SUCCESS FACTORS IN DEVELOPING A GEOLOGICAL TOURISM CURRICULUM FOR SCHOOLS IN THE UBON RATCHATHANI GEOPARK AREA*

ปัจจัยแห่งความสำเร็จในการพัฒนาหลักสูตรการท่องเที่ยวเชิงธรณีวิทยา สำหรับโรงเรียนในพื้นที่อุทยานธรณีอุบลราชธานี

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Abstract

This research article aims to explore the development of a geotourism curriculum for schools located within the Ubon Ratchathani Geopark area, with three main objectives to compare success components based on personal factors, to identify key success factors, and to propose developmental guidelines. A mixed-methods approach was employed, combining quantitative data from 400 participants across four districts with qualitative data obtained through interviews and focus group discussions involving 40 stakeholders.

The research findings revealed that personal factors such as gender, age, education, and income significantly influenced opinions on curriculum development. Four key success factors were identified: curriculum planning, operational management, outcome evaluation, and process improvement, which together accounted for 77.8% of the variance in success. Recommendations included revising content, adapting training methods and venues to local contexts, fostering collaboration in curriculum design, and implementing post-training evaluations to ensure continuous improvement.

*Received February 25, 2025; Revised June 29, 2025; Accepted July 1, 2025

The results underscore the importance of integrating theoretical knowledge with practical experience to cultivate skilled local tour guides, promote sustainable tourism, and support regional development. The initiative aligns with the UNESCO Global Geoparks program and aims to empower communities through education and conservation efforts.
Keywords: Success Factors; Curriculum Development; Geological Tourism; Ubon Ratchathani Geopark; Schools

บทคัดย่อ

บทความวิจัยนี้มีวัตถุประสงค์เพื่อสำรวจการพัฒนาหลักสูตรการท่องเที่ยวเชิงธรณีวิทยาสำหรับโรงเรียนในพื้นที่อุทยานธรณีอุบลราชธานี โดยมุ่งเน้นวัตถุประสงค์สามประการ การเปรียบเทียบองค์ประกอบความสำเร็จตามปัจจัยส่วนบุคคล การระบุปัจจัยความสำเร็จที่สำคัญ และการเสนอแนวทางการพัฒนา โดยใช้วิธีการแบบผสมผสาน ข้อมูลเชิงปริมาณจากผู้เข้าร่วม 400 คนจากสี่อำเภอได้รับการวิเคราะห์ร่วมกับข้อมูลเชิงคุณภาพจากการสัมภาษณ์และการสนทนากลุ่มกับผู้มีส่วนได้ส่วนเสีย 40 คน

ผลการวิจัยพบว่า ปัจจัยส่วนบุคคล เช่น เพศ อายุ การศึกษา และรายได้ มีอิทธิพลอย่างมีนัยสำคัญต่อความคิดเห็นเกี่ยวกับการพัฒนาหลักสูตร นอกจากนี้ ยังได้ระบุปัจจัยความสำเร็จที่สำคัญสี่ประการ ได้แก่ การวางแผนหลักสูตร การบริหารจัดการการดำเนินงาน การประเมินผลลัพธ์ และการปรับปรุงกระบวนการ ซึ่งคิดเป็น 77.8% ของความแปรปรวนของความสำเร็จ ข้อเสนอแนะรวมถึงการปรับปรุงเนื้อหา การปรับวิธีการฝึกอบรมและสถานที่ให้เหมาะสม การส่งเสริมความร่วมมือในการออกแบบหลักสูตร และการประเมินผลหลังการฝึกอบรมเพื่อให้มั่นใจว่ามีการปรับปรุงอย่างต่อเนื่อง ผลการวิจัยเน้นการบูรณาการความรู้ทางทฤษฎีกับประสบการณ์ภาคปฏิบัติเพื่อพัฒนามัคคุเทศก์ท้องถิ่นที่มีทักษะ พร้อมทั้งส่งเสริมการท่องเที่ยวอย่างยั่งยืนและการพัฒนาภูมิภาค โครงการนี้สอดคล้องกับโปรแกรมอุทยานธรณีโลกของยูเนสโก และมีเป้าหมายเพื่อเสริมพลังให้ชุมชนผ่านการศึกษาและความพยายามในการอนุรักษ์
คำสำคัญ: ปัจจัยความสำเร็จ; การพัฒนาหลักสูตร; การท่องเที่ยวเชิงธรณีวิทยา; อุทยานธรณีอุบลราชธานี; โรงเรียน

Introduction

Thailand's geological heritage and natural resources offer significant potential for sustainable development through geotourism, with the Department of Mineral Resources actively promoting geoparks to conserve geological sites while supporting education, research, and local economic growth (Department of Mineral Resources, 2010; Ubon Ratchathani Provincial Education Office, 2023). The Ubon Ratchathani Geopark holds particular significance as Thailand's third National Geopark, designated in 2019, containing 46 geological sites with outstanding features including Sam Phan Bok with the most natural potholes in ASEAN and Thailand's largest sandstone cave (Department of Mineral Resources, 2022; National Geoparks Committee, 2022). These extraordinary geological formations provide unparalleled hands-on learning opportunities that cannot be replicated in traditional classroom settings, making Ubon Ratchathani an exceptional location for integrating geotourism education into school curricula.

The educational importance extends beyond geology to encompass sustainable tourism development and community empowerment, with schools in the geopark area serving approximately 533,524 residents across four districts who depend on agriculture and emerging tourism sectors for their livelihoods (Ubon Ratchathani Agriculture and Cooperatives Office, 2023). The region's strategic location in Thailand's easternmost region near the Mekong River border with Laos positions it as a gateway for regional geotourism development, featuring sedimentary rocks of the Khorat Plateau with spectacular landforms (Department of Mineral Resources, 2022). While the geopark's alignment with UNESCO's Global Geopark Program standards ensures curriculum development efforts contribute to internationally recognized conservation and education goals (Office of Natural Resources and Environmental Policy and Planning, 2022), the area faces challenges including inadequate tourism management, limited public awareness of geological conservation, and a shortage of trained local guides (Ubon Ratchathani Agriculture and Cooperatives Office, 2023).

This study focuses on developing a geotourism curriculum for schools in the Ubon Ratchathani Geopark area, guided by curriculum development theories and sustainable tourism principles (Tyler, 1999; Ornstein & Hunkins, 1988; Newsome & Dowling, 2010). The research explores success factors in curriculum development, emphasizing planning, implementation, evaluation, and continuous improvement to overcome challenges such as seasonal accessibility and evolving educational standards (Ubon Ratchathani Provincial Education Office, 2023). Ultimately, this initiative supports UNESCO's Global Geopark Program while empowering local communities and serving as a replicable model for integrating conservation, community development, and sustainable tourism practices in geopark regions worldwide.

Research Objectives

1. To compare the success components of geological tourism curriculum development based on personal factors

2. To study success factors in developing a geological tourism curriculum for schools in the Ubon Ratchathani Geopark area

3. To propose guidelines for developing a geological tourism curriculum for schools in the Ubon Ratchathani Geopark area

Methodology

1. Research Design

The study employed a mixed-methods research design integrating quantitative and qualitative approaches to address three main objectives. Quantitatively, 400 stakeholders from the Ubon Ratchathani Geopark area were selected using Yamane's formula, with data collected through structured questionnaires featuring demographic information, curriculum development opinions, and success factor evaluations using a 5-point Likert scale. Qualitatively, the research conducted interviews and focus group discussions with 40 key informants including educators, students, community leaders, and geologists to propose curriculum development guidelines. The questionnaire's reliability was

confirmed through pilot testing and Cronbach's Alpha analysis, while qualitative data were analyzed using content analysis to identify recurring themes.

2. Populations and Samples and Key Informants

2.1 The study population comprised stakeholders from four districts within the Ubon Ratchathani Geopark area: Pho Sai, Si Mueang Mai, Khong Chiam, and Sirindhorn, totaling approximately 533,524 people.

2.2 For quantitative analysis, convenience sampling was used to select 400 individuals using Yamane (1973) formula to ensure statistical representativeness across the four districts, with participants proportionally distributed based on population density and stakeholder diversity.

2.3 For qualitative analysis, 40 key informants were strategically selected through purposive sampling to ensure comprehensive representation of all stakeholder groups. The informants were distributed across five categories: educational sector representatives (15 informants), community representatives (10 informants), government officials (8 informants), private sector participants (4 informants), and academic/technical experts (3 informants). This comprehensive selection approach ensured geographic distribution across all four districts and captured diverse perspectives necessary for developing contextually appropriate geotourism curriculum guidelines.

3. Research Instrument

The primary quantitative instrument was a structured questionnaire evaluating stakeholder opinions on curriculum development and success factors, incorporating demographic information, Likert-scale assessments, and success factor evaluations based on Best's criteria. The questionnaire underwent validation through Index of Congruency (IOC) review by advisors and pilot testing with 30 participants to ensure reliability (Cronbach's Alpha ≥ 0.7). For qualitative data collection, semi-structured interviews and focus group discussions were employed using interview guides developed from theoretical frameworks and research objectives.

4. Data Collection

4.1 Quantitative data collection involved administering the finalized questionnaire to the sample population, with descriptive and inferential statistics used for analysis, including T-tests, ANOVA, and multiple regression analysis to test hypotheses related to demographic factors and success components.

4.2 Qualitative data collection included interviews and focus group discussions with key informants, conducted after securing fieldwork permissions from Ubon Ratchathani University's Faculty of Liberal Arts. Data were gathered through on-site interactions with stakeholders in schools and community settings within the geopark area.

5. Data Analysis Statistics Used to Analyzed The Data

Quantitative analysis relied on statistical software to generate descriptive metrics frequency, mean, percentage, and standard deviation and to run inferential tests. Independent-Samples T-tests compared two groups, One-Way ANOVA examined differences across multiple groups, and Multiple Regression isolated the influence of the four success components on curriculum outcomes. Complementing these numbers, qualitative data from interviews and focus groups were coded through content analysis to uncover recurring themes. Together, the mixed methods revealed that Curriculum Planning, Implementation Management, Outcome Evaluation, and Process Improvement collectively explained 77.8% of the variance in curriculum effectiveness, offering a robust evidence base for refining the Ubon Ratchathani Geopark geotourism program.

Results

The researcher analyzed opinion levels from stakeholders involved in developing the geological tourism curriculum for schools in the Ubon Ratchathani Geopark area across 7 aspects, using statistical analysis of mean and standard deviation.

Table 1 Stakeholder Opinions on Geological Tourism Curriculum Development

Curriculum Development Aspects	Mean	SD	Opinion Level	Rank
Curriculum Planning	3.84	0.85	High	1
Curriculum Preparation	3.83	0.83	High	2
Curriculum Process Improvement	3.81	0.86	High	3
Curriculum Content Development	3.80	0.88	High	4
Curriculum Implementation	3.76	0.85	High	5
Curriculum Operation Summary	3.76	0.87	High	6
Curriculum Monitoring and Evaluation	3.76	0.89	High	7
Overall	**3.79**	**0.78**	**High**	-

The stakeholders' overall opinion towards the geological tourism curriculum development for schools in the Ubon Ratchathani Geopark area was at a high level (mean=3.79). When examining individual aspects, curriculum planning ranked highest (mean=3.84), followed by curriculum preparation (mean=3.83), and curriculum process improvement (mean=3.81). Curriculum content development ranked fourth (mean=3.80), while curriculum implementation, operation summary, and monitoring and evaluation all scored equally (mean=3.76).

Table 2 Mean, Standard Deviation, and Importance Levels of Success Factors for Geological Tourism Curriculum Development in Ubon Ratchathani Geopark Schools

Success Factors	Mean	SD	Importance Level	Rank
Curriculum Objectives	3.85	0.87	High	1
Learning Process Management	3.82	0.83	High	2
Curriculum Content	3.82	0.88	High	3
Curriculum Evaluation	3.81	0.87	High	4
Overall	**3.82**	**0.81**	**High**	-

The stakeholders rated the success factors for geological tourism curriculum development at a high level overall (mean=3.82). When examining individual aspects, curriculum objectives ranked highest (mean=3.85), followed by learning process management (mean=3.82), curriculum content (mean=3.82), and curriculum evaluation (mean=3.81).

Table 3 Multiple Regression Analysis of Success Factors in Geological Tourism Curriculum Development

Variables	Beta (β)	Standard Error	t-value	Sig.	VIF
Independent Variables					
Curriculum Planning	0.312	0.045	6.933	0.000*	1.245
Implementation Management	0.278	0.048	5.792	0.000*	1.312
Outcome Evaluation	0.251	0.051	4.922	0.000*	1.398
Process Improvement	0.224	0.049	4.571	0.000*	1.267

Table 4 Model Summary

Statistic	Value
R	0.882
R Square	0.778
Adjusted R Square	0.775
Std. Error of the Estimate	0.421
F-statistic	346.847
Sig. F Change	0.000*
Durbin-Watson	**1.987**

Note: *Significant at $p < 0.05$ level

Dependent Variable: Success in Geological Tourism Curriculum Development

N = 400

The multiple regression analysis demonstrates that Curriculum Planning serves as the most critical determinant of geotourism curriculum success, with a standardized coefficient of β=0.312, followed by Implementation Management (β=0.278), Outcome Evaluation (β=0.251), and Process Improvement (β=0.224). These four interdependent factors collectively account for 77.8% of the variance in curriculum development effectiveness (R^2=0.778), with statistical significance confirmed by an F-statistic of 346.847 ($p < 0.001$) and no multicollinearity concerns (VIF < 2.0). The planning phase establishes a structured framework that strategically integrates signature geosites such as Pha Chan and Sam Phan Bok with collaborative co-design involving educators, geologists, and community leaders to ensure cultural alignment and address seasonal constraints.

The curriculum's operational success depends on a dual-approach implementation that seamlessly combines classroom theoretical instruction with experiential field-based activities including geological surveys, rock

identification workshops, and tour-guide training simulations. This integrated model maintains its effectiveness through robust evaluation systems employing both quantitative assessments and qualitative stakeholder feedback, while continuous improvement mechanisms enable adaptive responses to practical challenges such as monsoon-related accessibility issues. The program's alignment with UNESCO Global Geopark Program standards ensures that students develop into knowledgeable local guides who can promote sustainable tourism practices and strengthen regional identity, positioning the Ubon Ratchathani Geopark as a replicable model for education-driven sustainable development.

Discussion

Stakeholder views on the Ubon Ratchathani Geopark curriculum differ by gender, age, education, occupation, and income (Sivalak & Ekrat, 2022), echoing curriculum theories that stress aligning objectives, content, learning processes, and evaluation with varied learner needs (Ornstein & Hunkins, 1988; Tyler, 1999). Multiple-regression confirms that planning, management, implementation, and evaluation jointly account for 77.8% of curriculum success (Department of Mineral Resources, 2022), emphasising the value of experiential approaches field trips and guided tours for translating geological theory into practice (Newsome & Dowling, 2010) and the need for season-aware flexibility (Techathorn, 2019).

Accordingly, the guidelines highlight broad stakeholder collaboration, continuous assessment, and alignment with UNESCO Global Geopark standards (Yang & Li, 2022). Hands-on tasks such as rock-identification and conservation projects sustain student engagement, while iterative feedback ensures responsiveness to evolving educational and environmental conditions (Tractenberg et al., 2020). By balancing academic rigour with community priorities, the model shows how education can advance sustainable tourism and heritage preservation, offering a replicable template for other geopark regions (Darinee et al., 2024).

Body of Knowledge

The Integrated Geotourism-Curriculum Success Model (IGCSM) that emerged from this study is a four-stage, cyclical framework grounded in UNESCO Global Geopark principles and validated through mixed-methods analysis, where multiple-regression testing showed that Curriculum Planning, Implementation Management, Outcome Evaluation, and Continuous Improvement collectively explain 77.8% of the variance in perceived curriculum success. The model operates as a closed loop emphasizing stakeholder collaboration, where Curriculum Planning aligns objectives and fieldwork with signature geosites like Pha Chan and Sam Phan Bok through co-design by teachers, geologists, and community leaders; Implementation Management blends classroom instruction with experiential activities including rock-identification workshops and tour-guide simulations; Outcome Evaluation employs tests, surveys, and focus-group feedback benchmarked against UNESCO Geopark education indicators; and Continuous Improvement uses evaluation data to adjust content, pedagogy, and logistics such as shifting field modules during monsoon months. The IGCSM provides an operational roadmap for schools seeking to balance academic rigor with community needs, enabling educators and policymakers to visualize how theoretical learning and hands-on field experience converge to produce skilled local guides, foster sustainable tourism, and strengthen regional identity in the Ubon Ratchathani Geopark area.

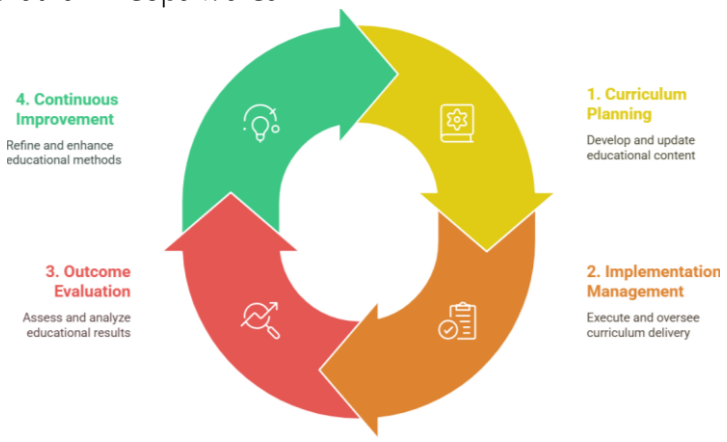

Figure 1 The Integrated Geotourism-Curriculum Success Model (IGCSM)

Recommendations

Policy Recommendations

Stakeholders should establish formal partnerships between schools, the Department of Mineral Resources, and UNESCO Global Geopark networks to create standardized geotourism curriculum frameworks. Educational authorities must develop contextually relevant content highlighting unique geological features like Sam Phan Bok's natural potholes and Pha Chan's cliff formations, while implementing the IGCSM through collaborative networks among educators, geologists, and community leaders. Schools should invest in essential field equipment, safety protocols, and transportation infrastructure to support hands-on geological surveys and guided tour training.

Operational Recommendations

Schools must establish flexible scheduling systems accommodating both classroom instruction and field-based learning activities, ensuring year-round geological surveys and guided tour simulations while adapting to seasonal weather patterns. Teachers should collaborate directly with local geological experts to deliver integrated lessons combining theoretical knowledge with hands-on experiences at key geosites, while implementing systematic feedback mechanisms through regular surveys and stakeholder meetings. Institutions should develop comprehensive safety protocols, resource management systems, and student assessment portfolios documenting both academic achievement and practical geotourism competencies.

Recommendations for Next Research

Future research should conduct longitudinal evaluations of curriculum implementation across multiple schools, building comprehensive databases of learning outcomes and community impact. Researchers should investigate different pedagogical approaches in geotourism education, comparing traditional classroom instruction with experiential field-based learning methods. Additional studies should examine the curriculum's impact on local economic development, explore IGCSM framework transferability to other geopark contexts internationally, and assess long-term sustainability by

evaluating teacher retention, resource availability, and institutional commitment.

Acknowledgement

We extend our heartfelt gratitude to the Faculty of Liberal Arts at Ubon Ratchathani University for their generous financial support, which made this research possible. Special thanks to our colleagues for their invaluable insights and collaborative spirit throughout this project. We also appreciate the administrative and technical teams for their seamless support. Lastly, we thank our families and friends for their unwavering encouragement and patience during this academic journey. This research is a collective effort, and we are deeply thankful to everyone who contributed to its success.

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