pedagogical paradigm that can be replicated to provide culturally responsive technology-enhanced higher education. Finally, this paper aims to make a contribution of a theoretically established and practically feasible model that would fill a gap in digital innovation, humanistic growth, and cultural sustainability.

2. Literature Review

2.1. Constructivism as the Core Theoretical Framework of the AI-Driven PBL-SDBL Model

The epistemological framework offered by constructivism can be used to support the suggested AI-based IPBL-SDBL teaching model. With premises that knowledge is constructed actively in the context of interaction, reflexive and contextually situated inquiry, the constructivist theory puts the learner at the center, as a meaning-maker, as opposed to a passive information receiver. Project-Based Learning (PBL) is the way to implement these principles, placing learning into the framework of realistic, problem-based assignments, where collaboration and disciplinary integration need to be engaged (Almulla, 2020). Constructivist learning settings promote intellectual richness and critical thinking, and enduring investigation in the context of higher education, so they resonate well with Subject-Based Deep Learning (SDBL) strategies advocating conceptual fluency as an outcome of learning as opposed to superficial acquisition of content (Le & Nguyen, 2024).

Constructivism takes artificial intelligence in AI-enhanced environments as a cognitive scaffold, not as an epistemic power (Wu et al., 2025). This comprehension guarantees that technological integration is in line with a higher level of thought and interdisciplinary synthesis. In this way, constructivism justifies the introduction of AI, project-based inquiry, and deep disciplinary engagement into the culturally situated areas of education, which compose the theoretical basis of the current model (Dai, 2025).

2.2. AI-Driven Pedagogical Innovation and Information Literacy Development

The fast pace of introducing artificial intelligence into the context of higher education has re-established the course of pedagogical innovation, as well as redefined the outlines of information literacy. The modern AI-based systems facilitate adaptive learning tracks, automated feedback, and data-based instructional design (Mahamad et al., 2025). Yet, such technological affordances enhance the necessity of possessing higher levels of information literacy, such as the awareness of algorithms, the detection of bias, and the quality judgement of machine products, at the same time. The frames of AI literacy people point at the fact that the learners should not merely learn to use the intelligent system but also learn how knowledge is constructed, filtered, and prioritized by the intelligent system (Chiu et al., 2024).

In the interdisciplinary PBL context, AI-based tools increase the possibilities of research synthesis, creating digital content, and working in real-time. Nevertheless, researchers warn that the blind use of generative AI can lead to the decline of epistemic awareness and the loss of analytical skills (Sætra, 2026; Spennemann, 2023). Thus, to make sure that AI does not replace, but complements critical inquiry, the design of pedagogy is required. The implementation of AI into the context of the PBL-SDBL facilitates students to question the sources of information, determine their credibility, and interact ethically with digital infrastructures, which enhances the higher-order information literacy competencies (Georgopoulou et al., 2025).

2.3. Emotional Intelligence and Socio-Emotional Learning in Project-Based Contexts

The dimensions of holistic education in the age of AI are Emotional Intelligence (EI) and Social-Emotional Learning (SEL). The EI theory stresses the importance of self-awareness, emotional management, empathy, and interpersonal competence as the ability to work collaboratively and respond to culture. It has been shown that in project-based learning settings, the concept of socio-emotional competence is greatly advanced through the necessity to negotiate and use shared responsibility and collective responsibility and solve problems (Huang, Wang & Han, 2024). Such forces are especially relevant to the interdisciplinary context where various views have to be unified into coherent results.

Adaptive systems that are enhanced by AI have also been shown to add to the emotional development in cases where the system is developed to facilitate reflective feedback and self-regulation among learners (Rakhmetov et al., 2025). In lieu of good education being practical skills, AI-blended PBL is capable of fostering emotional strength and team consciousness. Emotional intelligence is an essential aspect of culturally ingrained practices in intangible heritage music and tourism studies, where it is necessary to interpret and engage with community stories in an empathetic way and with ethical consideration. Accordingly, the inclusion of EI in the AI-powered PBL-SDBL model guarantees cognitive-affective balanced growth (Ruiz Viruel, Sánchez Rivas & Ruiz Palmero, 2025).

2.4. Intangible Cultural Heritage Music and Cultural Tourism as Interdisciplinary Learning Context

The intangible cultural heritage (ICH) music is a dynamic store of group memory, who I am and what I see as beautiful. Research on education is increasingly promoting participatory and digitally mediated methods of heritage preservation that bring together the aspects of innovation and authenticity (Del Soldato & Massari, 2024). Incorporating ICH in the higher education curriculum offers some avenues of interdisciplinary interaction, connecting musicology, cultural studies, tourism management, and digital media. These situations provide a real problem space that allows constructivist and project-based inquiry.

Cultural tourism also broadens this interdisciplinary approach by locating heritage as part of an economic, social, and technological framework. New platforms and artificial intelligence-driven creative technologies allow new means to interpret heritage, make it accessible, and engage the audience (Wang & Zhou, 2025). Nevertheless, cultural competence in technological innovation demands pedagogical frameworks that harmonize the two aspects. The ICH music and cultural tourism situation can thus serve as not only a thematic content but as a living laboratory to apply the AI-driven PBL-SDBL model to create information literacy, emotional intelligence, and sustainable cultural awareness in parallel.

2.5. Gap in Literature

Whereas previous research has looked at AI literacy, project-based learning, and digital competence separately, the research on AI-driven pedagogy has not been

combined with the development of emotional intelligence and culturally specific learning in social contexts with Intangible Cultural Heritage (ICH) music and cultural tourism. There is a paucity of empirical validation of interdisciplinary AI-based PBL-SDBL models in real life contexts of higher education, which makes a serious gap in holistic, culturally responsive AI-enhanced instructions.

3. Research Methodology

3.1. Research Method

The paper utilized a qualitative approach to data analysis in order to investigate the development of an AI-based interdisciplinary PBL-SDBL teaching model and its effect on the information literacy and emotional intelligence of college students during Intangible Cultural Heritage (ICH) music and cultural tourism. It examined the role of the AI-enhanced project-based and scenario-based pedagogies in higher learning cognitive, digital, and affective learning outcomes. The study was founded on secondary sources, such as peer-reviewed journal articles, conference papers, and academic reports. This approach suited well in integrating different theoretical insights and empirical evidence in new interdisciplinary and technology-rich teaching and learning processes.

3.2. Research Design

The paper is a Systematic Literature Review (SLR) of interdisciplinary publications published in 2015-2025 related to the subject of AI integration, project-based learning, information literacy, emotional intelligence, and cultural heritage education in higher education. The major academic databases such as Scopus, Web of science, ERIC, and Google Scholar were accessed to retrieve the relevant literature. The studies have been chosen on the basis of their applicability to AI-based pedagogy and interdisciplinary PBL models and learning outcomes connected to cognitive and emotional growth. The SLR approach provided transparency, coherence, and replicability by use of well-defined inclusion and exclusion criteria. Such a design allowed them to synthesize the literature systematically in terms of thematic units in educational technology, cultural tourism, and interdisciplinary pedagogy to develop a complex conceptual framework of the suggested teaching model.

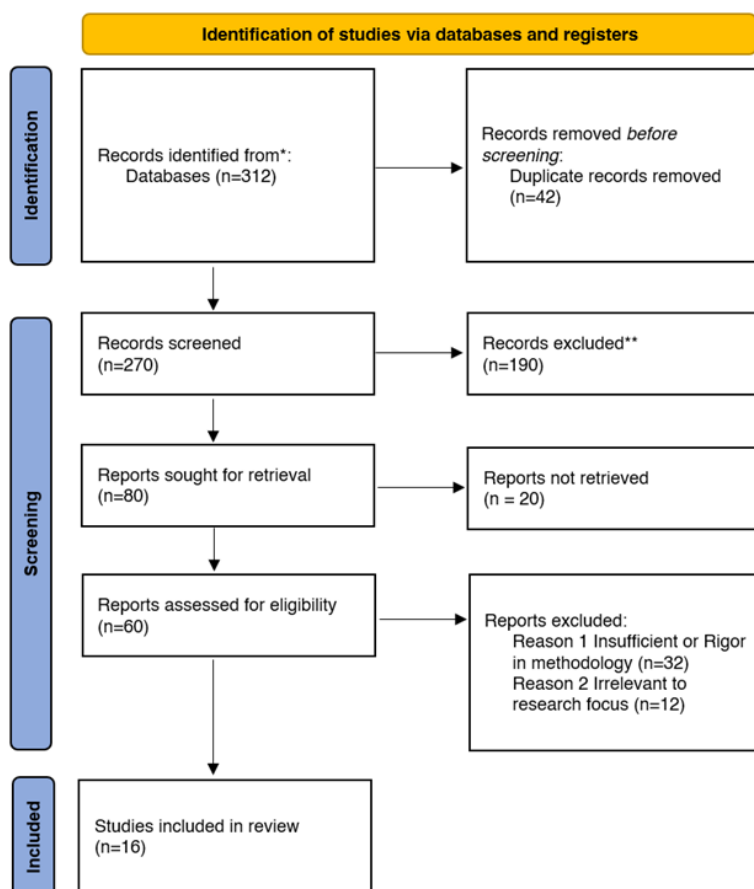
3.3. PRISMA Framework

The current research has been addressed following the PRISMA (Preferred Reporting Items to Systematic Reviews and Meta-Analyses) principles in order to guarantee methodological rigor, transparency, and replicability of the systematic literature review procedure. The PRISMA framework was used to present a systematic method of identifying, screening, and evaluating the eligibility and inclusion of concerned studies on AI-driven interdisciplinary PBL-SDBL teaching models in higher education. It allowed a transparent and methodological review of the literature that discusses information literacy, emotional intelligence, project-based learning, and cultural heritage education as the Intangible Cultural Heritage (ICH) music and cultural tourism.

The PRISMA guidelines aimed to assist in the transparent data retrieval, selection process, and thematic analysis, thus making the reporting and findings interpretation consistent. The key terms in the systematic search were the following: AI-driven project-based learning AND higher education, interdisciplinary PBL AND information literacy, emotional intelligence AND AI in education, and intangible cultural heritage AND cultural tourism education. The search strategy was done using Scopus, Web of science, ERIC, and Google Scholar to retrieve peer-reviewed articles released after 2015.

A total of 312 studies were found. Once we eliminated duplicates ($n = 42$), we looked at the titles and abstracts of the 270 remaining papers. As a result, 190 articles were left out because they did not fit the criteria, leaving 80 articles for the next review step. 20 articles were not retrieved leaving 60 articles for eligibility. 44 papers were then excluded due to insufficient methodology and irrelevant research focus. Finally, 16 papers were left for review. Figure 1 below represents the PRISMA Framework diagram.

Figure 1: The PRISMA Framework for the Selection of Studies for Analysis.



3.4. Inclusion Criteria

The articles used to review were peer-reviewed journal articles and either

empirical or theoretical research that was based on AI-driven project-based learning, interdisciplinary pedagogy, information literacy, emotional intelligence, and cultural heritage education in higher education and published after 2015. The studies, which investigated the aspects of AI integration in the teaching process, the framework of PBL or SDBL, cognitive and affective learning outcomes, and the interdisciplinary implementation in the cultural or tourism-related setting were considered only. The chosen sources were related to the interdisciplinary areas, such as educational technology, studies on higher education, digital humanities, cultural heritage education, and tourism studies. Both theoretical models and empirical studies that examined the link between AI-based pedagogy and information literacy or emotional intelligence growth of students were taken into account.

3.5. Exclusion Criteria

The outliers in terms of articles were those that did not directly relate to AI-supported project-based learning, interdisciplinary instructional models, or learning outcomes related to information literacy and emotional intelligence. Full papers of conference abstracts, theses/dissertations, and publications before 2015 were omitted because of the unavailability of rigorous peer-reviewing. The review also excluded studies that devoted their attention to technical AI development, but not educational implementation, or studies that did not relate to the context of higher education.

3.6. Analysis Method

A thematic analysis of the chosen studies was done through the qualitative synthesis approach. The articles reviewed were coded in a systematic manner and revealed the presence of similar themes and conceptual patterns connected with AI-driven project-based learning, interdisciplinary PBL-SDBL models, development of information literacy, development of emotional intelligence, and cultural heritage education. Themes related to strategies of AI integration, improvement of cognitive skills, emotional learning results, and interdisciplinary cooperation were coded and compared. This procedure helped to critically interpret convergent and divergent study findings. The methodology gave a detailed insight into the role and importance of AI-supported pedagogical models in developing cognitive and emotional abilities in a higher education setting.

3.7. Ethical Considerations

The analysis was solely based on the secondary data collected in the form of peer-reviewed scholarly articles available to the public. All sources were referenced appropriately so that academic integrity and compliance with research ethics would be met. Since the study did not entail any primary data collection or human subjects, the problem of informed consent and confidentiality did not arise. The review procedure did not infringe on intellectual property rights, but reported the findings of the original authors in a very accurate manner. They were careful to be objective and responsible in the synthesis of the literature in order to be balanced in the interpretation of various views in the interdisciplinary and technology-enhanced learning research.

3.8. Findings and Analysis

The review established that interdisciplinary PBL-SDBL models that are AI-based are major in promoting information literacy and emotional intelligence of students in tertiary education systems, especially when it comes to Intangible Cultural Heritage (ICH) music and cultural tourism. The generated results suggested that embedding AI tools in project-based and scenario-driven learning experiences reinforced the digital inquiry competencies, information source criticality, and responsible AI usage in students. Meanwhile, project activities of collaboration and immersion into the culture promoted emotional awareness, empathy, teamwork, and cultural sensitivity.

The extent of impact was relative to the nature of AI tools used, the extent of interdisciplinary integration, institutional support, and PBL pedagogical design. On the one hand, AI-enriched models encouraged innovation and interaction, but on the other hand, technological reliance and inequality in the digital skills of students were also noted (Zheng et al., 2024). Altogether, the results indicate that AI-assisted PBL-SDBL models not only enhance quantifiable cognitive performance but also transform affective and interpersonal skills, which can be used to develop the holistic learner in modern higher education.

3.9. Selected Studies for Analysis

The articles taken to be analyzed satisfied PRISMA requirements in systematic and transparent review processes. The selected articles were united by the theme of AI integration, the application of interdisciplinary PBL frameworks, cultural heritage education, and information literacy and emotional intelligence learning outcomes. Not only do these articles managed to pinpoint research gaps, including the lack of direct empirical studies in the particular field of ICH music and cultural tourism, but also give a thorough description of the new pedagogical practices in AI-enhanced higher education.

The chosen literature helped to develop a structured perception of the complicated interaction of technological development, the interdisciplinary curriculum design, the development of cognitive skills, and emotional growth. Cumulatively, the articles provided partial but significant information on how AI-based educational models could contribute to balanced academic, digital, and socio-emotional competencies. Table 1 below shows a summary of the reviewed studies.

Table 2 is an overall synthesis of 4 main themes in the literature and a representation of how an AI-driven interdisciplinary PBL-SDBL model of teaching incorporates technological innovation, information literacy, emotional intelligence, and cultural sustainability within higher education. To begin with, AI is used as an adaptive scaffold in project-based learning and improves students' capabilities of accessing information, assessing it, and utilizing it in a critical manner. Second, interdisciplinary PBL promotes emotional intelligence, collaboration, and reflective self-regulation as a result of authentic cultural tourism projects. Third, curriculum design equates digital innovation to the conservation and regeneration of intangible cultural heritage music. Fourth, successful implementation of the same requires adaptation of pedagogies, faculty facilitation, and systematic evaluation. Together, these themes indicate that the interdisciplinary pedagogy, the AI, and the culturally responsive higher education practice have a transformative relationship.

Table 1: Summary of Literature on Project-Based Learning (PBL) Frameworks, AI Integration, and Educational Outcomes (2019–2026).

Citation	Aim / Title	Key Findings	Codes
Kong, Cheung and Tsang (2024)	Developing an AI literacy framework via PBL.	PBL-based AI literacy courses significantly improved students' conceptual understanding, ethical awareness, and problem-solving competencies.	AI literacy; PBL; Information literacy; Ethics
Kumar (2021)	Educational chatbots in team-based PBL.	AI chatbots enhanced collaboration, engagement, and learning outcomes in design-based higher education courses.	Chatbots; Teamwork; AI support; Engagement
Zheng et al. (2024)	Co-designing AI integration in PBL.	Students emphasized transparency, co-creation, and scaffolded AI tools for effective PBL enhancement.	Co-design; Human-AI collaboration; Scaffolding
Azamatova et al. (2023)	AI tools in PBL for foreign language learning.	AI-supported PBL significantly improved academic achievement and learner motivation.	AI tools; Motivation; Achievement; Digital learning
Zhang and Ma (2023)	Meta-analysis of PBL effectiveness.	PBL positively affects academic performance, higher-order thinking, and affective outcomes.	Meta-analysis; Learning effects; Critical thinking
Zarouk et al. (2020)	Flipped PBL and self-regulation.	Flipped PBL models enhance self-regulated learning and autonomy in higher education.	Flipped classroom; Self-regulation; Autonomy
Shpeizer (2019)	Integration of PBL in higher education.	Successful PBL implementation requires technological infrastructure, faculty training, and structured assessment.	Implementation; Technology integration; Assessment
Carella and Colombo (2024)	Industry-collaborative PBL case study.	Authentic industry projects improve professional competencies and experiential learning.	Industry collaboration; Experiential learning
Mohammed and Ozdamli (2024)	Systematic review of soft skills in IT education.	Emotional intelligence, communication, and teamwork are critical competencies in technology-driven education.	Soft skills; Emotional intelligence; IT education
Sánchez-García and Reyes-de-Cózar (2025)	Framework for optimizing PBL structure.	Structured, sustainability-oriented PBL frameworks enhance interdisciplinary integration.	Framework; Sustainability; Interdisciplinary PBL
Polomoshnov, Masso and Lobanova (2026)	Digital, data, and AI literacy comparison.	Clarifies distinctions and overlaps among digital, data, and AI literacy competencies.	Digital literacy; Data literacy; AI literacy
Mansur (2025)	AI as catalyst in education and digital literacy.	AI accelerates adult learning and strengthens digital literacy through adaptive technologies.	Adaptive learning; Digital literacy; Lifelong learning
Karmazinuk and Helik (2026)	AI-enhanced adaptive learning and EI.	AI-driven adaptive systems support both technical skills and emotional intelligence development.	Adaptive AI; Emotional intelligence; Project management
Kantabutra (2020)	Organizational theory of sustainability vision.	Sustainability vision fosters long-term strategic alignment and stakeholder engagement.	Sustainability vision; Strategic alignment
Ingersoll et al. (2021)	Demographic transformation of teaching force.	Highlights diversity trends and implications for teacher preparation and policy.	Teacher demographics; Educational policy
Zhang and Ma (2023)	Impact of PBL on student learning.	Confirms robust cognitive and affective gains associated with PBL implementation.	PBL impact; Cognitive gains; Affective outcomes

Table 2: Summary of Research Themes, Descriptions, and Associated Studies.

Themes	Description	Studies
Theme 1: AI-Driven Pedagogical Innovation in Higher Education	Applications in project-based learning to improve instructional processes, adaptive scaffolding, student interaction, and AI literacy acquisition with the use of artificial intelligence tools. Focuses on the importance of co-designing, chatbot facilitating, and AI-mediated motivation in the case of higher education.	Azamatova et al. (2023); Kong et al. (2024); Kumar (2021); Zheng et al. (2024)

Theme 2: Interdisciplinary PBL-SDBL Model Construction	Empirical and theoretical basis of project-based and self-directed/blended learning models. Shows how interdisciplinary teamwork, inverted learning, and partnerships with the industry enhance cognitive performance, self-management, and real life experience.	Carella and Colombo (2024); Shpeizer (2019); Zarouk et al. (2020); Zhang and Ma (2023)
Theme 3: Development of Information Literacy in AI-Supported Environments	Digital, data, and AI literacy, AI-enhanced learning environments. Highlights coordinated systems, long-term execution, and assimilation of soft skills in technology based learning systems.	Mansur (2025); Mohammed and Ozdamli (2024); Polomoshnov et al. (2026); Sánchez-García and Reyes-de-Cózar (2025)
Theme 4: Emotional Intelligence and Cultural Identity Development through ICH Contexts	Development of emotional intelligence, sustainability vision and professional identity in interdisciplinary and culturally based learning contexts. Brings together the technical and socio-emotional skills in models of transformative higher education.	Ingersoll et al. (2021); Kantabutra (2020); Karmazinuk and Helik (2026); Zhang and Ma (2023)

4. Data Analysis

4.1. AI-Driven Pedagogical Innovation in Higher Education

Recent empirical studies show that AI-based pedagogical innovation makes a great difference to cognitive and digital skills in project-based learning (PBL) settings. Kong et al. (2024) concluded that an AI literacy framework incorporated in a PBL course enhanced the problem-solving skills, metacognitive approach, and ethical consideration of the application of AI concepts in learners. Likewise, Kumar (2021) stated that educational chatbots within team-based PBL courses positively impacted the learning performance and quality of collaboration, which suggests that AI tools can scaffold knowledge building and support the use of structural inquiry. Along these lines, Zheng et al. (2024) emphasized that students appreciate AI-based systems that overtly assist in the idea generation, documentation, and reflective evaluation, and indicate that AI mediated PBL transforms learning processes and assessment practices in higher education.

In addition to cognitive advantages, the AI-enhanced PBL models are associated with affective and motivational growth. As Azamatova et al. (2023) showed, AI and digital tools, applied within a PBL model, had a substantial positive effect on the academic success and learning motivation of university students as opposed to conventional teaching. Despite the fact that Kumar (2021) noted that some of the affective variables were affected with limited direct effects, the improved teamwork dynamics imply indirect socio-emotional advantages. Taken together, these results suggest that AI-infused PBL classrooms promote combined learning of information literacy, collaborative skill, and learner motivation, which in turn help to promote novel, interdisciplinary models of teaching in higher education.

4.2. Interdisciplinary PBL-SDBL Model Construction

Development of an interdisciplinary PBL-SDBL model is supported by strong empirical research that proves the effectiveness of project-based learning in both cognitive and affective domains. An extensive meta-analysis by Zhang and Ma (2023) proves that PBL substantially improves the academic success of students in comparison with other traditional models of instruction, higher-order thinking abilities, and affective attitudes, and the effects are especially high with small-group and practice-based settings. The results justify the architectural framework of the

interdisciplinary models, incorporating the collaborative inquiry and realistic problem-solving over long durations. On top of this, Zarouk et al. (2020) concluded that in higher education, self-directed blended learning model learning helped enhance self-regulation skills among students; moreover, pre-class preparation and project implementation as the means of structured organization of pre-disciplinary learning significantly promoted self-regulation and reflective learning behaviours as obligatory conditions of interdisciplinary engagement in learning.

Another aspect that provides an effective implementation is the strategic integration of technology, institutional alignment, and collaboration with the industry. Shpeizer (2019) notes that effective implementation of PBL in higher education institutes needs a clear scaffold, digital resources, and systematic alignment of the curriculum to beat the pedagogical and organizational barriers. Continuing this practical aspect, Carella and Colombo (2024) provide a case study of university-industry collaboration in a design course where it can be seen that real collaboration with industry contribute to a better experience, professional skills, and cross-disciplinary implementation. All these studies can be combined to offer empirical and practical groundwork to build an interdisciplinary PBL-SDBL model, which involves the combination of structured self-directed learning, joint inquiry, and the real practice within the industry to ensure the best learning outcome.

4.3. Development of Information Literacy in AI-Supported Environments

The creation of information literacy within the AI-enhanced setting will demand an integrated set of skills that involves technical, cognitive, and socio-emotional capabilities. In their systematic review of soft skills in education in information technology, Mohammed and Ozdamli (2024) make it clear that information literacy goes beyond technical skills to problem-solving, communication, and collaborative skills that are necessary in digitally mediated contexts. On the same note, Polomoshnov et al. (2026) differentiate between digital, data, and AI literacy, maintaining that AI literacy is the possibility to critically analyze the algorithmic systems, being ethically aware and attentive to the interpretation of the results provided by AI. This stratified concept implies that the use of AI to support the environment should not just scaffold access to information, but analytical judgment and responsible use as well, which would redefine the concept of information literacy as a multidimensional phenomenon.

Cognitively, project-based systems improve the information literacy acquisition in AI-enhanced contexts and are more structured. Sánchez-García and Reyes-de-Cózar (2025) emphasize that the design of PBL, which is optimized (with distinct phases, sustainability, and reflective elements), helps to increase research, evaluation, and synthesis of the skills of students. To add to this, Mansur (2025) puts AI in the category of adult learning and digital literacy, by stating that adaptive systems and smart tools encourage autonomous learning and skill acquisition. Collectively, these analyses suggest that AI-based settings, as part of a carefully designed project-based study, develop high-order information literacy by incorporating critical thinking, ethical consciousness and self-directed learning.

4.4. Emotional Intelligence and Cultural Identity Development through ICH Contexts

Cultural identity development and emotional intelligence can be developed through

a valuable avenue as a result of integrating the intangible cultural heritage (ICH) contexts into project-based learning. As shown by Karmazinuk and Helik (2026), the size of the technical competence and emotional intelligence scaffold using AI-enhanced adaptive learning environments can be facilitated by reflective prompts, simulation-based feedback, and collaboration. These results indicate that the following necessary skills can be developed using a pedagogical design that is emotionally responsive when integrated into culturally expressive ICH projects, namely empathy, interpersonal awareness, and conflict resolution. To these ends, the meta-analysis by Zhang and Ma (2023) supports the importance of project-based learning as an effective means of teaching and learning by demonstrating the significance of this educational method in enhancing affective attitudes and higher-order thinking, which is of value as a pedagogical framework in the context of real-world cultures and their effect on identity development and emotional well-being.

In a broader socio-cultural context, identity formation within educational institutions is closely interconnected with a common vision and epitomizes the population. According to Kantabutra (2020), the vision with the focus on sustainability promotes the shared sense-making process and long-term investment, and it can be aligned with the ICH-oriented curricula based on the focus on cultural continuity and value transmission. In the meantime, Ingersoll et al. (2021) pay attention to the demography of the teaching workforce, which is experiencing change, and the significance of culturally responsive education that is sensitive to various identities and experiences. Collectively, these studies contribute to the thesis that ICH-based interdisciplinary frameworks have the potential to develop emotional intelligence and enhance the cultural identity of students, especially under the leadership of an inclusive vision, adaptive technologies, and project-based learning.

5. Discussion

This paper conceptualized and developed an AI-supported interdisciplinary Project-Based Learning and Subject-Based Deep Learning (PBL-SDBL) instructional framework in the framework of Intangible Cultural Heritage (ICH) music and cultural tourism. Based on the results of a systematic literature review of 16 carefully chosen studies conducted with the help of the PRISMA framework, the results reveal that AI-enhanced PBL settings play a considerable role in cognitive as well as affective learning outcomes in higher education. Particularly, the introduction of AI was discovered to enhance the information literacy of students by boosting their information access, appraisal, synthesis, and ethical usage skills in digitally mediated learning settings. At the same time, emotional intelligence (EI), such as empathy, self-regulation, teamwork, and cultural sensitivity were developed as a result of collaborative and culturally integrated project activities.

The review also found out that the efficacy of the AI-based PBL-SDBL model is contingent on a number of modulating variables: the pedagogical layout of tasks, the transparency and scaffolding of AI applications, the institutional framework, and faculty preparedness. It was always noted in the studies that AI is most effective as an adaptive cognitive scaffold and not a substitute of human inquiry. Further, integrating ICH music and cultural tourism as an interdisciplinary problem space offered real-life contexts to the issues that offered authenticity, as well as contributed to the development of professional competencies and social-emotional development. On

the whole, the results suggest that the suggested model facilitates the comprehensive development of learners because it combines digital innovation, disciplinary depth, and cultural sustainability.

The findings indicate that AI-based PBL-SDBL frameworks are a transition towards technology-based to human-based, constructivist learning systems. AI tools, including adaptive feedback systems, chatbots, and generative platforms, are cognitive amplifiers, which frame inquiry and help with metacognitive reflection as well as research synthesis. Nonetheless, interdisciplinary design is not conceived by means of automation but through structured design. Using the AI as part of well-planned project stages and reflective assignments, students acquire a higher order of information literacy, such as algorithmic awareness, bias in thinking, and ethical reasoning.

Improvement of the emotional intelligence turns out to be one of the most important complementary results. It is necessary to negotiate, share responsibility, and understand interculturality in terms of projects, and this is especially true when working in ICH settings, where heritage narratives require empathy and ethical involvement. Self-regulation and emotion reflection are also reinforced by the implementation of AI-based feedback on the feedback mechanisms. In such a way, the model works on the border of cognitive, digital, and affective spheres, enabling the creation of balanced intellectual and personal development.

More importantly, pedagogical application of ICH music and cultural tourism has not only a thematic but an epistemological value. Cultural heritage is a living laboratory, which is a place where technological innovation crosses over with identity, memory, and sustainability. This contextualization makes the AI literacy not abstract but grounded in a social context, which is geared towards being culturally accountable as well as digital competence. Thus, the results suggest that interdisciplinary, culturally entrenched AI pedagogy will be able to balance technological progress against the humanistic education.

The results are well connected with the previous studies that show that project-based learning is effective to enhance academic performance and higher-level thinking. It has been meta-analytically proven that PBL elicits strong cognitive and affective outcomes in contrast with the traditional one (e.g., Zhang & Ma, 2023). The current model is a continuation of this research by incorporating AI as an organized scaffold in the context of PBL, which would improve digital inquiry processes without damaging constructivist principles.

On this note, previous research related to AI literacy models (e.g., Kong et al., 2024) also focuses on the significance of ethical awareness and conceptual knowledge in AI literacy. This research supports such findings, but extends them by incorporating AI literacy as a component of interdisciplinary cultural projects, as opposed to technical courses on their own. By doing so, it will overcome the criticisms that AI education is highly technical and does not consider socio-emotional or cultural aspects.

The findings are also echoed by the studies of digital competence in the higher education field (e.g., Zhao et al., 2021), which emphasize the multidimensionality of information literacy. But unlike most other studies that had been done previously, this model brings emotional intelligence into the fore as an equivalent result. The notion that project-based contexts promote socio-emotional competencies is supported by the research on the topic of collaborative learning and emotional regulation (e.g., Huang et al., 2024). The current research supports this argument and shows that emotional self-regulation can also be increased with the help of AI-enhanced adaptive feedback.

Additionally, the fact that ICH and cultural tourism are considered makes this work related to the literature on digitally mediated heritage preservation (e.g., Del Soldato & Massari, 2024; Wang & Zhou, 2025). Past research emphasizes the possible opportunities of AI in terms of introducing heritage innovation, but focuses less on pedagogical models. This study addresses that gap by presenting a framework of education that incorporates technological creativity with a sustainability vision and development of cultural identity.

However, as already noted (e.g., Sætra, 2026; Spennemann, 2023), the results also consider possible dangers of excessive dependence on generative AI, such as a lack of epistemic agency and shallow learning. The proposed model directly tackles these issues by placing AI in the role of a scaffold in SDBL and not as an authority of knowledge.

Overall, this paper has proven that an interdisciplinary PBL-SDBL teaching model based on the application of an AI can be effectively employed to improve information literacy and emotional intelligence among college students by relying on the ICH music and cultural tourism. The most significant addition will be a combination of adaptive AI applications with constructivist project design and culturally responsive materials. The model is a breakthrough in the field compared with the past studies because it brings together the digital competence, affective development, and cultural sustainability in one pedagogical approach. Finally, the results indicate that the future of AI-enhanced higher education must focus on holistic, interdisciplinary, and ethically-grounded learning experiences that train students to not only confront the complexity of technology but also to engage with human beings in a culturally diverse world, in a manner that is holistic, interdisciplinary, and ethical.

6. Conclusion

The instigating factors of the high rate of digitalization of higher education and growing use of artificial intelligence have led to a necessity to find the means through which pedagogical models should be designed that would not only enhance information literacy and emotional intelligence but also keep the culture relevant at the same time. The gap within this study was the creation of an AI-based interdisciplinary PBL-SDBL instructional model based on the Intangible Cultural Heritage (ICH) music and cultural tourism.

The main results show that AI-enhanced project-based learning greatly enhances the higher-order information literacy of students, such as critical analysis of the AI-generated information, ethical awareness, and algorithmic literacy. Meanwhile, the interdisciplinary cooperation in a real cultural setting encourages emotional intelligence, empathy, cooperation, and cultural sensitivity. AI is best applied as a mental framework and not a replacement of human inquiry.

Its implications are far reaching: the model illustrates the way in which digital innovation, constructivist pedagogy, and cultural sustainability can be combined into a consistent framework of higher education. The study is, however, weak because it uses secondary data and it is not empirically validated in the ICH music classrooms.

Observational empirical literature in the future needs to include longitudinal studies, cross-cultural studies, and experiments to quantify the quantifiable effects of learning. Finally, this model presents a revolutionary perspective on AI-improved education, which is both aligned with technological progress and humanistic development as well as with cultural responsibility.

6.1. Limitations

The study suffers in the fact that it uses a systematic literature review as opposed to primary empirical data. The suggested AI-based PBL-SDBL framework is theoretical and has yet to be practically applied and tested in real ICH music and cultural tourism classrooms. Also, 16 studies that were published after 2015 were reviewed only, which might not be as comprehensive as the opinions. Empirical studies were not done on variations in institutional settings, technological infrastructure, and student digital competencies. Lastly, there could be bias in the choice of databases and access to publications, which could have affected the synthesis of the results and the review of the conclusions.

6.2. Future Directions

Empirical validation of the AI-based interdisciplinary PBL-SDBL model should be the focus of future studies by conducting pilot studies in the higher education environment. The experimental and quasi-experimental designs would be capable of quantifying improvements in information literacy and emotional intelligence that could be determined in different cultural settings. To study the stable cognitive and affective development in the long-term, longitudinal studies are required. To avoid excessive dependence on generative systems, the transparency of artificial intelligence and the ethical design and student agency in epistemology should be explored further. It would be more applicable to comparative cross-cultural research on other ICH areas besides music, e.g., craft, dance, and oral traditions. Moreover, it is possible to complement learning analytics and mixed methods to gain a more comprehensive understanding of the effects of AI scaffolding on interdisciplinary collaboration and cultural identity development.

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