TOURISM VALUE PERCEPTION OF GUA PELANGI ARCHAEOLOGICAL SITE BY LOCAL VISITORS

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Abstract: Archaeotourism represents an emerging niche within sustainable tourism that integrates heritage conservation, environmental stewardship, and visitor engagement. This study investigates the perceived tourism value of Gua Pelangi, Negeri Sembilan, as a newly recognised archaeological destination in Malaysia. Specifically, it examines the extent to which archaeological attributes influence visitation decisions, evaluates whether the site meets visitor expectations, measures overall destination attractiveness using the Fishbein Multi-Attribute Attitude Model, and identifies the key determinants shaping perceived attractiveness. A quantitative research design was employed, involving 252 respondents who completed structured questionnaires distributed online and on-site. Data were analysed using SPSS version 30.0. Descriptive statistics were used to profile respondents and summarise perception levels, while non-parametric tests (Mann–Whitney U, Kruskal–Wallis, and Spearman's rho) examined differences and associations among variables. The Fishbein Model was applied to compute overall attractiveness scores, and qualitative responses were thematically analysed to contextualise the statistical findings. The findings indicate that Gua Pelangi is positively perceived as a destination that combines natural beauty, heritage significance, and conservation value. Scenic landscape and environmental preservation emerged as the strongest predictors of attractiveness, while accessibility and information availability functioned as supporting attributes. The results highlight the importance of strengthening interpretive communication and targeted marketing strategies to enhance public awareness of archaeotourism. This study contributes to the growing discourse on heritage-based tourism by providing empirical evidence on value perception in emerging archaeological destinations.

Keywords: Archaeotourism, Destination attractiveness, Fishbein Model, Heritage conservation, Sustainable tourism, Visitor perception, Value formation.

1. Introduction

1.1 *Archeotourism and its niche*

The conservation of limestone forests and associated ecosystems can be significantly enhanced through the establishment of protected areas such as national parks. Limestone cave regions possess not only high environmental importance but also considerable cultural and historical value. Given their ecological sensitivity and archaeological significance, the protection of these areas is essential to ensure the preservation of biodiversity, geological formations, and heritage resources for future generations.

Tourism is recognised as one of the fastest-growing industries worldwide and serves as a major generator of foreign exchange and employment across many destinations. It represents a significant social and economic phenomenon involving the movement of individuals beyond their usual environment for personal or professional purposes. These individuals are referred to as tourists (visitors or excursionists; citizens or non-residents), and tourism encompasses the activities they undertake, many of which involve tourism-related expenditures (UNTWO, n.d). Tourism can also be understood as the act of spending time away from one's residence to fulfil needs related to leisure, relaxation, and comfort through services provided by private enterprises (Walton, 2020). In Malaysia, tourism plays a crucial role in national economic development. According to (Nair et al., 2015), tourism is the country's third-largest revenue contributor after the oil and gas and industrial sectors. The Malaysia Tourism Report 2011 indicates that revenue from travel and tourism increased by 67.1% to RM53.4 billion (US$16.69 billion) between 2006 and 2009, while tourist arrivals rose by 43.6% to 23.6 million. In

2010, tourist expenditure reached RM56.5 billion (US$17.66 billion), contributing nearly 9% to Malaysia's Gross Domestic Product (GDP).

Within this expanding industry, niche tourism has gained increasing attention in response to heightened market competition. Rather than attempting to satisfy the needs of mass tourism markets, niche tourism adopts a more targeted approach by identifying and serving specific visitor segments. Based on (Nair et al., 2015), research findings can assist the Malaysian government in repositioning rural tourism as a specialised sector and strengthening its contribution to the broader economic structure, provided there is a clear understanding of its defining characteristics. Visitors engaged in niche tourism typically possess distinct motivations, preferences, and objectives, seeking experiences that align closely with their personal interests (Ayşe Nevin SERT, 2017).

1.2 *Gua Pelangi as tourism place*

Gua Pelangi exemplifies a unique tourism resource, as it is recognised as a 14,000-year-old archaeological site located in Negeri Sembilan. The cave represents an important historical and cultural attraction while also appealing to visitors interested in outdoor and adventure-based activities. In addition to its archaeological significance, the site offers opportunities for hiking and jungle trekking within the surrounding limestone forest landscape. Visitors are able to appreciate scenic views and engage directly with the natural environment, experiences that are increasingly limited in everyday urban settings. Thus, Gua Pelangi provides both educational value related to archaeology and ancient human history, as well as recreational and environmental benefits.

2. Literature Review

2.1 *Attractiveness of tourism place*

Destination attractiveness constitutes a fundamental driving force in tourism development, as the existence of attractions is essential for sustaining the visitor industry (Ariya et al., 2017). The appeal of a tourist destination is closely associated with visitors' perceptions, particularly their evaluation of a destination's capacity to fulfil their needs and expectations. Previous research emphasises that studies on destination attractiveness are crucial for understanding the motivational factors influencing travel behaviour.

A destination that effectively satisfies visitor needs is more likely to be perceived as desirable and consequently chosen over competing alternatives (Vengesayi et al., 2009). Furthermore, destination attractiveness refers to the range and quality of attractions available to meet the demands of the tourism market and potential visitor segments (Song et al., 2010). It also encompasses visitors' perceptions and emotional responses regarding a destination's ability to meet their expectations, reflecting both cognitive and affective evaluations of the place (Dimitrov et al., 2017).

2.2 *Tourism in depth*

Tourism-related departments and agencies are commonly established by governments to support strategic objectives in tourism management and development. These institutions play a vital role in coordinating policies, regulating industry standards, and facilitating sustainable growth within the sector. In addition, tourism offices strengthen public–private partnerships in international tourism marketing and often assume a central role in destination promotion and strategic planning (Camilleri, 2018).

Archaeological tourism is generally defined as visitor activities and experiences that take place at recognised heritage sites, including historical monuments, landmarks, and archaeological discovery locations. Such tourism involves engagement with the physical remains of the past, where the tangible attributes of sites form the basis of visitor interaction and interpretation. The conceptual foundation of

archaeological tourism positions the archaeological site as its core element, reflecting the traditional classification of archaeological heritage as primarily tangible in nature (Ross et al., 2019).

2.3 *Gua Pelangi as one of a tourism place*

Gua Pelangi offers a diverse array of attractions within its surrounding area. Visitors can participate in activities such as hiking, sightseeing, and exploring the natural and cultural environment, as well as engaging in archaeological tourism at the site itself. These experiences provide opportunities for both recreational enjoyment and educational enrichment.

Located within the Pasoh Forest Reserve in Jelebu, Negeri Sembilan, Gua Pelangi is a significant prehistoric site in southern Peninsular Malaysia, providing valuable insights into the behaviour and lifestyles of early humans. Archaeological excavations have revealed that the cave was continuously occupied as a habitation and activity site from approximately 14,000 to 9,000 years ago, spanning the Late Pleistocene to early Holocene epochs. The site has yielded a rich assemblage of archaeological evidence, highlighting the subsistence strategies and technological practices of its prehistoric inhabitants (Halim et al., 2022).

Archaeotourism at sites like Gua Pelangi has the potential to generate substantial benefits for local communities, including income generation and enhanced cultural engagement with archaeological resources. Research indicates that in rural or less-developed regions where archaeological assets are located, tourism initiatives that actively involve local stakeholders can support livelihoods, stimulate economic activity, and foster stronger connections between communities and heritage sites (Pacifico & Vogel, 2012).

2.4 *Fishbein Model in tourism industry*

The Fishbein Multi-Attribute Attitude Model is widely applied in tourism research to evaluate visitors' attitudes toward destinations, attractions, and tourism experiences (Fishbein & Ajzen, 1975). By analysing the combination of beliefs regarding site attributes and their corresponding evaluations, researchers can gain insight into how visitors form overall attitudes that influence behavioral intentions, such as visiting, revisiting, or recommending a destination (Poria, Reichel, & Biran, 2006).

Perceived value in tourism refers to the visitor's overall assessment of the benefits obtained from a tourism experience relative to the costs incurred, including time, money, effort, and personal engagement. Recent studies suggest that when tourists perceive high value from their experiences, through meaningful cultural engagement, satisfying activities, or emotional rewards, where they are more likely to develop positive behavioral intentions, such as returning to the destination, recommending it to others, or engaging in supportive behaviors (Qian & Li, 2024).

3. Methodology

3.1 *Study area*

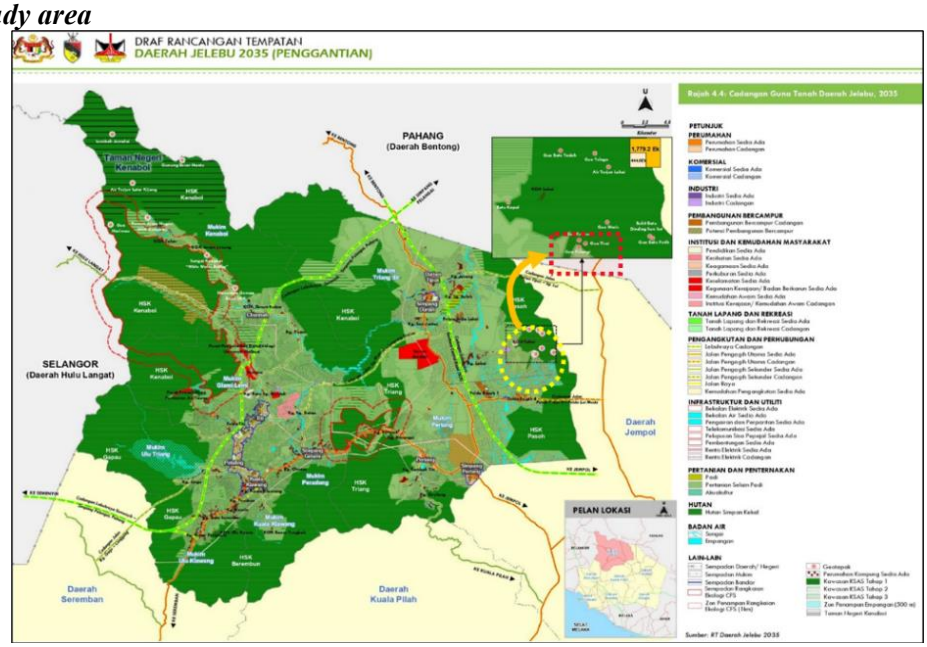

Figure 1: Map of Gua Pelangi

The research area and a map of Malaysia are shown in the figure above. Gua Pelangi, a notable archeotourism site with unique limestone formations and archaeological features, is located in Jelebu, Negeri Sembilan. This area provides opportunities to study both the ecological and cultural aspects of tourism. Negeri Sembilan, in the western part of Peninsular Malaysia, is known for its traditional culture, rivers, and hilly terrain. Jelebu, in particular, is suitable for archeotourism due to its rich biodiversity and rural heritage. Selecting Gua Pelangi allows the study to focus on a site that combines natural beauty, cultural importance, and accessibility for field research.

The main cave, along with a series of nearby caves, is referred to by locals, mainly from Felda Pasoh 4. Spanning 16 hectares and situated about 135 meters above sea level, it is a popular destination due to its historical value and rich biodiversity (BorneoPost, 2017). Archaeological studies conducted around 2014 by Prof. Datuk Dr. Mokhtar Saidin and his team from USM indicated that the limestone caves could have been inhabited in ancient times (BorneoPost, 2017).

3.2 *Questionnaire design*

Table 1: Questionnaire design

Section	Item
Section A	Demographic Profile
Section B	Importance of Gua Pelangi in making decision to go there
Section C	Expectation towards Gua Pelangi
Section D	Attractiveness value of Gua Pelangi as archeological site
Section E	Influence of Gua Pelangi as a tourism destination
Section F	Opinion and comment
Section G	Overall satisfaction

The questionnaire design comprises a total of seven components. Section A will focus on the demographic profile of the responder. Section A consists of a total of eight variables. The variables examined in this research included: (1) Gender, (2) Age, (3) Nationality, (4) Residency, (5) Occupation, (6) Purpose of Visit to Gua Pelangi, (7) Frequency of Visits to Gua Pelangi each year, and (8) Source of Information about Gua Pelangi.

4. Result Analysis

4.1 *Demographic profile of respondents*

The survey received a total of 252 responses, providing insights into the demographic characteristics of visitors to Gua Pelangi. Female respondents accounted for a higher proportion (61.5%) compared to males (38.5%), while the majority of visitors were aged between 18 and 30 years old (58.7%), followed by those aged 31 to 45 years (24.2%) and above 45 years (14.3%). All respondents were Malaysian, with the largest group residing in Negeri Sembilan (41.3%), followed by Selangor (15.1%) and Kuala Lumpur (12.7%).

Regarding employment, most respondents were employed in the private sector (37.3%), followed by self-employed individuals (20.2%) and students (15.5%). The main reasons for visiting Gua Pelangi were educational purposes (47.6%), visiting archaeological sites (27.4%), and vacations (20.6%). Most respondents visited fewer than two times per year (80.2%) and stayed for less than one night (67.5%). Small groups of 5–10 visitors were the most common (46.4%), followed by larger groups of more than ten people (32.9%), pairs (12.3%), and solo visitors (8.3%).

Visitors primarily learned about Gua Pelangi through social media (44.8%) and recommendations from friends (38.9%), with a smaller proportion informed by local sources (16.3%). Overall, these demographic profiles provide a foundational understanding of visitor characteristics, supporting the analysis of perceptions, motivations, and behaviors at Gua Pelangi.

4.2 *Reliability test*

The reliability of the survey instrument was assessed using Cronbach's Alpha, which measures internal consistency and the degree to which items on a scale contribute to the same construct (UCLA, 2020; Howard, 2016). Cronbach's Alpha values range from 0 to 1, with higher values indicating greater reliability: values of 0.9 or above are considered excellent, 0.8 or above good, 0.7 acceptable, 0.6 questionable, 0.5 poor, and below 0.5 unacceptable. In this study, the overall Cronbach's Alpha for Sections B, C, D, and E was 0.967 across 42 items, demonstrating excellent reliability. Individually, Section B (10 items) recorded 0.920, Section C (12 items) 0.939, Section D (11 items) 0.922, and Section E (9 items) 0.898, indicating that each section possessed good to excellent internal consistency. These results confirm that the questionnaire is a reliable instrument for measuring respondents' perceptions and attitudes across the key research constructs.

4.3 *Normality test*

Prior to conducting statistical analysis, it is essential to assess whether the data are normally distributed to ensure appropriate techniques are applied. In this study, normality was examined using skewness and kurtosis. Skewness indicates the asymmetry of the data distribution, with negative values showing responses clustered toward higher agreement levels, while positive values indicate clustering toward lower scores. Kurtosis measures the peakedness of the distribution, where higher values suggest more extreme responses and lower values indicate a more even spread. For a dataset to be considered normally distributed, skewness and kurtosis values should ideally fall between -2 and +2 (UCLA, 2020).

The analysis of Sections B to E revealed negative skewness across nearly all items, indicating that respondents generally agreed with statements regarding archaeological tourism, destination attractiveness, accessibility, environmental quality, and visitor expectations. Most kurtosis values fell within acceptable limits, though a few items showed elevated positive kurtosis, suggesting clustering around high agreement levels. These results indicate a tendency toward consensus and favorable perceptions of Gua Pelangi. As the data do not fully meet the normality assumptions, non-parametric analyses, such as the Kruskal-Wallis test, are deemed appropriate for further evaluation of differences among ordinal Likert-scale responses.

4.4 *Inferential analysis*

i. Mann-Whitney U Test

The Mann–Whitney U test was conducted to determine whether differences existed between two independent respondent groups regarding their perceptions of Gua Pelangi as an archaeological tourism site. This non-parametric test was chosen because the data did not follow a normal distribution. The results revealed that, for the majority of items across Sections B to Section E, there were no statistically significant differences ($p > 0.05$), suggesting that both groups generally shared similar views on the archaeological value, visitor experience, accessibility, facilities, and motivations for visiting. However, one item in Section B "Surrounding of Gua Pelangi should not be touched and have to be protected from any development" showed a significant difference ($p = 0.032$), indicating some divergence in opinions regarding environmental preservation. Overall, these findings indicate that visitors' perspectives and experiences are broadly consistent, reflecting a shared appreciation of Gua Pelangi's natural and archaeological importance, while highlighting minor variations in environmental concerns between respondent groups.

ii. Kruskal-Wallis H Test

The Kruskal-Wallis H test was applied to examine differences in perceptions based on several demographic characteristics and visitation-related variables, including age, residency, employment type, purpose of visit, frequency of visit, duration of stay, number of visitors per group, and sources of information. The analysis indicated that most demographic factors such as age, residency, and employment type, as well as visit frequency and duration, did not result in statistically significant differences in responses for Sections B to Section E ($p > 0.05$). However, significant differences were identified for a few variables: visitor motivations affected perceptions of the site's uniqueness and exotic appeal, group size influenced views on archaeological value, and prior information sources impacted visitor expectations and pre-visit behaviour. These findings demonstrate that while general perceptions are largely uniform across demographics, specific visitor characteristics and behaviours, particularly motivations and information channels, can shape particular aspects of experience and perception, emphasizing the importance of targeting communication and planning strategies for different visitor segments.

iii. Spearman Rank Correlation

Spearman's rank correlation coefficient was used to investigate relationships between visitors' characteristics, awareness, and perceptions of Gua Pelangi. The analysis revealed several significant positive correlations, illustrating the influence of awareness and interest in archaeological tourism on visitor perceptions. For example, visitors who viewed Gua Pelangi strongly as an archaeological site were more likely to consider it a worthwhile destination ($\rho = 0.624$, $p < 0.001$), while those familiar with archaeotourism tended to gain new knowledge and insights during their visit ($\rho = 0.346$, $p < 0.001$). Additionally, environmental quality, scenic beauty, recreational facilities, and eco-friendly practices were positively correlated with satisfaction and visitor experience, highlighting the importance of both natural and man-made features in shaping perceptions. Pre-visit information and social recommendations were also associated with visitors' planning and expectations, suggesting that knowledge acquisition and social influence significantly contribute to engagement, motivation, and overall evaluation of Gua Pelangi as an archaeological tourism site.

iv. Pearson Chi-Square Test

The Pearson Chi-Square test was performed to explore associations between visitors' demographic variables and their perceptions of Gua Pelangi as a tourism destination. Significant relationships were found for age, purpose of visit, duration of stay, group size, and information sources. Younger visitors showed a stronger interest in the site, while longer stays were associated with higher appreciation of scenic beauty and the site as an escape from urban life. The purpose of the visit influenced perceptions of the site's uniqueness, archaeological value, and recreational facilities, demonstrating that motivations directly shape engagement. Additionally, the number of visitors in a group affected experiences of relaxation and perception of educational value, while prior knowledge and information sources

influenced expectations, satisfaction, and pre-visit preparation. These findings suggest that both individual characteristics and contextual factors, such as group size and information channels, play an important role in shaping overall perceptions, highlighting the need for effective site management, visitor communication, and targeted tourism strategies to enhance the visitor experience at Gua Pelangi.

v. Fishbein Multi-Attribute Attitude Model

Visitors' cognitive attitudes toward Gua Pelangi as an archaeological tourism destination were assessed using the Fishbein multi-attribute model, focusing on beliefs (b_i) and evaluations (e_i). Respondents rated each attribute on a five-point Likert scale, with overall attitude scores (A_o) calculated by multiplying belief strength and fixed evaluation. Results show generally positive perceptions, with mean belief scores above the scale midpoint. The highest scores were for biodiversity conservation (A_o = 21.35), site preservation (A_o = 21.15), and appreciation of the natural environment (A_o = 21.07), reflecting strong recognition of Gua Pelangi's environmental value. Attributes related to perceived attractiveness, educational value, visitor experiences, and promotion also received high ratings, indicating positive assessments of experiential and learning opportunities. Knowledge and interest in archaeotourism scored slightly lower but remained favorable, suggesting some gaps in awareness. Overall, the findings highlight a positive cognitive perception.

4.5 *Thematic analysis*

Thematic analysis was used to examine respondents' opinions, comments, and overall satisfaction with their visit to Gua Pelangi (Sections F and G). This approach identifies recurring themes in qualitative data to understand visitors' experiences and perceptions (Nowell et al., 2017). Five main themes emerged from Section F: emotional experience, visit worthiness, satisfaction with services and facilities, expectation versus actual experiences, and future visit intention.

Table 2: Thematic analysis

Theme	Description	Sample Quotes
Emotional Experience	Visitors felt happy, relaxed, and emotionally fulfilled due to the peaceful environment and natural surroundings	"Sangat seronok", "The place made me calm and relieved my stress"
Worthiness of Visit	Time spent and educational opportunities were valuable, especially learning about archaeology and nature	"Worth my time", "A lot of knowledge to gain here"
Services & Facilities	Most were satisfied, but maintenance and basic amenities need improvement	"Need more facilities for visitors", "Kurang kemudahan air dan tandas"
Expectation vs Actual	Visits often met or exceeded expectations, especially regarding caves and greenery	"Lebih menarik dari jangkaan saya", "I will recommend this place to my friend"
Future Visit Intention	Many expressed willingness to return; improvements could encourage repeat visits	"Wajib dating balik", "Maybe after facilities upgraded"

Thematic analysis was used to explore visitors' opinions, comments, and overall satisfaction with Gua Pelangi (Sections F and G). Five main themes emerged: emotional experience, visit worthiness, satisfaction with facilities, expectation versus actual experience, and future visit intention.

i. Emotional Experience: Visitors generally felt relaxed, happy, and emotionally fulfilled during their visit, with the natural surroundings contributing to a calming and refreshing experience. Many highlighted the enjoyment of learning new things, showing the site's positive impact on both emotions and curiosity.

ii. Visit Worthiness: Most respondents considered the visit valuable, appreciating the educational opportunities in archaeology and biodiversity. Comments emphasized that time spent at Gua Pelangi was meaningful and enriching.

iii. Satisfaction with Facilities: While overall satisfaction was high, some respondents noted areas for improvement, including maintenance, toilets, and other visitor amenities. Addressing these could further enhance the visitor experience.

iv. Expectation vs. Actual Experience: Many visitors found their experience met or exceeded expectations, particularly regarding the caves' uniqueness and the natural environment, highlighting the site's appeal and authenticity.

v. Future Visit Intention: A majority expressed willingness to return, especially if facilities are upgraded or new activities are introduced, indicating strong visitor loyalty.

Section G measured overall satisfaction using a 5-point scale. The mean satisfaction score was 4.23, showing visitors were generally satisfied or very satisfied, aligning with the positive themes identified in the qualitative analysis.

N	Sum	Mean	Min	Max
252	1066	4.23	3	5

These results suggest that Gua Pelangi delivers enjoyable, educational, and emotionally fulfilling experiences, with room for improvement in facilities to further enhance visitor satisfaction.

5. Discussion

This study aims to assess the tourism value of Gua Pelangi, Negeri Sembilan, based on local visitors' perceptions. Data were collected through site visits, questionnaires, and interviews to understand visitor behavior and motivations. The research focuses on four objectives: (i) the importance of archaeological tourism in visitors' decision-making, (ii) how well Gua Pelangi meets visitors' expectations, (iii) measuring attractiveness using the Fishbein Model, and (iv) identifying factors that influence perceived attractiveness. Findings show that Gua Pelangi has potential to attract more visitors, enhance experiences, and promote preservation, though environmental management challenges remain. Properly planned archaeotourism can increase respect for heritage sites.

5.1 *Key findings*

Gua Pelangi is valued for its archaeological significance, natural environment, and experiential qualities. Visitors rated the site positively, especially for authenticity, educational value, and emotional impact. Archaeological interest strongly influenced visitation, fulfilling most expectations related to the cave's uniqueness and surrounding nature. Fishbein Model results highlighted that natural beauty and heritage are prioritized over amenities, while visitor characteristics and experiences shape perceived attractiveness.

5.2 *Local visitors' perception*

Local visitors generally hold positive views of Gua Pelangi. Despite limited facilities, its authenticity and heritage value are appreciated. This aligns with research showing undeveloped heritage sites are valued for authenticity over convenience, emphasizing preservation as a key strength.

5.3 *Importance of archaeological tourism*

Archaeological interest drives visits, showing Gua Pelangi is perceived as educational and culturally significant. Local visitors, in particular, are motivated by heritage connection. Enhanced interpretive resources could further increase engagement and appreciation of the site's historical value.

5.4 *Visitors' expectations*

Most visitors found their experiences aligned with expectations, enjoying natural beauty, tranquility, and learning opportunities. However, facilities, accessibility, and information were noted as areas needing improvement. Balancing enhancements with authenticity is important to maintain overall visitor satisfaction.

5.5 *Perceived attractiveness*

Visitors' attitudes are influenced primarily by natural and archaeological attributes rather than facilities. While low scores for accessibility or amenities may affect overall perception, maintaining authenticity alongside minor infrastructure improvements can enhance visitor experience.

6. Recommendation

6.1 *Engage with local communities*

Active involvement of local communities around Gua Pelangi can benefit both visitors and residents. Locals can promote their culture, handicrafts, and local food, creating economic opportunities while enhancing visitors' experiences. Collaboration with site management can include organizing cultural events, educational workshops, or guided tours, allowing visitors to gain deeper knowledge about the area. Engaging younger audiences through school trips, online quizzes, or social media campaigns can further increase interest and awareness. By integrating the community into tourism activities, Gua Pelangi's cultural value is highlighted, creating meaningful connections and sustainable benefits for both visitors and locals.

6.2 *Enhancing visitor experiences*

Improving visitor engagement at Gua Pelangi can be achieved through thematic and interactive tours. Specialized tours focused on archaeology, ecology, or history allow visitors to explore the caves in depth, while hands-on activities like mock excavations or artifact handling make learning fun and memorable. The use of technology, such as mobile applications, AR, or VR, can offer immersive experiences, visualizing historical environments and archaeological processes. Interactive maps, multilingual audio guides, and gamified learning tools provide flexibility and accessibility for all visitors. These approaches increase understanding, emotional connection, and enjoyment while preserving the site's heritage and natural environment.

6.3 *Promoting sustainable practices*

Sustainable tourism is crucial for preserving Gua Pelangi's ecological and archaeological integrity. Eco-friendly infrastructure, such as pathways, viewing platforms, and facilities using natural or recycled materials, minimizes environmental impact. Waste management practices, including "carry in, carry out" policies and recycling stations, ensure the site remains clean. Briefing visitors on responsible behavior and installing energy-efficient lighting or solar panels supports environmental conservation. Promoting these practices encourages visitors to respect the site and adopt similar habits in daily life. A balance between accessibility, visitor satisfaction, and conservation ensures that Gua Pelangi can be enjoyed by future generations without compromising its natural or cultural heritage.

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