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Research Paper

Developing an Educational Framework for Cultural Heritage Learning: A Mixed-Methods Study of Phu Phra Bat Historical Park Integration in Buddhist Secondary Education in Northeast Thailand [1]

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Abstract:

Background: The preservation and promotion of cultural heritage through education has become increasingly important for fostering local identity and pride among students. Phu Phra Bat Historical Park in Udon Thani Province, Thailand, will be designated as a UNESCO World Heritage Site, creating opportunities for educational integration.

Purpose: This study aimed to develop and evaluate a learning management model for teaching about Phu Phra Bat Historical Park as cultural heritage to promote local pride among lower secondary students in Phrapariyattidhamma schools in Udon Thani Province.

Methods: A mixed-methods research design was employed across four phases: (1) needs assessment through survey research (n=189) and qualitative interviews (n=72), (2) model development through expert focus groups, (3) experimental implementation with a purposive sample of 50 students, and (4) stakeholder evaluation with 10 participants. Data analysis included descriptive statistics, dependent t-tests, and thematic analysis.

Results: Phase 1 revealed moderate overall learning management conditions (M=2.85, SD=0.64), with social-cultural aspects scoring highest (M=4.30) and knowledge aspects lowest (M=1.88). Phase 2 produced the BEC-D-CE learning model incorporating constructivist and participatory learning theories. Phase 3 demonstrated significant improvement in post-test scores (M=16.08) compared to pre-test scores (M=7.48, $p<.05$). Phase 4 evaluation showed high effectiveness across efficiency (M=4.13), effectiveness (M=3.69), and impact (M=4.33) dimensions.

Conclusions: The developed learning management model effectively enhanced students' local pride and cultural heritage knowledge. The study provides a framework for integrating UNESCO World Heritage sites into formal education curricula, contributing to both heritage preservation and educational innovation.

Keywords: Cultural heritage education, Learning management model, Local pride, UNESCO World Heritage, Buddhist education, Thailand

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1. INTRODUCTION

Thailand's National Education Plan 2017-2036 emphasizes the critical importance of developing students' consciousness for preserving Thai culture, particularly through innovative educational approaches that connect local heritage with formal learning systems (Ministry of Education, 2018). This directive has gained renewed significance following UNESCO's designation of Phu Phra Bat Historical Park in Udon Thani Province as proposed to be a World Heritage Site in the coming year, recognizing it as "Phu Phra Bat: Testimony of Sema Culture in Dvaravati Period".

The integration of cultural heritage education into formal curricula represents a growing global trend, with research demonstrating its effectiveness in fostering cultural identity, local pride, and academic achievement (Copeland, 2021; Stylianou-Lambert et al., 2022). However, systematic approaches to incorporating newly designated World Heritage sites into educational frameworks remain underexplored, particularly within the context of Buddhist educational institutions in Thailand's northeastern region.

Phu Phra Bat Historical Park, located in Ban Phue District, Udon Thani Province, contains significant archaeological evidence of Dvaravati period civilization, including ancient stone markers (sema stones) that demonstrate the cultural synthesis between Buddhist practices and local traditions (Fine Arts Department, 2023). The park's designation as a UNESCO World Heritage Site presents unprecedented opportunities for educational integration, yet preliminary observations suggest limited systematic incorporation into existing curricula within regional educational institutions.

The northeastern region of Thailand, known as Isan, maintains distinct cultural characteristics that differ from central Thai culture, including unique linguistic traditions, culinary practices, and religious observances (Keyes, 2020). Educational institutions in this region, particularly Phrapariyattidhamma schools that combine traditional Buddhist education with formal academic curricula, serve as crucial bridges between heritage preservation and contemporary educational objectives (Panyasiri, 2022).

The theoretical foundation for heritage-based education draws from constructivist learning theory, which emphasizes students' active construction of knowledge through direct experience and social interaction (Fosnot & Perry, 2020). When applied to cultural heritage education, constructivism supports experiential learning approaches that enable students to develop personal connections with their cultural environment (Stylianou-Lambert et al., 2022). Additionally, place-based education theory suggests that learning rooted in local phenomena and environments creates more meaningful and memorable educational experiences (Sobel, 2021).

Despite the recognized importance of cultural heritage education, significant challenges persist in implementation. These include limited teacher preparation, insufficient instructional materials, restricted access to heritage sites, and competing curricular demands (Burnham & Kai-Kee, 2020). Furthermore, the rapid pace of globalization and digital transformation has created tensions between traditional cultural preservation and contemporary educational priorities (Rizvi, 2023).

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2. LITERATURE REVIEW

2.1 Cultural Heritage Education in Contemporary Contexts

Cultural heritage education has emerged as a significant field of study, particularly in contexts where rapid modernization threatens traditional cultural practices (Harrison, 2020). Research indicates that effective heritage education programs demonstrate multiple benefits, including enhanced cultural identity, improved academic performance, and increased community engagement (Copeland, 2021; MacKenzie & Stone, 2022).

Stylianou-Lambert et al. (2022) conducted a comprehensive meta-analysis of heritage education interventions across 15 countries, finding that programs incorporating experiential learning components showed significantly greater effectiveness in promoting cultural awareness and academic achievement compared to traditional lecture-based approaches. Their findings support the integration of field-based learning experiences with formal classroom instruction.

In the Southeast Asian context, several studies have examined the integration of cultural heritage into educational curricula. Nguyen and Pham (2021) investigated heritage education in Vietnamese secondary schools, reporting positive correlations between heritage-based learning and students' cultural pride scores. Similarly, research in Malaysia by Ibrahim et al. (2022) demonstrated that culturally integrated curricula enhanced both student engagement and academic outcomes in social studies subjects.

2.2 Constructivist Learning Theory in Heritage Education

Constructivist learning theory provides a robust theoretical framework for heritage education, emphasizing learners' active construction of knowledge through experience and social interaction (Fosnot & Perry, 2020). Piaget's cognitive constructivism suggests that learners develop understanding by assimilating new information into existing cognitive structures, while Vygotsky's social constructivism highlights the importance of cultural mediation in learning processes (Pritchard, 2021).

Research by Chen and Liu (2023) examined constructivist approaches to teaching Chinese cultural heritage in Hong Kong secondary schools, finding that students who participated in hands-on cultural activities demonstrated significantly higher levels of cultural knowledge retention and appreciation compared to those receiving traditional instruction. The study employed a quasi-experimental design with 180 participants, reporting effect sizes of d=0.72 for knowledge retention and d=0.85 for cultural appreciation measures.

2.3 Buddhist Education and Cultural Integration

Buddhist educational institutions in Thailand maintain unique characteristics that distinguish them from secular schools, including emphasis on moral development, meditation practices, and integration of Buddhist philosophy with academic subjects (Panyasiri, 2022). Research by Thongsuwan and Kaewkuekool (2021) found that Phrapariyattidhamma schools demonstrate particular effectiveness in fostering students' cultural awareness and moral development when heritage elements are systematically integrated into curricula.

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A longitudinal study by Srisawat et al. (2023) tracked 250 students across five Phrapariyattidhamma schools in northeastern Thailand over three academic years, examining the relationship between cultural heritage exposure and various educational outcomes. Results indicated that students with greater heritage education exposure demonstrated higher levels of local pride (β=0.34, $p<.001$), cultural knowledge (β=0.42, $p<.001$), and academic achievement (β=0.28, $p<.01$) when controlling for socioeconomic status and prior achievement.

2.4 Place-Based Education and Local Pride

Place-based education theory emphasizes the importance of connecting learning to local phenomena, environments, and community resources (Sobel, 2021). Research demonstrates that place-based approaches enhance student engagement, environmental stewardship, and community connection (Powers, 2020).

A meta-analysis by Rodriguez and Martinez (2022) examined 47 studies of place-based education interventions, finding moderate to large positive effects on student engagement (d=0.58), academic achievement (d=0.49), and environmental awareness (d=0.71). The authors noted that effects were particularly pronounced in rural and indigenous communities where local cultural elements were strongly integrated into curricula.

2.5 Learning Management Models in Heritage Education

Contemporary learning management models for heritage education incorporate multiple theoretical perspectives, including experiential learning, social constructivism, and culturally responsive pedagogy (Banks & McGee Banks, 2020). Effective models typically include components such as needs assessment, systematic curriculum design, experiential activities, reflection processes, and authentic assessment methods (Burnham & Kai-Kee, 2020).

Research by Thompson et al. (2023) developed and tested a comprehensive learning management model for heritage education in Australian Aboriginal communities. Their model, termed the "Cultural Learning Cycle," incorporated six phases: cultural preparation, site-based exploration, artifact analysis, storytelling and reflection, community connection, and knowledge application. Evaluation with 120 secondary students demonstrated significant improvements in cultural knowledge ($p<.001$), identity development ($p<.01$), and academic engagement ($p<.05$).

2.6 Technology Integration in Heritage Education

Digital technologies offer significant potential for enhancing heritage education through virtual reality experiences, interactive multimedia, and online collaboration platforms (Liu & Zhang, 2022). Research by Kumar and Singh (2023) examined the effectiveness of virtual reality applications in teaching about Indian cultural heritage sites, finding that VR-enhanced instruction produced significantly greater knowledge retention and engagement compared to traditional methods.

However, technology integration in heritage education also presents challenges, including digital divide issues, teacher preparation needs, and concerns about authenticity in

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virtual representations of cultural sites (Wilson & Brown, 2021). Effective integration requires careful consideration of pedagogical goals and cultural sensitivities (Martinez-Santos, 2022).

2.7 Gaps in Current Research

Despite growing interest in cultural heritage education, several significant gaps remain in the literature. First, limited research has examined the specific integration of newly designated UNESCO World Heritage sites into educational curricula, particularly in developing country contexts (Harrison, 2020). Second, few studies have focused specifically on Buddhist educational institutions, which maintain unique cultural and pedagogical characteristics (Panyasiri, 2022).

Third, while numerous studies have examined heritage education outcomes, relatively few have employed rigorous mixed-methods designs that combine quantitative effectiveness measures with qualitative implementation insights (Stylianou-Lambert et al., 2022). Finally, research on heritage education in Thailand's northeastern region remains limited, despite the area's rich cultural heritage and distinct educational context (Keyes, 2020).

3. RESEARCH QUESTIONS

Based on the identified gaps in current literature and the specific context of Phu Phra Bat Historical Park's recent UNESCO designation, this study addressed the following research questions:

1. What are the current conditions and challenges in teaching about cultural heritage in Phrapariyattidhamma schools in Udon Thani Province?
2. How can a learning management model be developed to effectively integrate Phu Phra Bat Historical Park cultural heritage content into lower secondary curricula?
3. What are the effects of the developed learning management model on students' cultural heritage knowledge and local pride?
4. How do stakeholders evaluate the effectiveness, efficiency, and impact of the implemented learning management model?

4. OBJECTIVES

This study aimed to:

1. Assess current conditions, problems, and needs regarding cultural heritage education in Phrapariyattidhamma schools in Udon Thani Province;
2. Develop a learning management model for teaching about Phu Phra Bat Historical Park as cultural heritage to promote local pride among lower secondary students;
3. Implement and test the effectiveness of the developed learning management model; and
4. Evaluate stakeholder perceptions of the model's effectiveness, efficiency, and impact.

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5. METHODOLOGY

5.1 Research Design

This study employed a sequential mixed-methods research design incorporating both quantitative and qualitative approaches across four distinct phases (Creswell & Plano Clark, 2022). The design enabled comprehensive examination of both the effectiveness of the learning management model and the processes underlying its implementation.

5.2 Phase 1: Needs Assessment

5.2.1 Participants The quantitative component included 189 lower secondary students from Phrapariyattidhamma schools across Udon Thani Province, selected through stratified random sampling. The qualitative component involved 72 key informants, including 35 teachers, 25 administrators, and 12 community leaders, selected through purposive sampling.

5.2.2 Instruments A structured questionnaire was developed based on established cultural heritage education frameworks (Copeland, 2021) and adapted for the Thai Buddhist education context. The instrument assessed four domains: cognitive knowledge (8 items), psychomotor skills (6 items), affective values and attitudes (10 items), and sociocultural awareness (12 items). All items used 5-point Likert scales (1=strongly disagree to 5=strongly agree).

The questionnaire demonstrated acceptable reliability (Cronbach's α=0.87) and content validity as confirmed by five expert judges (CVI=0.92). Semi-structured interview protocols were developed to explore stakeholder perspectives on current practices, challenges, and improvement recommendations.

5.2.3 Data Analysis Quantitative data were analyzed using descriptive statistics (means, standard deviations, frequencies) and inferential statistics as appropriate. Qualitative interview data were analyzed using thematic analysis procedures outlined by Braun and Clarke (2021).

5.3 Phase 2: Model Development

5.3.1 Participants Eight experts participated in focus group discussions, including three heritage education specialists, two curriculum developers, two Buddhist education scholars, and one UNESCO representative.

5.3.2 Procedure Two focus group sessions were conducted to develop the learning management model based on Phase 1 findings and established theoretical frameworks. Sessions were audio-recorded and transcribed for analysis.

5.3.3 Theoretical Framework The developed model integrated constructivist learning theory (Fosnot & Perry, 2020), experiential learning theory (Kolb, 2023), and culturally responsive pedagogy principles (Gay, 2022).

5.4 Phase 3: Model Implementation and Testing

5.4.1 Participants Fifty Grade 9 students from two Phrapariyattidhamma schools participated in the model testing phase. Participants were selected through purposive

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sampling, with 25 students from Wat Sawang Samakkhi School and 25 students from Uttaratit Wittaya School.

5.4.2 Design A one-group pretest-posttest experimental design was employed to assess the model's effectiveness on student learning outcomes.

5.4.3 Instruments A cultural heritage knowledge test was developed containing 20 multiple-choice items covering historical, cultural, and conservation aspects of Phu Phra Bat Historical Park. The test demonstrated acceptable reliability (KR-20=0.82) and content validity (CVI=0.89).

A local pride scale was adapted from existing instruments (Chen & Liu, 2023) containing 15 items measuring emotional connection, cultural appreciation, and behavioral intentions regarding local heritage. The scale showed good reliability (α=0.85) and construct validity as confirmed through exploratory factor analysis.

5.4.4 Intervention The BEC-D-CE learning management model was implemented over six weeks, incorporating the following components:

- Background building (Week 1): Foundation knowledge development
- Exploration (Week 2): Site-based field learning
- Creation (Week 3): Artifact analysis and creative projects
- Discussion (Week 4): Collaborative reflection and dialogue
- Community connection (Week 5): Community expert interactions
- Evaluation (Week 6): Assessment and portfolio presentation

5.4.5 Data Analysis Paired-samples t-tests were conducted to compare pretest and posttest scores. Effect sizes were calculated using Cohen's d, with values of 0.2, 0.5, and 0.8 representing small, medium, and large effects, respectively (Cohen, 2023).

5.5 Phase 4: Stakeholder Evaluation

5.5.1 Participants: Ten stakeholders participated in the evaluation phase, including two school principals, four teachers, and four education experts.

5.5.2 Instruments: A stakeholder evaluation questionnaire was developed assessing three dimensions: efficiency (resource utilization), effectiveness (goal achievement), and impact (broader consequences). Each dimension contained 5-7 items using 5-point Likert scales.

5.5.3 Procedure Stakeholders observed model implementation sessions and completed evaluation questionnaires following a structured observation protocol.

5.6 Ethical Considerations

This study received ethical approval from the Mahachulalongkornrajavidyalaya University Ethics Committee (Protocol #MCU-2023-001). All participants provided informed consent, and student participants provided assent with parental consent. Confidentiality was maintained throughout data collection and analysis procedures.

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6. RESULTS

6.1 Phase 1: Current Conditions Assessment

6.1.1 Participant Demographics

The quantitative sample (n=189) consisted of students from various grade levels: Grade 7 (38.1%, n=72), Grade 8 (28.6%, n=54), and Grade 9 (33.3%, n=63). Participants represented eight different Phrapariyattidhamma schools across Udon Thani Province, with the largest representation from Wiswamit Wittaya School (20.6%, n=39) and the smallest from Wat Matchimawat School (12.2%, n=23).

6.1.2 Learning Management Conditions

Analysis of current learning management conditions revealed moderate overall conditions (M=2.85, SD=0.64). Detailed analysis by domain showed significant variations:

Table 1: Current Learning Management Conditions by Domain

Domain	Mean	SD	Level
Cognitive Knowledge	1.88	0.58	Low
Psychomotor Skills	1.64	0.52	Low
Affective Values	3.56	0.71	High
Sociocultural Awareness	4.30	0.69	Very High
Overall	**2.85**	**0.64**	**Moderate**

The sociocultural awareness domain received the highest ratings, indicating students' strong connection to their cultural environment. However, cognitive knowledge and psychomotor skills domains showed concerning deficits, suggesting inadequate systematic instruction about local heritage content.

6.1.3 Specific Knowledge Gaps

Analysis of individual questionnaire items revealed critical knowledge gaps. Students demonstrated minimal knowledge about cultural heritage found in the park (M=1.15, SD=0.42) and limited technology skills for heritage learning support (M=1.11, SD=0.38). These findings highlighted urgent needs for systematic knowledge building and technology integration.

6.1.4 Qualitative Themes

Thematic analysis of 72 stakeholder interviews revealed five primary themes:

Limited Curricular Integration: Most schools lacked systematic integration of local heritage content into existing curricula.

Resource Constraints: Schools reported insufficient funding, materials, and transportation for heritage-based learning activities.

Teacher Preparation Needs: Teachers expressed limited confidence and preparation for teaching heritage content effectively.

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Community Disconnection: Weak connections between schools and local heritage communities limited authentic learning opportunities.

Assessment Challenges: Absence of appropriate assessment tools for measuring heritage learning outcomes.

6.2 Phase 2: Learning Management Model Development

6.2.1 Expert Consensus

Focus group discussions with eight experts achieved consensus on a comprehensive learning management model termed "BEC-D-CE" (Background-Exploration-Creation-Discussion-Community-Evaluation). The model incorporated six sequential phases designed to promote deep learning and cultural connection.

6.2.2 Theoretical Integration

The developed model integrated multiple theoretical frameworks:

Constructivist Learning Theory: Students actively construct knowledge through experience and reflection

Experiential Learning Theory: Learning occurs through concrete experience, reflection, abstract conceptualization, and active experimentation

Culturally Responsive Pedagogy: Instruction builds upon students' cultural assets and community knowledge

Place-Based Education: Learning connects to local environments and community resources

6.2.3 Model Components

The BEC-D-CE model consists of six integrated phases:

Background Building (B): Foundation knowledge development through multimedia presentations, readings, and preliminary discussions

Exploration (E): Site-based field learning at Phu Phra Bat Historical Park with guided observation activities

Creation (C): Hands-on artifact analysis, creative projects, and knowledge construction activities

Discussion (D): Collaborative reflection sessions, peer dialogue, and concept consolidation

Community Connection (C): Interactions with local experts, community members, and heritage practitioners

Evaluation (E): Comprehensive assessment through portfolios, presentations, and reflection essays

6.3 Phase 3: Model Implementation Results

6.3.1 Participant Characteristics

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The implementation phase included 50 Grade 9 students (56% age 15, 20% age 14, 24% age >15) from two schools. Gender distribution was 52% male and 48% female, with all participants from rural backgrounds.

6.3.2 Academic Achievement Outcomes

Paired-samples t-test analysis revealed significant improvements in cultural heritage knowledge from pretest to posttest:

Table 2: Pretest-Posttest Comparison Results

Measure	Pretest M(SD)	Posttest M(SD)	t	df	p	Cohen's d
Heritage Knowledge	7.48(2.00)	16.08(1.14)	-28.94	49	<.001	5.23
Local Pride Scale	3.12(0.68)	4.21(0.45)	-12.67	49	<.001	1.85

Results demonstrated large effect sizes for both heritage knowledge (d=5.23) and local pride (d=1.85), indicating substantial practical significance of the intervention.

6.3.3 Satisfaction Levels

Student satisfaction with the learning management model was high across all measured dimensions:

Table 3: Student Satisfaction Ratings

Dimension	Mean	SD	Level
Content Relevance	4.34	0.51	Very High
Learning Activities	4.28	0.48	Very High
Teacher Facilitation	4.31	0.44	Very High
Technology Integration	4.15	0.62	High
Overall Satisfaction	4.27	0.41	Very High

6.3.4 Learning Process Observations

Qualitative observations during implementation revealed several positive indicators:

- Increased student engagement during field-based activities
- Enhanced peer collaboration and discussion quality
- Improved confidence in presenting heritage-related topics
- Greater interest in local history and cultural preservation
- Strengthened connections between Buddhist values and heritage conservation

6.4 Phase 4: Stakeholder Evaluation Results

6.4.1 Evaluation Dimensions

Stakeholder evaluation (n=10) assessed three key dimensions of the learning management model:

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Table 4: Stakeholder Evaluation Results

Dimension	Mean	SD	Level
Efficiency	**4.13**	**0.45**	**High**
Human Resources	4.05	0.35	High
Time Management	4.18	0.52	High
Material Resources	4.15	0.48	High
Effectiveness	**3.69**	**0.39**	**High**
Goal Achievement	4.05	0.35	High
Learning Outcomes	3.51	0.56	High
Curriculum Alignment	3.50	0.25	High
Impact	**4.33**	**0.79**	**Very High**
School Learning Environment	4.51	0.89	Very High
Community Engagement	4.30	0.59	Very High
Student Character Development	4.20	0.75	High

6.4.2 Stakeholder Feedback Themes

Qualitative analysis of stakeholder feedback identified several key themes:

Model Appropriateness: Stakeholders praised the model's cultural sensitivity and alignment with Buddhist educational values

Implementation Feasibility: Most stakeholders considered the model practical for implementation with adequate preparation and resources

Student Engagement: Unanimous agreement that the model significantly enhanced student motivation and participation

Community Benefits: Recognition that the model strengthened school-community relationships and heritage awareness

Sustainability Concerns: Some stakeholders expressed concerns about long-term resource requirements and teacher preparation needs

7. DISCUSSION

7.1 Interpretation of Findings

This study's findings provide strong evidence for the effectiveness of the BEC-D-CE learning management model in promoting cultural heritage knowledge and local pride among lower secondary students in Phrapariyattidhamma schools. The large effect sizes observed for both knowledge acquisition (d=5.23) and local pride development (d=1.85) substantially exceed typical educational intervention effects, suggesting the model's exceptional practical significance (Hattie, 2023).

The initial needs assessment revealed a concerning paradox: while students demonstrated high sociocultural awareness and affective connection to their cultural environment, they possessed minimal systematic knowledge about specific heritage content. This finding aligns with research by Srisawat et al. (2023), who identified similar knowledge

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gaps in northeastern Thai schools despite strong cultural affinity. The discrepancy suggests that informal cultural transmission, while maintaining emotional connections, requires systematic educational support to develop comprehensive heritage literacy.

7.2 Theoretical Contributions

The study's theoretical contributions center on the successful integration of constructivist learning theory with culturally responsive pedagogy in a Buddhist educational context. The BEC-D-CE model demonstrates how experiential learning phases can be systematically structured to promote both cognitive development and cultural identity formation (Kolb, 2023). This integration addresses gaps identified by Panyasiri (2022) regarding the need for culturally appropriate pedagogical frameworks in Thai Buddhist education.

The model's emphasis on community connection phases reflects Vygotsky's sociocultural learning theory, demonstrating how authentic cultural learning emerges through interaction with more knowledgeable community members (Pritchard, 2021). The significant improvements in local pride scores suggest that systematic heritage education can strengthen cultural identity while enhancing academic achievement, supporting arguments by Gay (2022) for culturally responsive educational approaches.

7.3 Practical Implications

The study's practical implications extend beyond the immediate research context to broader applications in heritage education. The BEC-D-CE model provides a replicable framework for integrating UNESCO World Heritage sites into formal education curricula, addressing implementation gaps identified in previous research (Harrison, 2020).

The model's success in Buddhist educational contexts suggests potential for adaptation across diverse cultural and religious educational settings. The integration of meditation and reflection practices within heritage learning activities offers insights for educators seeking to combine contemplative practices with academic content (Thongsuwan & Kaewkuekool, 2021).

Furthermore, the study demonstrates how newly designated World Heritage sites can serve as catalysts for educational innovation. The timing of Phu Phra Bat's UNESCO designation created unique opportunities for educational integration that might be applicable to other recent designations globally.

7.4 Addressing Research Questions

Research Question 1: Current conditions assessment revealed moderate overall learning management conditions with significant variations across domains. While students demonstrated strong cultural affinity, substantial knowledge gaps existed regarding specific heritage content and technological skills. These findings highlight the need for systematic curriculum integration and teacher preparation.

Research Question 2: The developed BEC-D-CE learning management model successfully integrated constructivist, experiential, and culturally responsive pedagogical

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approaches. Expert consensus validated the model's theoretical foundation and practical applicability within Buddhist educational contexts.

Research Question 3: Model implementation produced significant improvements in both heritage knowledge and local pride measures, with effect sizes indicating substantial practical significance. Student satisfaction ratings were consistently high across all measured dimensions.

Research Question 4: Stakeholder evaluation revealed high ratings across efficiency, effectiveness, and impact dimensions. Qualitative feedback emphasized the model's cultural appropriateness and student engagement benefits, while noting sustainability challenges requiring ongoing attention.

7.5 Limitations and Constraints

Several limitations should be acknowledged in interpreting these findings. First, the experimental design lacked a control group, limiting causal inferences about the model's effectiveness. Future research should employ randomized controlled trial designs to strengthen causal claims (Shadish et al., 2022).

Second, the study's focus on a single UNESCO World Heritage site in one Thai province limits generalizability to other heritage contexts. Cross-cultural validation studies would strengthen confidence in the model's broader applicability (Stylianou-Lambert et al., 2022).

Third, the relatively short implementation period (six weeks) prevents assessment of long-term retention and sustained attitude change. Longitudinal follow-up studies are needed to evaluate the model's enduring effects (Chen & Liu, 2023).

Fourth, the study's reliance on self-report measures for local pride assessment introduces potential social desirability bias. Future research should incorporate behavioral and observational measures to complement self-report data (Rodriguez & Martinez, 2022).

7.6 Comparison with Previous Research

The study's findings align with previous research demonstrating positive effects of heritage education on student engagement and cultural identity (Copeland, 2021; Thompson et al., 2023). However, the effect sizes observed in this study substantially exceed those reported in most previous research, suggesting particular effectiveness of the Buddhist educational context or the specific model design.

The emphasis on experiential learning components supports findings by Stylianou-Lambert et al. (2022) regarding the superiority of hands-on heritage education approaches. Similarly, the study's community integration focus aligns with place-based education research demonstrating enhanced engagement when learning connects to local environments (Sobel, 2021).

The successful technology integration addresses concerns raised by Wilson and Brown (2021) about digital divide issues in heritage education, demonstrating that carefully designed technology integration can enhance rather than replace authentic cultural experiences.

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7.7 Future Research Directions

Several future research directions emerge from this study's findings. First, randomized controlled trials comparing the BEC-D-CE model with traditional instructional approaches would strengthen causal inferences about effectiveness. Such studies should include multiple heritage sites and diverse cultural contexts to assess generalizability.

Second, longitudinal research tracking students over multiple academic years would provide insights into the model's sustained effects on cultural identity, academic achievement, and career interests. Particular attention should be paid to whether heritage education influences students' post-graduation choices regarding cultural preservation careers.

Third, comparative studies examining the model's effectiveness across different types of heritage sites (archaeological, architectural, natural, intangible) would provide insights into optimal applications. Such research could inform heritage site selection criteria for educational integration.

Fourth, research examining the model's effects on broader community outcomes, including heritage conservation awareness, tourism development, and intergenerational cultural transmission, would provide insights into heritage education's societal benefits.

Finally, studies investigating the model's adaptation for different educational levels (primary, upper secondary, tertiary) and institutional contexts (secular schools, other religious institutions) would expand its potential applications.

8. CONCLUSION

This study successfully developed and validated the BEC-D-CE learning management model for integrating Phu Phra Bat Historical Park cultural heritage content into lower secondary education. The model demonstrated significant effectiveness in enhancing students' heritage knowledge and local pride while maintaining high levels of student satisfaction and stakeholder approval.

The research makes several important contributions to heritage education scholarship. Theoretically, it demonstrates successful integration of constructivist, experiential, and culturally responsive pedagogical approaches within Buddhist educational contexts. Methodologically, it provides a rigorous mixed-methods framework for evaluating heritage education interventions. Practically, it offers a replicable model for integrating UNESCO World Heritage sites into formal education curricula.

The study's findings have important implications for educational policy and practice in Thailand and beyond. The demonstrated effectiveness of systematic heritage education supports arguments for greater curricular integration of local cultural content. The model's success in Buddhist educational contexts suggests potential for adaptation across diverse cultural and religious educational settings.

However, several challenges remain for widespread implementation. These include teacher preparation needs, resource requirements, and sustainability concerns identified by stakeholders. Addressing these challenges will require coordinated efforts among educational institutions, heritage organizations, and government agencies.

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The study's timing coinciding with Phu Phra Bat's UNESCO designation created unique opportunities for educational innovation that might be applicable to other recent heritage designations globally. As the number of recognized World Heritage sites continues to grow, the need for systematic educational integration becomes increasingly important for heritage preservation and cultural continuity.

Future research should focus on expanding the model's applications, conducting randomized controlled trials, and examining long-term effects on both individual students and broader communities. Such research will contribute to growing understanding of heritage education's role in fostering cultural identity, academic achievement, and heritage preservation in an increasingly globalized world.

The BEC-D-CE model represents a promising approach to heritage education that honors cultural traditions while embracing contemporary pedagogical innovations. Its success in promoting both learning and cultural pride demonstrates the potential for education to serve as a bridge between past and future, connecting students with their heritage while preparing them for their roles as cultural stewards in the 21st century.

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APPENDICES

Appendix A: Cultural Heritage Knowledge Assessment Instrument

Instructions: Please select the best answer for each question about Phu Phra Bat Historical Park and its cultural significance.

Sample Items:

1. Phu Phra Bat Historical Park is located in which district of Udon Thani Province? a) Mueang Udon Thani b) Ban Phue c) Nong Wua So d) Phen
2. The sema stones found in Phu Phra Bat primarily date from which historical period? a) Sukhothai Period b) Ayutthaya Period c) Dvaravati Period d) Lanna Period [Continue with 18 additional items...]

Appendix B: Local Pride Measurement Scale

Instructions: Please indicate your level of agreement with each statement using the following scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Neither Agree nor Disagree, 4 = Agree, 5 = Strongly Agree

Emotional Connection Dimension:

1. I feel proud when I think about Phu Phra Bat Historical Park
2. Visiting Phu Phra Bat makes me feel connected to my ancestors
3. I experience a sense of belonging when I am at Phu Phra Bat
4. The cultural heritage of Phu Phra Bat gives me a sense of identity
5. I feel emotionally attached to the traditions represented at Phu Phra Bat

Cultural Appreciation Dimension: 6. I believe Phu Phra Bat represents important cultural values 7. The historical significance of Phu Phra Bat is meaningful to me 8. I

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appreciate the artistic and architectural features of Phu Phra Bat 9. The spiritual significance of Phu Phra Bat is important to me 10. I value the traditional knowledge preserved at Phu Phra Bat

Behavioral Intentions Dimension: 11. I would like to learn more about Phu Phra Bat's history 12. I plan to visit Phu Phra Bat again in the future 13. I would recommend visiting Phu Phra Bat to others 14. I want to participate in activities that preserve Phu Phra Bat 15. I would support efforts to protect and maintain Phu Phra Bat

Appendix C: Statistical Analysis Summary Tables

Table C1: Descriptive Statistics for All Study Variables

Variable	N	Minimum	Maximum	Mean	SD	Skewness	Kurtosis
Pre-test Knowledge	50	3	12	7.48	2.00	0.23	-0.45
Post-test Knowledge	50	13	18	16.08	1.14	-0.67	0.89
Pre-test Local Pride	50	1.87	4.13	3.12	0.68	-0.12	-0.34
Post-test Local Pride	50	3.33	5.00	4.21	0.45	-0.23	-0.78
Age	50	14	17	15.08	0.84	0.45	0.12

Table C2: Correlation Matrix for Study Variables

Variable	1	2	3	4	5
1. Pre-knowledge	-				
2. Post-knowledge	.34*	-			
3. Pre-pride	.28*	.41**	-		
4. Post-pride	.19	.52**	.67**	-	
5. Age	.12	.23	.15	.18	-

*p < .05, **p < .01

Table A3: ANOVA Results for School Differences

Variable	Source	SS	df	MS	F	p	η²
Pre-knowledge	Between Schools	12.45	1	12.45	3.18	.081	.062
	Within Groups	187.92	48	3.91			
	Total	200.37	49				
Post-knowledge	Between Schools	2.34	1	2.34	1.81	.185	.036
	Within Groups	62.16	48	1.30			
	Total	64.50	49				

Appendix D: Qualitative Data Analysis Framework

Thematic Analysis Coding Scheme for Stakeholder Interviews

Primary Theme 1: Model Effectiveness

- Subtheme 1a: Student engagement indicators
- Subtheme 1b: Learning outcome achievement

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- Subtheme 1c: Knowledge retention evidence
- Subtheme 1d: Skill development observations

Primary Theme 2: Implementation Feasibility

- Subtheme 2a: Resource requirements
- Subtheme 2b: Time management challenges
- Subtheme 2c: Teacher preparation needs
- Subtheme 2d: Institutional support factors

Primary Theme 3: Cultural Appropriateness

- Subtheme 3a: Buddhist value integration
- Subtheme 3b: Local community acceptance
- Subtheme 3c: Traditional knowledge respect
- Subtheme 3d: Intergenerational connection

Primary Theme 4: Sustainability Considerations

- Subtheme 4a: Long-term resource planning
- Subtheme 4b: Teacher training systems
- Subtheme 4c: Community partnership development
- Subtheme 4d: Curriculum integration pathways

Sample Interview Quotes by Theme:

Model Effectiveness: "The students were completely different after the field visit. They started asking questions I had never heard from them before about our local history." (Teacher, School A)

Implementation Feasibility: "We need more training for teachers, but the basic structure of the model works well with our existing schedule." (Principal, School B)

Cultural Appropriateness: "This approach honors both our Buddhist teachings and our local heritage in a way that feels natural and respectful." (Community Elder)

Sustainability Considerations: "The challenge will be maintaining this level of community involvement year after year without additional funding." (Education Expert)

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