



# Balancing Engagement and Efficiency: A Qualitative Exploration of Local Nature Guides' Perspectives on Non-Personal Interpretation in Taman Negara Pahang

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## Abstract

*The post-pandemic resurgence of nature-based tourism has intensified visitor pressure on ecologically sensitive areas such as Taman Negara Pahang, Malaysia, prompting a renewed focus on sustainable visitor management strategies. This study explored the awareness, acceptance, and perceived effectiveness of non-personal interpretation among local nature guides, with attention to its role in complementing traditional guiding experiences. Using a qualitative design, semi-structured interviews were conducted with fifteen certified local guides and analyzed thematically, guided by Rogers' innovation diffusion theory. The findings revealed varied responses regarding awareness and understanding, with some guides viewing non-personal interpretation, such as signage and panels, as beneficial for enhancing storytelling and engaging independent visitors. Others expressed concerns about redundancy, reduced guide-visitor interaction, and the diminished role of personal interpretation. Key determinants of acceptance or resistance included compatibility with guiding roles, perceived complexity, and relative advantage. Overall, non-personal interpretation was recognized as a potentially valuable tool when strategically integrated and well-maintained. The study concludes that effective implementation requires participatory planning, alignment with guiding practices, and ongoing support from park authorities. These insights inform interpretive management strategies and highlight the importance of empowering local guides in developing inclusive, effective, and sustainable visitor engagement approaches in protected areas.*

*Keywords: nature-based tourism, innovation adoption, visitor engagement strategies, non-personal tools*

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## Introduction

The Covid-19 pandemic significantly transformed global tourism by halting mobility, drastically reducing visitation, and disrupting the tourism sector. As restrictions were lifted, nature-based tourism has experienced a rapid resurgence, exerting unprecedented pressure on numerous protected areas. This situation has led to an uncontrolled influx of tourists, contributing to overcrowding, which has substantial adverse effects on both the quality of the environment and the visitor experience. In Malaysia, national parks such as Taman Negara Pahang have witnessed a surge in visitation that has overwhelmed existing infrastructure, jeopardizing ecological resilience and intensifying management challenges. This resurgence has brought renewed attention to long-standing issues concerning visitor carrying capacity, the quality of visitor experiences, and the sustainability of tourism practices in ecologically sensitive areas.

**The role of environmental interpretation in nature-based tourism** Environmental interpretation has long been recognized as a cornerstone of meaningful visitor engagement in nature-based tourism. It serves not merely as an

educational tool but also as a strategic intervention that shapes environmental values, fosters environmental understanding, and motivates pro-environmental behavior (Moscardo et al., 2004; Kohl, 2008; Weiler & Walker, 2014). According to Freeman Tilden (1977), who pioneered this concept, environmental interpretation is defined as “an educational activity which aims to reveal meanings and relationships through the use of original objects and first-hand experience, rather than simply communicate factual information”. This definition positions interpretation as an experiential process that builds emotional and intellectual connections with the natural environment.

In protected areas such as Taman Negara Pahang, environmental interpretation serves a dual role: enhancing the quality of visitor experiences while concurrently supporting conservation goals. Effective interpretation not only informs but also inspires stewardship, particularly in ecologically sensitive destinations where visitor impact must be carefully managed. As nature-based tourism recovers in the post-pandemic era, the strategic role of interpretation becomes even more crucial, acting as a mediating tool between visitor demand and environmental thresholds.

One of the critical responses to these post-pandemic challenges was implementing sustainable visitor management strategies that balance conservation imperatives with tourist satisfaction. Among these strategies, environmental interpretation has emerged as a central tool for fostering environmental awareness and influencing pro-environmental behavior. When delivered personally by trained nature guides, interpretation can deepen understanding and establish emotional connections that inspire protective action. As noted, interpretation is not merely one of many functions that a nature guide performs; it is the distinguishing feature of best practices in guiding. However, the post-pandemic surge in tourism has significantly strained human resources, leaving many guides with heavier workloads and limited capacity for in-depth engagement.

**Integrating non-personal interpretation in visitor management strategy** Although personal interpretation by trained guides remains the standard in fostering meaningful visitor engagement, this flexibility is inevitably constrained, particularly in high-traffic locations such as Taman Negara Pahang. The increased visitation has intensified the demands placed on local guides, exacerbating issues related to guide shortages, interpretive fatigue, and inconsistent message delivery (Hamilton, 2022; Baloch et al., 2023). Within this context, non-personal interpretation, such as interpretive signage, panels, brochures, and digital displays, emerges as pragmatic and adaptable complements to guide-led experiences.

Non-personal interpretation offers several strategic advantages, as it delivers consistent and targeted messages to a broad audience, reinforces conservation, and enables self-directed learning. This thereby reduces reliance on personal interactions (Pendit & Zaibon, 2013; Moscardo, 2020). These media can enhance cognitive engagement through visual storytelling, structured narratives, and emerging technologies like augmented reality (AR), which increasingly feature in global heritage interpretation (Pendit & Zaibon, 2013). However, the interpretive impact of such media is not guaranteed, as its effectiveness depends on several interrelated factors, including content relevance, design quality, strategic placement, and the extent to which it resonates with diverse audiences (Miller, 2013).

Given these challenges, particularly during peak seasons, non-personal interpretation methods, such as signage and interpretive panels, serve as alternative mechanisms for educational and engagement purposes. This approach is considered an effective complement for reaching broader audiences and alleviating the responsibilities of nature guides in promoting environmental stewardship among visitors (Moscardo, 2020). Non-personal interpretation has the capacity to deliver consistent and scalable messages that facilitate independent and non-captive visitors while reinforcing specific conservation goals. Nevertheless, the efficacy of non-personal interpretation depends on various factors, including the quality of the content, its strategic placement, and the level of visitor engagement.

At Taman Negara Pahang, non-personal interpretation primarily consists of static and semi-permanent displays installed by the Department of Wildlife and National Parks (PERHILITAN) as part of its visitor education program.

These include informational panels, interpretive signage, and directional boards distributed along major visitor areas such as the Kuala Tahan Park Centre, the Lubok Simpon trail, the Canopy Walkway, and the Bukit Teresek route. Most panels were initially designed to introduce local flora and fauna, safety reminders, and conservation messages, often featuring bilingual text and photographs.

However, field observations during this study and respondents' testimonies revealed that many of these interpretive materials have deteriorated over time due to tropical weather, wildlife interference, and insufficient maintenance. Several guides reported that some panels were faded, illegible, or missing entirely, especially along secondary trails.

Despite the growing use of non-personal interpretation in managing global protected areas, its integration within Malaysian national parks has received limited scholarly attention. These issues represent significant gaps, particularly from the perspective of groups directly involved in delivering interpretation, the local nature guides. Understanding their perceptions is crucial for the effective implementation of non-personal interpretation. Their viewpoints should significantly influence the design of interpretive strategies, and their experiential insights and professional roles establish them as essential stakeholders in developing an effective interpretive strategy (Roberts et al., 2014). The question now is to examine whether they view non-personal interpretation as a complementary support system or as a competing adversary, which could have significant implications for the success of implementation and long-term visitor engagement.

**Applying innovation diffusion theory** This study adopts Rogers (1983) innovation diffusion theory (IDT) as a guiding framework to explore how local guides in Taman Negara Pahang perceive and engage with non-personal interpretation. IDT offers a robust lens to examine how innovations introduced are being assessed and adopted (or rejected) by individuals within a social system (Rogers, 2003). This theoretical framework is especially applicable to the post-pandemic context, where rapid adjustments in visitor management strategies have necessitated the broader use of scalable, non-personal media.

Within the context of this study, non-personal interpretation represents an innovation in environmental communication, where its acceptance depends on how well it aligns with existing practices. This framework serves as a guideline to determine whether the nature guides at Taman Negara Pahang consider these applications of environmental interpretation tools compatible with their roles by assessing their complexity and perceiving their relative advantages and disadvantages. These constructs help us understand guides' willingness to adopt or support non-personal interpretation as part of a comprehensive visitor management strategy. By highlighting these dimensions, the study revealed how non-personal interpretation is positioned as either an “ally” that empowers, guides, and enriches interpretation or an “adversary” that threatens its centrality and effectiveness within the interpretive programs at Taman Negara Pahang.

Rogers (2003) proposed the IDT as the systematic process by which innovations are communicated through

specific channels over time among members of a social system. According to the IDT, the innovation-decision process unfolds in five distinct stages: 1) awareness, 2) persuasion, 3) decision, 4) implementation, and 5) confirmation. Within this theoretical framework, the perception of key innovation attributes, namely relative advantage, compatibility, complexity, trialability, and observability, significantly influences adoption behavior. In the context of this study, non-personal interpretations such as signage and information panels are considered innovations at Taman Negara Pahang. Employing this will facilitate the identification of how local guides perceive these tools, whether their perception aligns with their guiding ethos, and whether it enhances or undermines their roles, ultimately contributing positively to the visitor experience. Thus, based on this innovation, the guide can choose to adopt or reject its implementation. This analytical approach not only enhances our understanding of innovation uptake in tourism contexts but also contributes to the design of interpretive strategies that are inclusive, adaptive, and sustainable.

Therefore, this study explores the awareness, acceptance, and perceived effectiveness of non-personal interpretation among local nature guides in Taman Negara Pahang. The findings inform the development of interpretive approaches that are both environmentally sound and inclusive of those who convey and embody the parks' conservation messages.

## Methods

**Study area** The data was collected at Taman Negara Pahang, one of Malaysia's premier ecotourism destinations. As one of the world's oldest tropical rainforests, the park is renowned for its rich biodiversity and cultural heritage, successfully attracting both domestic and international visitors (Aziz et al., 2017). Given the surge in visitor numbers to Taman Negara Pahang today, the capacity of traditional guiding or personal interpretation has become constrained, highlighting the relevance of the presence of non-personal interpretation tools. This makes Taman Negara Pahang a significant case study area, as one of the pioneering conservation and ecotourism areas for guiding tours in Malaysia.

**Research design** This study employed a qualitative research design to explore the perceptions of local nature guides regarding non-personal interpretation at Taman Negara Pahang. The qualitative design was deemed suitable to obtain rich, in-depth insights and allow the respondents to express their experiences, perceptions, beliefs, and opinions in their own words (Busetto et al., 2020). Semi-structured interviews were employed as the primary data collection method. This method offered flexibility while maintaining a consistent framework across the interview sessions. Thus, this allowed respondents to have an open dialogue and minimize researcher bias (Reja et al., 2003). In this study, respondents were invited to share their views on the availability, awareness, acceptance, and perceived effectiveness of non-personal interpretation tools used at Taman Negara Pahang.

**Sampling method and respondent selection** A non-random sampling technique was employed in this study, using a purposive sampling approach with practical access considerations to ensure that only experienced and certified nature

guides were included in the study. This strategy ensured that all respondents possessed substantial experience and contextual knowledge relevant to the study objectives. A total of 15 respondents were selected, representing approximately 10% of the total 147 registered guides under the Ministry of Tourism, Arts and Culture Pahang, who had the following inclusion criteria: 1) certified local guides who have completed the local nature tourist guide course; 2) currently active in nature-guiding activities at Taman Negara Pahang.

The sample encompassed diversity in guiding experience (junior, mid-level, and senior categories based on Ministry of Tourism, Arts and Culture endorsements), as well as variation in age and guiding specialization, thereby enhancing the breadth of perspectives. Consistent with the principles of qualitative inquiry, the emphasis was placed on data depth rather than statistical representation. As the interview process began, data saturation was achieved on the thirteenth interview, as no new themes emerged thereafter, indicating that the sample size was adequate for capturing key insights (Rahimi & Khatooni, 2024). This purposive yet practically accessible approach ensured methodological rigor and relevance to the interpretive context of Taman Negara Pahang.

**Data collection** Semi-structured interviews were conducted using an interview protocol that included open-ended questions. This format provided a consistent structure while allowing flexibility to explore emerging themes comprehensively. Each interview lasted approximately 30 minutes and was audio recorded with the respondents' informed consent. All interviews were conducted in Bahasa Malaysia and later transcribed verbatim. The transcripts were then translated into English for analysis, ensuring semantic consistency through back-translation procedures. NVivo 15 software was used to manage and organize the data throughout the analysis process. During the data collection phase, NVivo played a pivotal role in facilitating the systematic handling of qualitative data, particularly by enabling the researcher to store, categorize, and retrieve data segments efficiently. Transcribed interview documents were imported into the software, enabling efficient storage and retrieval. Open coding was initially applied to identify key concepts, followed by axial coding to group related ideas under broader themes aligned with the research objectives. This structured approach fostered a deeper exploration of how local guides perceived and engaged with non-personal interpretation.

**Ethical approval** The study received ethical approval from the Ethics Committee for Research Involving Human Subjects at Universiti Putra Malaysia (Reference: JKEUPM-2024-011). All respondents were provided with an information sheet detailing the study objectives, and informed consent was obtained prior to their participation. Confidentiality and anonymity were maintained throughout the research process.

**Data analysis** Data were analyzed using thematic analysis following the six-phase approach as proposed by. All coding and theme development were conducted using NVivo 15, which served as the primary analytical tool for this study. The data underwent comprehensive verbatim transcription in

NVivo by creating open codes directly within the software, which were then iteratively refined into broader categories and themes.

The initial phase involved familiarization through repeated readings of the transcripts before generating inductive open codes within NVivo. Axial coding was then applied to group related concepts under higher-order categories that aligned with the study's objectives (Braun & Clarke, 2006). The process was repeated, allowing the researcher to traverse back and forth between the data, codes, and categories to ensure that nothing important was overlooked and that the final themes were both comprehensive and meaningful.

To enhance the reliability of the analysis, a second researcher, experienced in qualitative analysis, independently reviewed a sample of transcripts and double-coded decisions. Any differences in interpretation were discussed and resolved through open dialogue until a consensus was reached. This process contributed to the enhancement of the analysis's reliability.

Additional strategies were employed to ensure the study's trustworthiness and rigor. Member checking was conducted with six respondents, who were invited to review their transcript summaries and confirm the accuracy of the interpreted meanings. Additionally, an external qualitative expert, not involved in data collection, reviewed all coded transcripts and thematic structures to provide independent validation. These measures, along with prolonged engagement and regular peer debriefing, strengthened the credibility, dependability, and confirmability of the study in relation to the Lincoln (1995) trustworthiness criteria. Then, regular team meetings were held to discuss emerging ideas, refine themes, and critically assess interpretations. A sample of respondents was invited to review selected transcripts and preliminary findings to confirm the accuracy of the interpretations, ensuring that their views had been accurately represented. Furthermore, to provide an external perspective, the coded data and preliminary themes were shared with an experienced qualitative researcher who was not involved in the data collection process. This external review provided critical feedback and ensured that the themes generated were well-grounded in the data and accurately reflected the respondents' perspectives with integrity.

## Results

A total of fifteen certified local nature guides from Taman Negara Pahang voluntarily participated in these in-depth interviews. Thematic analysis revealed three overarching themes addressing the research objectives: 1) awareness and understanding of non-personal interpretation, 2) evaluation of the acceptance or resistance, and 3) perceived benefits or limitations of non-personal interpretation at Taman Negara Pahang. The themes are discussed in detail, supported by illustrative quotes (pseudonyms used) and interpreted with relevant literature.

**Respondents** According to the Ministry of Tourism, Arts and Culture Pahang (2023), 147 local nature guides were officially registered under the Taman Negara Association. In this study, some certified local nature guides ( $n = 15$ ),

who met the set criteria for actively conducting guiding activities at Taman Negara Pahang, were selected as respondents. Their demographic characteristics were assessed through socio-demographic questions covering age, gender, education level, marital status, employment status, guiding experience, frequency of guiding activities, and monthly income (Table 1).

**Awareness and understanding of non-personal interpretation** The term 'aware' in this research refers to local guides' understanding and knowledge of the types of non-personal interpretation and their existence in Taman Negara Pahang. The findings revealed two significant key themes in the awareness and understanding of non-personal interpretation among local nature guides. While some guides demonstrated comprehensive knowledge of its purpose and applications, others expressed limited or no awareness.

*High awareness and understanding* Seven out of fifteen guides exhibited a clear understanding of non-personal interpretation. They can identify components such as information panels, maps, and brochures and recognize their function in facilitating visitor learning. For example, Aki remarked that "The panels would have pictures, names, and even some elaboration stories in them." At the same time, Pak Chu also observed the precise location of the non-personal interpretation: "If visitors want to get information from those storytelling boards, they can find them directly at the park center."

*Partial awareness and conceptual uncertainty* There was another subset of respondents who reported partial awareness, recognizing the existence of non-personal interpretation yet expressing a lack of clarity regarding its function and current relevance. Adib shared, "I noticed them before, back when I used to follow my brother... but I didn't pay attention to them." Additionally, one guide, Ajim, explicitly admitted unfamiliarity with the concept by inquiring, "What is non-personal interpretation supposed to be?"

The variability in awareness indicates that guides may possess uneven exposure to and training in interpretive strategies. Furthermore, several guides reported having previously encountered non-personal interpretation in specific areas in the past, such as Lubok Simpon or Bukit Teresek, but noted the current absence or deterioration of such interpretations. This spatial limitation and apparent decline in maintenance may have led to a reduction in guide familiarity and utilization. As Kak Ngah recalled, "They used to have it along the trail to Lubok Simpon, the Canopy Walkway, and Bukit Teresek."

**Local guides' perceptions of acceptance or resistance** The second theme represents guides' attitudes towards non-personal interpretation, which varied. Responses were grouped into two key themes: acceptance of non-personal interpretation and resistance to its use.

*Resistance towards non-personal interpretation* Nine respondents reported showing resistance or rejection towards non-personal interpretation. Some expressed concern that over-reliance on panels would diminish the need for guides

Table 1 Respondents' demographics

Characteristic	Respondents, n (%)	
	Frequency (n)	Percentage (%)
<b>Gender</b>		
Male	13	86.7
Female	2	13.3
<b>Age</b>		
18–25 years	2	13.3
26–35 years	7	46.7
36–45 years	1	6.7
46 years and above	5	33.3
<b>Education level</b>		
Primary education	1	6.7
Secondary education	10	66.7
Tertiary education	4	26.6
<b>Marital status</b>		
Single	8	53.3
Married	6	40.0
Others	1	6.7
<b>Year of license awarded</b>		
1990–1999	3	20.0
2000–2009	5	33.3
2010–2019	3	20.0
2020–2025	4	26.7
<b>Employment status as nature guide</b>		
Full-time	10	66.7
Part-time	5	33.3

during jungle trekking activities. Opie remarked, “The experience is lacking without the usage of a guide.”

The economic concerns also highlighted resistance, where some guides expressed that a one-way interpretation, such as an overreliance on the interpretation panels, may diminish visitor interaction, making the experience less immersive. This situation could subsequently reduce the demand for guided tours, potentially impacting the livelihood of the guides. Others have suggested that, rather than allocating resources towards additional interpretation panels, agencies should encourage visitors to engage guides, which would ensure a more enriching and informative experience. This is supported by Tiyah, who stated, "Agencies could take this opportunity to encourage walk-in visitors to hire a guide for a better experience."

*Acceptance towards non-personal interpretation* In contrast, one-third of the respondents acknowledged the value of non-personal interpretation as beneficial support, complementing their guiding activities, especially for independent or non-captive audiences in Taman Negara Pahang. As noted by Akim, “Most of the visitors that use these panels are typically independent visitors or those without a guide”. In addition, others also reported that they appreciated the non-personal function in aiding the recall of scientific information or as a factual reference that directly supported their storytelling and reduced the cognitive load of memorising technical content. Ajim commented in his interview session that, “These boards can help guide us to come up with ideas for storytelling,” while in the meantime Adib also added, "The scientific details could be written on the boards, so we don't have to memorise difficult names or dates".

**Perceived effectiveness in visitor engagement** The third theme identified relates to the local guides' perception of the effectiveness of non-personal interpretation in promoting visitor learning and engagement. Three key themes were reported that provide insights into the efficacy of non-personal interpretation at Taman Negara Pahang, namely, non-personal interpretation as a complementary tool in guiding, its role in stimulating visitor curiosity, and the potential challenges associated with visitor engagement.

*As a complementary tool* Many guides acknowledge the value of non-personal interpretation in enhancing their storytelling. Particularly for scientific or factual content, these tools were considered reliable references that allow guides to expand and adapt their storytelling. Tiyah reflected that, “If the panel already provides the facts, I'll use them to relate something else to make the story more engaging.” Similarly, Ajim also remarked that, “If the panel talks about health benefits, we might provide additional or more up-to-date information on the topic,” thereby underscoring the role of guides in complementing standardized information with current insights.

*Encouraging visitor curiosity* The findings also suggest that non-personal interpretation may significantly contribute to fostering visitor autonomy and inquiry-based learning. Several guides advocated for a sequence in which visitors first interact with the panels and subsequently seek clarification or further elaboration. For instance, Aki mentioned, “There's no issue with visitors reading the panel first. After that, we can check what they understood and clarify any points they didn't get.”

*Cautions and challenges* However, the findings also reveal concerns among some guides regarding the potential for non-personal interpretation to diminish their roles or reduce interactive engagement. Jai expressed concern that, “If everything is written on the panels, guides won't bother telling stories anymore; visitors will just be asked to read.” Similarly, Akim remarked, “If they've read everything beforehand, they might not listen when we're explaining.” These perspectives highlight fears that exposure to static information could reduce guided storytelling's novelty and perceived value.

**Integration of innovation diffusion theory** The findings reflect the essential frameworks of Rogers' (2003) IDT, particularly in how local nature guides at Taman Negara Pahang are influenced by non-personal interpretation. The study found that three core dimensions (compatibility, complexity, and relative advantage) were most salient in shaping guides' acceptance or resistance to innovation. These factors emerged consistently throughout the narratives, determining whether non-personal interpretation was viewed as a beneficial complement to personal guiding or as a potential disruption to their traditional role.

Compatibility refers to how well an innovation aligns with potential adopters' values, beliefs, and practices. In this study, it played a critical role in determining guides' willingness to accept non-personal interpretation. Guides who perceived these tools as consistent with their guiding methodology are more likely to incorporate them into their visitor engagement strategies. Several respondents proposed that interpretation panels could enhance their storytelling rather than replace it. For example, Choky emphasized that, “If the panel already explains the different types of Kelah species, I'll take the opportunity to add some tips so that visitors can differentiate them by their head shapes.” However, when guides perceive non-personal interpretation as conflicting with their role, they exhibit resistance. This can be viewed by Akim's expression, “If they've read everything beforehand, they might not listen when we're explaining.”

Complexity refers to the degree of difficulty associated with understanding, implementing, or integrating an innovation into existing practices. The findings show that guides generally considered non-personal interpretation easy to use, particularly when materials were visually appealing and clearly designed. As Kak Ngah explained, “If the design is attractive and easy to understand, I would refer to it in my explanations.” However, concerns were raised regarding the inadequate maintenance, environmental degradation, or improper positioning of non-personal interpretation tools. For example, guides reported that signage was either misplaced, damaged, or missing, which hindered usability and diminished its perceived relevance. As remarked by Farid, “Most of these panels were damaged by elephants, and the remains will draw visitors' attention without adding real value.”

Relative advantage represents the extent to which an innovation provides a clear benefit over established practices. Many guides are more likely to adopt non-personal interpretation when they perceive it as a means of improving their effectiveness rather than diminishing their role. They

recognize the educational advantages of non-personal interpretation, especially for independent visitors who explore the park without a guide. As Adib mentioned in the interview, “I think that these boards will enhance the visitors' understanding, as they won't enter the forest clueless at the end. They'll at least bring back some knowledge” (Adib).

However, the dimensions of trialability and observability were not evident in this context, as the guides operate within a management system where PERHILITAN centrally controls interpretive innovations (such as panel design or installation). This institutional setting limits the guides to directly involved trials or observing adoption outcomes, thereby extending IDT's applicability to hierarchical and co-managed environments. Theoretically, this study refines Rogers' framework by demonstrating that, in nature-based tourism, the diffusion of innovation is not solely an individual cognitive process but a co-governed institutional dynamic shaped by organizational authority, perceived task relevance, and professional identity. The prominence of compatibility and relative advantage suggests that acceptance depends more on perceived alignment with guiding values and the enhancement of interpretive roles than on opportunities for experimentation. Hence, this research contributes to the contextual adaptation of IDT in ecotourism and interpretation studies, affirming its relevance while clarifying its practical limits in regulated protected-area settings.

## Discussion

The results confirm varied levels of awareness and conceptual understanding among local guides. While some are familiar with non-personal interpretation tools, others lack clarity about their purpose, likely due to inconsistent maintenance or exposure. Such findings align with the observations made by Cheng et al. (2017), who noted that personal interpretation tends to be prioritized in tourism contexts, which may lead to the marginalization of non-personal methods. This phenomenon may explain why numerous guides underutilize or overlook static interpretation media. The findings suggest that, despite non-personal interpretation materials existing in the park, their inconsistent visibility and maintenance may hinder their incorporation into guiding practices. In the absence of sufficient recognition or understanding of these resources, guides may be less motivated to reference them or advocate for their utilisation among visitors.

The split between acceptance and resistance is informed by practical, professional, and economic concerns. As mentioned by Roberts et al. (2014), some guides view the interpretation signage as a threat to their role. This fear reflects tensions between interpretive innovation and occupational identity, especially when non-personal interpretation is perceived as a substitute rather than a complement.

Thus, although non-personal interpretation is acknowledged in other National Parks (Hamilton, 2022), some local guides believe it is only beneficial for visitors without a guide and serves no purpose for guided groups. This suggests that while guides recognize the role of non-personal interpretation for visitors, they may not see it as essential for their work.

As indicated by Munro et al. (2008), guides often perceive personal interpretation as more engaging and interactive than static signage. Additionally, some guides expressed concerns about over-reliance on non-personal interpretation, arguing that it should not replace personal interaction entirely. Research has shown that non-personal interpretation should not replace personal guiding and should be limited to complementing rather than substitute traditional storytelling methods (Roberts et al., 2014).

In contrast, some guides still accept non-personal interpretation when it is considered a practical enhancement. This aligns with previous research on visitor management in ecotourism, which suggests that interpretation should serve as a crucial tool in providing educational content for self-guided tourists (Weiler & Black, 2015). Furthermore, these viewpoints are based on findings in the field of environmental education, indicating that a combination of personal and non-personal interpretation fosters a more immersive and informative experience for visitors. By allowing non-personal interpretation to complement their efforts, guides can focus on interactive and engaging storytelling components while depending on interpretive signage for detailed factual information. In summary, the responses highlight that non-personal interpretation should be considered a valuable supplementary tool for Taman Negara Pahang, particularly in assisting self-guided tourists, bridging knowledge gaps for guides, and alleviating repetitive inquiries from visitors.

As shared by Hughes and Morrison-Saunders (2002), maintaining the parks' visual attributes is compulsory to help visitors feel safe. Thus, regular maintenance can help visitors who are unfamiliar with the park's landscape, have significance, and have safety guidelines that convey important messages, leading to higher awareness and appreciation of conservation efforts. By addressing these challenges, Taman Negara Pahang can develop a balanced approach where both personal and non-personal interpretations work together to enhance the visitor experience and support conservation education.

In terms of perceived effectiveness, the study affirms that non-personal tools are best utilized as a foundation for deeper storytelling or to trigger curiosity, rather than as substitutes. This methodology aligns with the conclusions presented by Ballantyne et al. (2011), who argued that well-designed interpretive media can stimulate curiosity and enhance engagement through follow-up dialogue. In this sense, non-personal tools do not serve as a substitute for guides; instead, they function as conversation starters that help tailor subsequent interactions based on the specific interests and misunderstandings of the visitors.

The adoption of IDT within this research facilitates a deeper understanding of the factors that influence the acceptance or resistance of local nature guides. It also enables the effective integration of non-personal interpretation into visitor management and environmental education. Respondent narratives indicated that compatibility with guiding practices, perceived ease of use (complexity), and visible benefits (relative advantage) were all present. Those who perceived high compatibility and low complexity were more inclined to adopt non-personal tools. This compatibility aligns with findings by, who suggests that guides are more

likely to accept interpretation tools as they complement their traditional role of knowledge sharing rather than replacing their interaction with visitors. To enhance compatibility, park management (PERHILITAN) must involve guides in the planning and implementation of non-personal interpretation, ensuring that it supports rather than undermines their expertise. Regarding complexity, research by Pedit and Zaibon (2013) indicates that guides exhibit greater receptivity towards new interpretive technologies when these innovations are visually appealing and intuitive. Simple, well-designed materials that align with prevailing narratives may facilitate reductions in the inherent complexity of the adoption process. Moscardo (2020) echoes these concerns, emphasizing the need for interpretive tools to mitigate operational complexity and maintenance challenges. When interpretation materials are perceived as burdensome, particularly due to unclear messaging, degraded conditions, or insufficient upkeep, it is understandable that guides may show less interest in engaging with or promoting them. Concerning relative advantage, Miller (2013) suggests that interpretation tools providing structured knowledge to self-guided visitors are often regarded as valuable enhancements. This aligns with existing literature, where guides express concern that self-guided interpretation could decrease direct interaction with visitors (Roberts et al., 2014). To promote the adoption of non-personal interpretation at Taman Negara Pahang, PERHILITAN should adopt a participatory approach by actively involving guides in the design, trial, and evaluation of interpretation tools. Such an involvement fosters a sense of ownership, thereby reducing resistance, improving the quality of interpretation materials, and enriching the overall visitor experience.

## Conclusion

This study examined local nature guides' awareness, acceptance, and perceived effectiveness of non-personal interpretation at Taman Negara Pahang and found that guides' responses varied according to perceived relevance, practical experience, and alignment with their guiding roles. While some guides accepted non-personal interpretation as a complementary resource that supports storytelling and visitor learning, particularly for independent visitors, others expressed resistance due to concerns about role displacement and reduced interaction. These responses were shaped primarily by perceived compatibility with guiding practices, complexity of use, and relative advantage, indicating that acceptance depends less on the presence of interpretive tools and more on how well they integrate with guides' professional identities and routines. The findings suggest that non-personal interpretation holds value as a supportive mechanism rather than a substitute for personal guidance, provided it is strategically integrated, well-maintained, and aligned with guides' narratives. This exploratory, single-site study is limited by its small purposive sample and focus on guide perspectives, which restricts transferability and excludes other stakeholder views; however, the insights offer analytic relevance for similar nature-based tourism contexts. Overall, the study concludes that effective implementation of non-personal interpretation requires collaborative design with

guides, institutional support, and contextual sensitivity to enhance visitor learning while sustaining guides' role as key facilitators of environmental education and conservation stewardship.

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