

Crafting Cultural Connection: Human-Centred Design Approach for Promotional Product Design Development Inspired by Myths and Legends

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ABSTRACT

The study on Crafting Cultural Connections examines the complex interplay between design, culture, and people's experiences in promotional product production. Inspired by Langkawi's rich mythology, this research promotes a Human-Centred Design (HCD) approach and seeks to educate novice industrial designers on how to utilise the approach in developing products that create value for people. This study is driven by three critical challenges: (1) the underrepresentation of cultural heritage in promotional product design, (2) the disconnect between designers and end-users in integrating culturally inspired product design, and (3) the lack of awareness among locals and tourists about myths and legends due to the dominance of digital entertainment and shifting cultural preferences. This research begins with an extensive understanding of the context of culture and belief, user awareness, and experiences, which serve as the foundation for well-informed design decisions. It is followed by designers who hold collaborative workshop design development sessions with local stakeholders, including renowned storytellers and seasoned tourism experts, to ensure the product draws inspiration from Langkawi's rich tapestry of stories and tales. They then modified prototypes based on user feedback to find a balance between visual aesthetics and functionality. Documenting and reflecting on this process motivates novice industrial designers to engage in hands-on learning by adopting the HCD approach in design development to produce innovative products. This research will highlight the physical outcomes of this journey, showcasing meticulously created products and assessing their impact on using the HCD approach to improve cultural awareness among users.

Keywords: human-centred design, product design development, crafting cultural connection

INTRODUCTION

The combination of creativity, culture, and Human-Centred Design (HCD) approach can drive positive change and sustainable development in various fields, such as technology, science, society, politics, and business (Liaqat et al. 2023). These three elements are crucial for fostering a prosperous and sustainable future. They inspire innovation, fresh perspectives, and creative solutions, thereby enhancing environmental responsibility and economic growth. Culture shapes societies and individuals, influencing behaviours, values, and interactions. It acts as a driver of development, fostering inclusivity, dialogue, and understanding among diverse populations (Liaqat et al. 2023). Creativity is essential in developing HCD approaches, inclusive social structures, and environmentally conscious practices (Marchese 2021). Combining creativity, culture, and HCD can help stimulate innovation and economic growth while promoting social cohesion, environmental awareness, and inclusive product development (Mallik 2023).

Creative design can achieve transformation and integration of scientific and technological achievements, leading to infrastructure development and digitised manufacturing. This innovative approach to design promotes resource efficiency and new product development models, contributing to sustainable practices (Ali et al. 2023; Mallik 2023). Thus, by integrating creativity, culture, and HCD into product design development practices, people can create a more vibrant, resilient, and prosperous product for all (Nguyen Ngoc et al. 2022).

Promotional product development is an intriguing field where creativity, culture, and HCD converge to create products that truly resonate with customers. This project is an example of this combination, drawing inspiration from Langkawi's mythology to create products that delight tourists and nurture the talents of emerging industrial designers. This study explores the interplay between design, culture, and HCD approach in promotional product development, focusing on Langkawi's rich mythology. By weaving together elements of myth, tradition, and HCD, this project will explore the process of creating products that will capture the imagination of tourists and other stakeholders on a deeper level. Through this project, people can discover the power of HCD in forging a deeper connection with stakeholders and creating meaningful and impactful solutions. The research objectives (RO) for this study are:

- RO1. To explore how HCD methodologies can be leveraged to understand the dynamic relationship between design and culture in promotional product development.
- RO2. To design a product that achieves functional and cultural relevance, capturing the awareness of target audiences (locals and tourists) and fostering engagement and understanding of Langkawi's cultural heritage to promote tourism and cultural awareness.

The research questions (RQ) for the study are as follows:

- RQ1. What are the key principles and methodologies of HCD that can be applied to explore the design and culture intersect in the context of promotional product development?
- RQ2. What design approaches can be employed to create products that are both functionally and culturally relevant, effectively raising awareness among the target audience (locals and tourists) while fostering engagement and understanding of Langkawi's cultural heritage?

HCD METHOD

The HCD approach encompasses methods and techniques used by designers to create products, services, or systems with a deep understanding of human needs, wants, and behaviour (Isa and Liem 2015; Ali et al., 2023). According to Isa and Liem (2015) and Marchese (2021), the core idea is to place users or stakeholders at the centre of the design development process to ensure that product solutions are intuitive, user-friendly, and aligned with real-world needs. HCD in the design world has been used in many areas, such as market research, sustainability market trends, user studies, consumer behaviour, and product competition (Burns 2018; Isa and Liem 2023). In this research, HCD, in developing promotional products and design, will explore how culture and HCD can be incorporated into design development methods, as shown in Figure 1. This approach will enhance designers' discovery and understanding of human needs, behaviours, and desires.

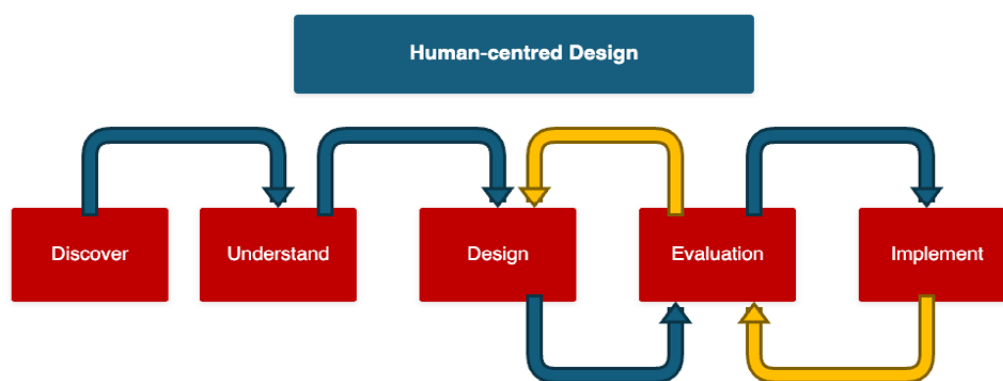


Figure 1 Human-centred design approach overflow in design development

The HCD process adopted in this study aligns closely with several established design frameworks that emphasise empathy, iteration, and contextual relevance. Although this study's primary focus is on cultural exploration and design development, its structure resonates with theoretical principles from key design scholars and practices:

1. Norman's Human Centred Design Model (2005; 2024) emphasises the understanding of users' needs, mental models, and context of use before ideation, reflected in the Empathise and Define phases, where cultural narratives and user insights guided the design direction.
2. The IDEO (2009; 2014) HCD Framework, comprising Inspiration, Ideation, and Implementation, that informed the overall structure of the design workshops. The Inspiration phase corresponded to the exploration of myths and legends; Ideation involved concept generation; and Implementation was realised through prototype fabrication and expert evaluation.

RESEARCH METHODOLOGY

This study was conducted by researchers from Universiti Teknologi MARA, Universiti Putra Malaysia, and Multimedia University. It utilised qualitative research methods and incorporated the HCD approach, as adapted from the works of Ali et al. (2022), Isa et al. (2023), and Tosi (2020). By employing this method, this study aims to encourage emerging industrial designers to create products that help tourists and stakeholders to better connect with Langkawi's cultural heritage

through collaboration with the Langkawi Development Authority. This study employed HCD approach, structured into systematic and testable steps, to explore how mythological narratives can inspire culturally grounded promotional product design. The methodology was designed to ensure both creative exploration and evaluation rigour, emphasising collaboration between designers, users, and cultural stakeholders.

Phase 1: Initial Project Brief (Discover and Understand)

A workshop-based design study was conducted involving a total of six novice industrial designers aged 22 to 24 years, including four males and two females. Each participant had two to four years of working experience and volunteered to participate in this 14-week study. The workshop was structured to align with the stages of the HCD process, combining design exploration, peer feedback, and researcher facilitation each week. This workshop was implemented based on the three main phases described in this methodology section. The designers participated in weekly sessions on iterative activities ranging from ideation to prototyping to evaluation and refinement, supported by continuous facilitation and feedback from the researcher.

The researcher provided the designers with an overview of the project and the tasks they needed to complete. Following that, the designers began the process of understanding the context of the study by conducting comprehensive literature reviews on myths and legends in Langkawi. Each designer selected the most popular myth and legend based on the tourist population that visited the related areas, which has the potential to be explored in creating promotional product items.

Empathise and Context Research

After conducting primary studies of the issues, a field trip to Langkawi Island was arranged to gather first-hand experiences of the chosen myths and legends. The designers were then divided to visit the places in Langkawi related to their selected themes. They conducted face-to-face interviews with relevant stakeholders, including 20 tourists, five NGOs, 12 people from the creative industry, six experts in myth and legends, and seven individuals in the tourism sector, to assess the current awareness of Langkawi's myths and legends while gathering different perspectives (Neubauer 2019). The designers also observed the landscape, layout of the place, architectural elements, legendary statues and monuments, cultural heritage symbolism, education, enlightenment, and visitor experiences (Figure 2). This phase focused on understanding symbolic meanings, motifs, and narratives.

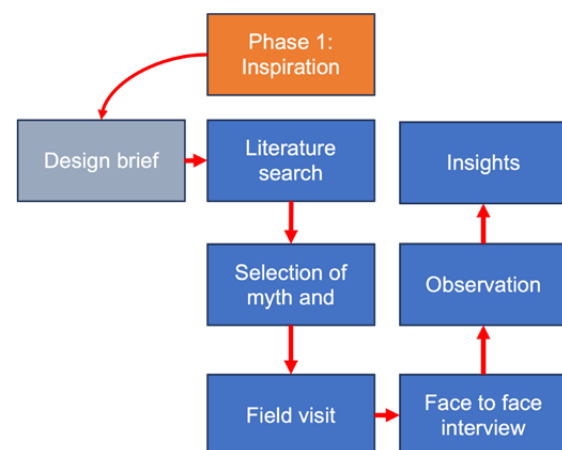


Figure 2 Inspiration phase for project understanding

Sample Size Selection

The sample size of this study is justified based on its exploratory nature, the focus on qualitative insights, and the need for an in-depth understanding of cultural product development through the HCD approach. The selection of six novice industrial designers ensures a manageable yet

diverse group with sufficient experience to engage with the research objectives for detailed observation and iterative design exploration while maintaining feasibility within the 14-week timeframe. The study also includes a broad range of 50 stakeholders to ensure a well-rounded perspective on Langkawi's myths and legends. The selection of stakeholders provides a balance between depth and breadth, capturing diverse viewpoints while allowing meaningful qualitative analysis. As Isa and Liem (2023) suggest, qualitative research does not require a large sample size; it focuses on the depth of understanding of stakeholders' interviews and hands-on design processes with a moderate sample size of participants that can fully immerse in the research process. Overall, the sample size for this study is appropriate for achieving the research objectives, providing in-depth insight into cultural awareness, stakeholders' recognition, and design opportunities while maintaining a feasible and structured research approach.

Phase 2: Design and Ideation

For Phase 2 of ideation (Figure 3), the designers collaborated with selected volunteers and stakeholders, including six local people, 12 tourists, and six tourism experts, to authentically portray Langkawi's cultural narrative while developing the initial ideas. These sessions served as a platform where ideas, traditions, and contemporary design sensibilities converge to create products imbued with the spirit of local myths and legends. Then, the designers conducted a collaborative creative session with other designers and product design experts who were not involved with the field visit to develop potential concepts. During the session, the designers and stakeholders proposed initial concept sketches, learned about the design process, and engaged with the stories behind each creation. Based on user and cultural insights, each designer generated 15 initial concept sketches exploring different ways of embedding mythological elements into product form, symbolism, and functionality. Then, they had direct involvement in demonstrations and storytelling sessions, which incorporated concept sketches, offering a multi-sensory experience that immerses them in Langkawi's rich cultural heritage and the project team's innovative design solutions.

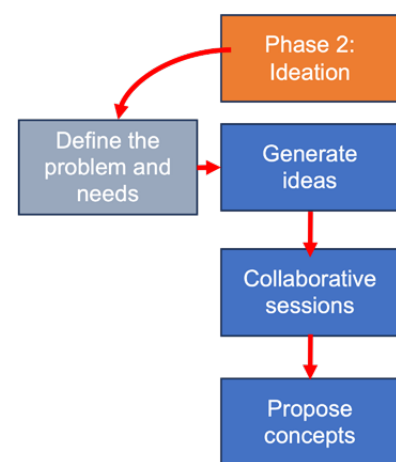


Figure 3 Ideation phase for proposing potential idea solutions

Phase 3: Prototype Development and Concept Evaluation for Refinement

In Phase 3 (Figure 4), the designers and stakeholders evaluated their 15 initial concepts based on cultural significance, feasibility, and storytelling value as primary filters to select the three most promising concepts. Then, the selected ideas were translated into low-fidelity prototypes using simple materials, allowing for usability testing and gathering feedback from users and experts for further implementation. During this phase, multiple low-fidelity prototypes were created, and the designers continuously refined and improved their concepts based on the feedback. Then, they finalised the concept and presented their ideas to the team for final product selection.

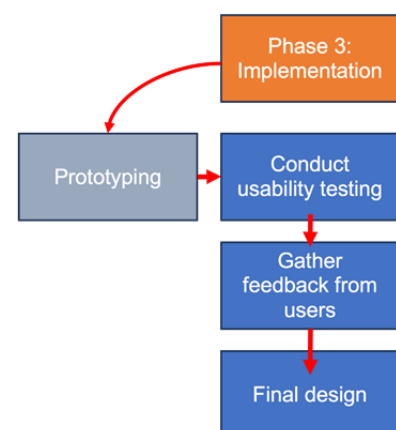


Figure 4 Implementation phase to gather feedback on concepts for product improvement.

Data Collection

To conduct this study, the research team will comprehensively assess user awareness and needs, collaborating with local stakeholders such as tourists, NGOs, creative industry people, and tourism sector individuals. The priority is to emphasise user experience and cultural sensitivity throughout the design and research process (Isa and Liem 2023; Boy 2017). The research consisted of three distinct study phases, as illustrated in the research framework in Figures 2, 3, and 4, that will provide a structured representation of the research context outlining the relationship between independent variables (e.g., design approaches, cultural elements, user feedback) and the dependent variables (e.g. functional and cultural relevance, awareness level and engagement). It will also illustrate how the HCD process integrates these variables to achieve the research objectives.

Data Analysis

The data analysis approach used for this study was adapted from Isa and Liem (2023), Ali et al. (2023), Isa et al. (2023) and Neubauer (2019). The analysis process was divided into three phases to ensure a comprehensive understanding and development of the project. The first phase involved the designer finding inspiration from face-to-face interviews with multiple stakeholders and conducting site observation. This helped to develop a final insight into the project to fully comprehend this study's requirements and objectives. During this phase, the data were analysed by transcribing the interview scripts, reviewing the observational notes to capture the potential myth and legend of promotional product selection, identifying key themes and analysing cultural significance. After completion of the initial phase, the analysis moved to the ideation phase, focusing on generating potential solutions that align with the project's needs.

The analysis during this phase focused on how the designer organised their HCD approach into six mapping contexts, which were derived from the key themes identified during the initial phase of the study. These contexts help to deepen the understanding of the design process and its implications. The six mapping contexts are as follows: (1) Historical Context, (2) Social Context, (3) Symbolism and Interpretation, (4) Narrative Elements, (5) Visual Imagery, and (6) Cultural Practices. In the third phase, the researcher collaborated with a panel of experts to evaluate the designer and present their concept proposal, encapsulating the essence of their creative vision to address the project's demands. This analysis procedure benefited from the expertise of four professionals in product design development, who provided valuable insights and feedback. They evaluated a 14-week compilation of the designer's portfolio and assessed the presentation of the proposed concepts to ensure that the outcome is informed and refined.

RESULTS

Six industrial designers who participated in this project developed a product inspired by myths and legends in Langkawi. Each designer picked one myth as an inspiration, as shown in Table 1. The results show that HCD is a valuable tool where diverse ideas, traditional craftsmanship, and contemporary design approaches combine to infuse the project with authenticity, creativity, and a deep reverence for Langkawi's cultural heritage. These tools help designers draw inspiration from the rich tapestry of Langkawi's myths and legends, allowing designers to create products that resonate with the cultural narrative of Langkawi. The fundamental principles and methodologies of HCD that have been applied by the designers in this project assisted them in exploring how design and culture intersect in the context of promotional product development.

Empathy Building

During the inspiration phase, the designers conducted research and analysis to explore the chosen legends, identify key themes and elements, and analyse their cultural significance. This helped them gain a deep understanding of the content of each selected theme by delving into human needs and experiences. Table 1 illustrates how the designers used the HCD approach to understand and uncover the context of their early project, enabling them to gain a deeper understanding of the themes.

Table 1 The project selection made by the designers to develop the promotional product based on the interviews and observations

Designers	Discover and understand on inspiration selection		
	Potential project selection	Identify key themes	Analyse cultural significance
Designer 1	Explore the Langkawi legend of Mahsuri through primary sources, historical accounts, folklore, literature, and cultural resources to comprehensively understand the story	Explore themes of betrayal, injustice, love, vengeance, supernatural elements, and redemption in Mahsuri's legend with key characters, events, and motifs	Analyse the cultural significance of the Mahsuri legend in Langkawi and how preservation, interpretation, and adaptation reflect broader cultural beliefs
Designer 2	Research myths and legends from various sources Analyse the narrative, characters, themes, and symbolism in each story	Identify creative inspirations such as characters (e.g., Mat Teja, Mambang Sari), conflict, supernatural elements, culture, and morals	Myth and legends shape Langkawi's cultural values, beliefs, and traditions
Designer 3	Research the myth of Tok Dian from Gua Cerita with accounts, oral traditions, and cultural artefacts	Identify themes in the myth, such as protagonist, adventure, supernatural encounter, oral traditions, and cultural artefacts	Examine Tok Dian's cultural significance within Langkawi's history, tradition, and identity to understand its reflection of cultural values, beliefs, and social norms
Designer 4	Research the Sang Kelembai myth in Langkawi Explore local folklore and culture for origin, variations, and significance	Themes: Sang Kalimba's myth, supernatural beings, human-nature relationships, ethics, culture, and heritage	Study culture, history, geography, and cultural practices to analyse local myths for key themes, symbols, and motifs
Designer 5	Research the myth of Naga Putih in Langkawi folklore, dragon significance in Malaysian and Southeast Asian mythology, and Naga Putih's impact on local beliefs	The myth of Naga Putih includes themes of power, nature, and transformation, symbolised by the dragon's strength, guardianship, and spiritual growth	Examine Naga Putih's cultural significance in Langkawi, including its role in rituals, festivals, and daily life
Designer 6	Discover Garuda and Jentayu's cultural significance in Langkawi's identity through historical texts, oral traditions, and cultural practices	Langkawi boasts stunning natural scenery and recurring themes of heroism, divine intervention, and human-supernatural interactions	Explore how the myths of Garuda and Jentayu have influenced Langkawi's culture, values, beliefs, rituals, traditions, and artistic expressions

Define Problems and Needs to Get Context Awareness

During this phase, the designers collaborate with the stakeholders to synthesise research findings and clearly formulate their problem statement and design challenges through creative techniques such as brainstorming, storytelling, and empathy mapping. The designers clustered

their HCD approach into six mapping contexts, as shown in Table 2. With the data gathered, the designers generated a wide range of ideas and potential solutions in their concept proposal, which played a crucial role in developing and shaping the connection between the cultural context of the myth and product development. This method ensured that the end product promotes awareness of Langkawi's myth and legend and honours Langkawi's cultural heritage.

Table 2 Cultural context analysis in related with history, objects and humans

Designers	Cultural context analysis: historical, objects and human					
	Historical context	Social context	Symbolism and interpretation	Narrative elements	Visual imagery	Cultural practices
Designer 1	Examine the historical background of the Mahsuri legend, including her life circumstances, the political and social dynamics of Langkawi, and any events that might have impacted the legend's evolution	Consider the role of storytelling, oral traditions, rituals, and cultural practices in transmitting and perpetuating the Mahsuri legend within the community	Profound impact of the Mahsuri legend on Langkawi's cultural beliefs, customs, values, identity, and collective memory This legend is not just a story but a living, breathing part of the community, shaping its essence	Analyse the Mahsuri legend's narrative elements, including characters, plot, conflict, and moral lessons, to gain a deeper understanding of its richness, complexity, cultural values, and beliefs	Analyse the visual elements in the Mahsuri Legend and their contribution to the legend's significance	Explore cultural practices linked to the Mahsuri legend, including festivals, reenactments, pilgrimages, and performances Analyse how these practices reinforce cultural significance and contribute to continuity, highlighting the living nature of these narratives
Designer 2	Explore the historical background Analyse the historical context of myths and legends, including the period, socio-political dynamics, and cultural background	Examine how myths and legends are preserved and transmitted through social and cultural practices such as storytelling, rituals, festivals, and art	Interpret the symbolism in myths and convey a deeper meaning	Analyse myths into narrative components Identify recurring motifs and structures of Langkawi's storytelling tradition	Analyse myth and legend imagery, including landscape description, to interpret the artist's representation	Explore Langkawi's cultural practices and rituals associated with myths and their significance Consider how they are enacted and preserved within the community
Designer 3	Learn about Langkawi's cultural heritage, the myth of Tok Dian, and the island's historical events and geographical landmarks	Analyse the social context of Langkawi inhabitants, including community dynamics, social structure, and traditional practices related to the myth	Analyse symbols in Tok Dian within Langkawi's cultural context	Analyse the myth's narrative, character development, and themes Examine Tok Dian's journey, challenges, and lessons	Experience myth through creatures, magic, and landscapes that evoke wonder	Analyse the cultural practices depicted in the myth and how they reflect the cultural values and identity of Langkawi's people

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Table 2 (continued)

Designers	Cultural context analysis: historical, objects and human					
	Historical context	Social context	Symbolism and interpretation	Narrative elements	Visual imagery	Cultural practices
Designer 4	Analyse Langkawi's historical and cultural context based on its location and interactions with neighbouring regions	Explore Langkawi's social structures, traditions, and practices, including kinship, religion, customs, and law	Analyse mythical elements' symbolic meaning and allegorical interpretation, considering their relevance to cultural identity and spiritual belief	Analyse the myth narrative, identifying recurring motifs, archetypal characters, and symbolic events that contribute to its thematic depth	Examine visual depictions of the myth and analyse the art uses imagery to convey mood, atmosphere, and cultural symbolism	Analyse how Sang Kelembai's cultural practices strengthen the significance of the myth in Langkawi's community
Designer 5	Discover Langkawi's rich history, culture, and mythology and learn about the events and figures that shaped Naga Putih's development	Analyse Langkawi's social structures, customs, and traditions through the myth of Naga Putih to understand how they reflect societal norms and hierarchies	Examine the symbolism of the White Dragon (Naga Putih) in Langkawi folklore and interpret the different narratives and perceptions of the myth	Analyse the myth of Naga Putih, identifying its origin story, hero's journey, and moral lessons	Analyse Naga Putih's art and sculpture for symbolism, aesthetics, and significance to the myth	Explore Naga Putih's cultural significance in Langkawi and how it impacts local customs and celebrations
Designer 6	Analyse the historical context of the Garuda and Jentayu myth in Langkawi, including cultural exchanges, migrations, and historical events that may have influenced its evaluation	Examine how Langkawi's social structure, norms, and practices influenced the interpretation of Garuda and Jentayu, considering factors like social hierarchy, religion, and communal values	Analyse Garuda and Jentayu's symbolic significance in Langkawi's cultural context	Identifying its key elements and how they contribute to the overall meaning and significance of the myth within the Langkawi community	Discover how the visual imagery of Garuda and Jentayu in art and crafts convey values, aesthetics, and mythology	Explore how the Garuda and Jentayu myth influences Langkawi's local cultural practices, traditions, and festivals

Implementation and Evaluation

During this phase, designers focused more on reflecting on the design process and the outcomes of their proposed concepts. The designers presented their ideas to the four experts (product design senior lecturers) using a structured evaluation rubric (Table 3), aiming to determine which concept proposals were both functionally and culturally relevant.

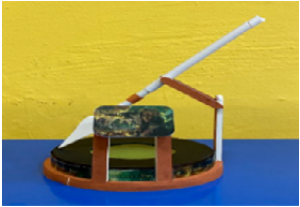
Table 3 Expert evaluation rubric based on HCD dimensions

Criteria/ HCD dimension	Evaluation focus Total marks = 60	Evaluation criteria (for early concept assessment)	Rating scale × 2
Cultural relevance	Reflection of cultural meaning and symbolism (10 marks)	How effectively does the concept represent or draw inspiration from local myths, legends, or cultural narratives?	1 = Poor 2 = Fair 3 = Good 4 = Very good 5 = Excellent
	Contextual storytelling (10 marks)	Clarity of the story or cultural message communicated through the design idea	
Functional and practical design	Conceptual clarity (10 marks)	How clearly the function and intended use are expressed in the early prototype	
	Design feasibility (10 marks)	Potential for future development into a working or manufacturable product	
User engagement	Initial appeal (10 marks)	The extent to which the design attracts interest and emotional response	
	Potential for interaction (10 marks)	How design invites handling curiosity, or participation during low-fidelity testing	

The goal for this experts' evaluation was to effectively engage the target audience and enhance their understanding of Langkawi's cultural heritage. Each designer proposed and showcased three concepts through low-fidelity prototypes during one-on-one presentations with the experts. The experts then selected three potential concepts for the designers to develop, facilitating final design improvements and evaluating the HCD approach that effectively captures the Langkawi cultural heritage.

Based on the experts' review evaluation, the HCD approach helps the designers to implement and evaluate their initial concepts and iteratively change the design based on stakeholders' feedback. This method emphasises iterative improvements, allowing the designers to modify their design based on ongoing feedback from collaborative sessions with stakeholders, including local people, tourists, and tourism experts. Experts play an important role in evaluating the HCD process through a series of assessments. They analyse the designers' interactions with stakeholders, examining how well the initial concepts align with user needs and preferences, identifying pain points and areas for improvement that address specific challenges. Experts used criteria such as (1) Cultural Relevance (How well the concept incorporates and respects Langkawi's heritage), (2) Functional and Practical Design (The practicality and usability of the proposed product), and (3) User Engagement (The potential for the product to capture the interest and create meaningful connections). Based on the output shown in Table 4, this result indicates that HCD is a design process that can also serve as a form of expression and a powerful tool for cultural understanding. By exploring the threads that bind design, culture, and humans, designers can create products that resonate with customers and promote a deeper appreciation of cultural heritage. This result reveals the true potential of HCD to foster meaningful connections with customers, thereby developing innovative products that positively impact tourism and cultural awareness.

Table 4 Matrix mapping of final prototypes to experts' evaluation evidence for cultural relevance, functional and practical design, and user engagement

Designers	Proposed concept with low-fidelity prototypes		
	Proposed concept 1	Proposed concept 2	Proposed concept 3
Designer 1			
	Diorama Mahsuri house Rating: 58/60	Mahsuri monument Rating: 44/60	Queen of Langkasuka doll Rating: 40/60
Cultural motif and inspiration	Integrates the Mahsuri legend's symbol	Integrates the Mahsuri legend's symbol	Integrates the Mahsuri legend's symbol of purity and femininity
Functional and practical design	Mini diorama house for educational purposes, resembling the Malay traditional house during that period	Multi-slot pen holder for creative workspace	Doll or collection figure of the Legend's Langkawi
User engagement	It has storytelling elements, and Learning purposes on what the house looked like during that period	It has a symbolic shape but limited functionality, as it can only hold one pen	The symbol of feminism and the representation of Malay women as collective figures
Designer 2			
	Langkawi legends quest: an interactive mythical board game Rating: 54/60	A Langkawi mythical quest board experience Rating: 50/60	Mystical realms: portals of Langkawi chronicles Rating: 56/60
Cultural motif and inspiration	References a combination of multiple myths	Inspired by multiple myths, Langkawi folklore	Incorporated narratives from multiple Langkawi legends
Functional and practical design	Designed as a cooperative educational board game	Allowing players to learn myths through gameplay challenges	Engaging educational games illustrate wood notes and culturally inspired tokens
User engagement	Engaging and interactive, liked the storytelling surfaces	Highly interactive, which the user expressed enjoyment	User expressed a deeper understanding of legends

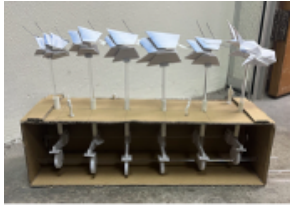
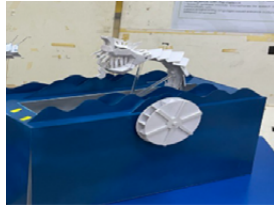
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Table 4 (continued)

Designers	Proposed concept with low-fidelity prototypes		
	Proposed concept 1	Proposed concept 2	Proposed concept 3
Designer 3			
	Design myth bag packaging Rating: 42/60	Mythical gamification elements Rating: 46/60	Mythical storytelling gift box Rating: 52/60
Cultural motif and inspiration	Inspired by the coastal folklore of Langkawi, Tasik Dayang Buntung	Incorporated narratives from multiple Langkawi legends	References a combination of multiple myths
Functional and practical design	Multifunction compact bag	Enabling players to explore myths through engaging gameplay challenges	Designed as a cooperative educational souvenir
User engagement	User-friendly as a hand carrier	User expressed a deeper understanding of legends	Positive aesthetic feedback
Designer 4			
	Mythical air purifier Rating: 48/60	Wearable mythical creature biometric sensor Rating: 46/60	Mythical air purifier Rating: 42/60
Cultural motif and inspiration	Incorporated narratives from multiple Langkawi legends	Inspired by the Langkawi myth creature from Dream Forest	Drawing inspiration from Gunung Mat Raya and Gunung Mat Chincang
Functional and practical design	It combines a diorama, a diffuser, and an ambient lamp for relaxation	Wearable product enhancement on technology and cultural elements	Dual-purpose air purifier
User engagement	The elegant presentation and serene atmosphere, featuring greenery replicas in the Langkawi forest, create a calming experience	Positive feedback on ergonomics and a wearable bangle that connects people with cultural elements	User felt a calm connection

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Table 4 (continued)

Designers	Proposed concept with low-fidelity prototypes		
	Proposed concept 1	Proposed concept 2	Proposed concept 3
Designer 5			
	Mechanical kinetic sculpture landmark Rating: 54/60	Talking mythical beast mascot Rating: 58/60	Kinetic diving sculpture Rating: 48/60
Cultural motif and inspiration	Draw inspiration from the Ular Naga, the form integrates a flowing dragon	The White Dragon symbolises strength and wisdom. The form integrates from Malay carvings	Influenced by the mythical dragon serpent that represents protection
Functional and practical design	Portable art installation for outdoor/indoor environment	Set up for an adaptable gallery or tourism event	Portable art installation for outdoor/ indoor environment
User engagement	Appreciate the sculpture for cultural curiosity	Create emotional engagement, detailed form, and educated people with the actual carvings	Interactive sculpture for entertaining younger people to visit the setup
Designer 6			
	LANG luggage carrier Rating: 44/60	3D mapping board Rating: 54/60	Themed inspired environment Rating: 52/60
Cultural motif and inspiration	Based on the Helang myth, it symbolises guardianship	A combination of Helang and Dayang Bunting Legend uses a lake-inspired form	References a combination of multiple myths
Functional and practical design	Compact, not too ergonomic, and less functional	3D and tangible map board for learning purposes	Modular exhibition setup adaptable for gallery or tourism events
User engagement	Portable product and unique character	Aesthetics appeal, tactile feel	Emotional engagement and cultural curiosity led stakeholders to value the educational potential of Langkawi interpretation

DISCUSSIONS

The Crafting Cultural Connections research project adopts this HCD approach by prioritising human and cultural sensitivity in product development. By understanding market trends, consumer behaviours, and competitive landscapes, the research project gains valuable insights that steer the design process toward relevance and resonance. The project's success lies in its ability to cater to the needs and preferences of end-users, ensuring that the final products captivate and satisfy the audience. The Crafting Cultural Connections research project embodies

an HCD approach that prioritises user experience above everything else. Its primary goal is to create products that look great and enrich the lives of those who use them. To achieve this, the project prioritises human and cultural sensitivity, producing products that connect with consumers emotionally and intellectually. Every design decision regarding its impact on the user and culture is carefully considered. The project's ethos values empathy and understanding, which is evident in the products it creates by combining HCD design principles with a reverence for product design development. This research project hopes to set a new standard for promotional product development that resonates with the audience and the values it represents, making it a project that is impactful and fair to all.

This study demonstrates that HCD methodologies can be applied to develop culturally relevant products that promote Langkawi's heritage, targeting tourists and younger generations. These findings reveal several key insights into the interplay between design, culture and user engagement, align with prior studies (Tosi 2020; Lopez and Bhutto 2023; Moustafa 2023; Udoewa 2022) emphasising the importance of integrating user feedback into product development to enhance cultural relevance. For example, Tosun (2020) demonstrated that culture embedded in tourism products improved user engagement and connection to heritage. Similarly, De La O Campos and Guemes (2021), Isa et al. (2023), and Ali et al. (2023) highlighted the value of stakeholder collaboration to ensure authenticity and user acceptance in culturally inspired product design. Consistent with their findings, this study includes collaborative sessions with multiple stakeholders, ensuring that the products developed reflect an authentic portrayal of Langkawi's cultural narrative. The critical aspects of the sessions include the convergence of ideas and traditions, inspiration from local folklore, and the forging of meaningful connections between the project participants, local stakeholders, and Langkawi's cultural heritage. Through the collaborative sessions, designers gain a deeper understanding and appreciation of the local culture, fostering a sense of respect and authenticity in the design process. The products created during these sessions convey creativity and cultural significance, showcasing Langkawi's cultural heritage and resonating with audiences on a deeper level. Overall, the collaborative sessions bridge the gap between traditional cultural elements and contemporary design practices, providing a space for exploration, inspiration, and new ways of changing ideas. The sessions play a crucial role in infusing authenticity, creativity, and a deep reverence for Langkawi's cultural heritage into the design process.

Despite this study's contribution, it also faced several limitations. Firstly, the study was focused solely on Langkawi, which limited the scope of the demographic background in terms of tourists' knowledge and understanding of local myths and legends. While this focused approach effectively targeted a specific audience, it may not fully represent the diverse perspectives and experiences of a wider demographic. Additionally, considering other locations known for their myths and legends could provide comparative insights, allowing for a deeper exploration of how geographical and cultural context influences tourist perception and knowledge. A notable limitation of this study was the involvement of only six designers in the design development and data collection process. While this small group enabled close collaboration and detailed engagement with HCD methodology, it is also constrained by the relatively small degree of diversity of design perspectives. Larger teams often bring varied expertise and creative approaches, which can enrich the ideation and development phases. Additionally, the workload of each designer was intensified due to the small team size, which might have influenced the iterative development process by limiting the number of prototypes and refinements made within the viable timeframe.

Future studies should consider involving a more extensive and diverse team of designers to address this limitation, ensuring representation from different cultural and regional backgrounds. This would allow for a broader range of design approaches and facilitate a more comprehensive exploration of how HCD principles can be adapted to various cultural contexts.

Additionally, future research should explore expanding the scope of HCD application to different regions by considering local traditions, social structures, and design practices. Expanding the scope of the HCD application to include diverse demographic groups and testing the designed products in real-world scenarios across multiple cultural settings will help evaluate long-term impacts on cultural awareness and re-engagement in varied contexts.

Future Work

While the current study emphasised the design process and qualitative assessment through expert and stakeholder feedback, future research will expand the scope to include quantitative user evaluation methods. This will involve conducting pre- and post-design exposure tests with users to measure changes in their knowledge of Langkawi legends and perceived cultural connection, using structured questionnaires and Likert-scale instruments. The results will be analysed statistically (e.g., paired t-test or Wilcoxon test) to validate the impact of culturally inspired product design on user perception and engagement.

Limitations

This study did not include pre- and post-evaluations of user cultural perception due to time and scope constraints, focusing instead on the design process and expert-based evaluation. The absence of quantitative user testing limits the ability to statistically confirm changes in users' cultural understanding or emotional connection. Future studies will address this by incorporating measurable user-response data to strengthen the empirical validation of design outcomes.

CONCLUSION

The Crafting Cultural Connections research project embodies a holistic approach to design, culture, and sustainability, fostering a harmonious relationship between these elements. By providing hands-on learning experiences, promoting cultural awareness, and showcasing sustainable design practices, the project has created a platform for designers and stakeholders to engage meaningfully with Langkawi's rich cultural heritage.

Through interactive sessions with various stakeholders, the designers have honed their design skills and developed a deeper appreciation for traditional craftsmanship and the importance of preserving cultural heritage. The project's emphasis on HCD methodologies has enabled designers to create products that showcase their creativity while enhancing tourism and cultural exchange in Langkawi. In essence, the Crafting Cultural Connections research project is a model for how design can bridge the gap between different cultures, promote sustainable practices, and empower individuals to become agents of positive change in their communities. A collaborative and mindful approach to design can create a more inclusive, culturally rich, and environmentally conscious world for future generations.

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