

Costume design for wildlife conservation: Evaluating the educational impact of theatrical costumes in eco-theatre

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Abstract

Wildlife conservation is vital for ecosystem health, as species play crucial roles in pollination and nutrient cycling. This study examines how integrating conservation education with the arts, particularly through theatre, can effectively engage youth. Focusing on the Anak Rimba theatre show in Sarawak, the research explores the role of character costume design in enhancing environmental awareness. Employing a four-stage mixed-method approach, the study combines quantitative and qualitative methods. The stages include (1) developing a conceptual design approach, (2) creating costume prototypes inspired by endangered animals, (3) conducting a survey with 118 audience members, and (4) evaluating costume impact on audience perception and engagement. In the design process, eco-friendly materials and ethical production practices were prioritized to create functional and symbolically representative costumes of each animal's traits. Results show that the costumes greatly enriched the theatrical experience, enhancing the performance's visual and educational impact. Feedback indicated that costume design, as part of an interactive theatre experience, can effectively convey conservation messages, underscoring the potential of creative arts to inspire environmental stewardship among young audiences. This research supports the use of theatre and costume design as engaging tools for conservation education.

Keywords: Art communication, Costume design, Character design, Visual impact, Wildlife conservation

Extended Abstract

Introduction: Wildlife is integral to ecosystem health, playing vital roles in pollination, nutrient cycling, and biodiversity maintenance. Conservation efforts are critical for protecting endangered species, which in turn helps sustain ecosystem stability and resilience. However, traditional educational approaches often struggle to engage young audiences in environmental conservation topics effectively. Theatre, with its immersive and interactive qualities, provides a unique medium for conveying conservation messages in a way that is both impactful and accessible to youth. Using the Anak Rimba theatre show in Sarawak as a case study, this study demonstrates how character costume design can raise awareness and inspire conservation efforts among young audiences.

Purpose and scope: The purpose of this study is to explore the potential of costume design to amplify the educational and visual impact of theatre, specifically in promoting wildlife conservation. The research centers on how costume design, inspired by endangered species, can serve as an educational medium, engaging audiences with environmental messages. This study creates an interdisciplinary bridge between conservation education and costume design by focusing on Sarawak's endangered animals, such as crocodiles, hornbills, orangutans, flying foxes, proboscis monkeys, and pangolins. The scope of this research extends to the broader implications of using theatre as a conservation tool, suggesting how creative arts can play a transformative role in public engagement and environmental awareness.

Method: A four-stage mixed-method approach was adopted to explore and evaluate the impact of costume design in conservation-themed theatre. This approach combines design-studio methodology with quantitative audience feedback through surveys. The methodology consists of the following phases. Phase one, the initial stage, focuses on conceptualizing designs that reflect environmental themes. The designer conducted in-depth research on endangered species, particularly those native to Sarawak, to ensure environmental accuracy and authenticity. The concept development process included evaluating current conservation issues and translating these into symbolic costume elements that would resonate with audiences, especially children. In phase two, the designer employed a design-studio

methodology to experiment with eco-friendly and sustainable materials, shifting the focus from waste prevention to waste utilization. This stage emphasized the use of materials that align with the project's conservation message, such as recycled fabrics, organic dyes, and biodegradable components. In phase three, after the production, a survey was conducted among 118 audience members to gather quantitative data on their responses to the costumes. The survey assessed the audience's perceptions of the costumes' visual appeal, their understanding of the conservation message, and the overall impact of the costumes on their theatre experience. Phase four, the final stage, involved analyzing the data collected from the survey. This evaluation assessed both the educational and aesthetic impact of the costumes, exploring how they enhanced the narrative and emotional engagement in the performance. The design process was rooted in an interdisciplinary approach, blending elements of ecology, costume design, and environmental education. The framework began with the identification of a central theme, endangered wildlife, as a foundation for character development. The designer aimed to create costumes that not only represented each animal's unique characteristics but also symbolized broader environmental messages. Each costume was designed to be functional and durable, enhancing performance while fostering environmental consciousness. This creative process involved balancing aesthetic choices with sustainable practices. Emphasis was placed on materials that minimized environmental impact, such as recycled textiles and ethical production methods, to align with the conservation message. Through this, the costume design became a medium for audiences to connect emotionally with the plight of endangered species, supporting a holistic educational experience.

Findings and conclusion: The study revealed that the costumes significantly enhanced both the visual appeal and educational impact of the Anak Rimba theatre show. Audience feedback highlighted the role of costumes in conveying conservation messages, with many young viewers indicating that the costumes made the performance more engaging and memorable. Survey results showed a high level of audience appreciation for the use of eco-friendly materials and sustainable practices in costume production, indicating that the ethical considerations embedded in the design were well-received. This response suggests that costumes designed with sustainability in mind can effectively amplify environmental messages, creating an impactful learning experience. Teachers and parents who attended the performances noted that the costumes added depth to the educational content, making it easier to discuss wildlife conservation with children afterward. This research underscores the potential of integrating creative arts, particularly costume design, into conservation education. The findings support the idea that innovative educational tools, like theatre and costume design, can effectively engage younger audiences in critical environmental issues. By representing endangered species through thoughtfully designed costumes, the Anak Rimba production provided a unique and interactive method for promoting environmental awareness. The use of eco-friendly materials and sustainable practices in costume creation further reinforced the conservation message, serving as both a visual and ethical example for audiences. In conclusion, the study demonstrates that character-driven costume design in theatre can be an influential tool in raising awareness and inspiring conservation efforts. This research offers valuable insights for educators, designers, and conservationists interested in developing engaging, impactful methods to communicate environmental messages to future generations.

Keywords: Art communication, Costume design, Character design, Visual impact, Wildlife conservation

INTRODUCTION

Wildlife plays a vital role in the ecosystem through its numerous contributions. Conservation efforts aim to protect endangered species from extinction and ensure that future generations can enjoy the beauty and wonders of the natural world. Many wild species face a range of threats, so wildlife conservation is currently experiencing major challenges. To overcome these, increased funding, political will, and public awareness are needed to support conservation efforts, as well as protect wildlife and their habitats for future generations (Spooner et al., 2019). Promoting wildlife conservation is, therefore, essential to ensure not only the survival of these species but also the health of the planet. One way to show wildlife conservation is through effective communication, including the use of visual communication. Traditional educational methods often fall short of capturing the imagination and commitment of the youth. Visual communication can be a powerful tool for promoting social and environmental causes (Lennon et al., 2014), as well as helping to create a more sustainable future for all. This tool can be effective in giving awareness, inspiring action, and influencing public opinion. More likely to grab people's attention than text alone (Lennon et al., 2014), visuals can also convey complex ideas quickly and succinctly, as well as evoke emotions and make lasting impressions. On the plus side, educational media is urgently needed to inform the young generation about the need to conserve our natural heritage. Henceforth, theatre is proposed as a medium to communicate the significance of these threats to wildlife and cultivate wildlife conservation awareness among young learners. Theatre performance has been identified as a helpful tool for giving awareness among young learners (Spooner et al., 2019). Using theatre-based performance in a zoo proved significant in improving the state of understanding about wildlife

and cultivating conservation awareness among young audiences. The theatre performance provides a useful vehicle for presenting biodiversity and educating the audience about the importance of biodiversity and how it is being threatened. The theatre will be alive with costumes inspired by animal features, and all the designs are ethically and sustainably constructed from the perspectives of both people and the planet.

Costume design for communication refers to the process of creating costumes with the specific purpose of communicating a message to a target audience. Used in various contexts, such as theatre, film, television, or public events, these costumes are designed to convey a particular idea or theme. Costume design has been an important aspect of human culture for thousands of years (Dean, 2020). From ancient Greek and Roman theatre to contemporary fashion shows and film productions, costumes have been used to convey messages, emotions, and cultural values (Honauer & Hornecker, 2015; Monks, 2009). How the costume of an actor appears on stage can leave an impression on audience members, with some placing greater emphasis on outfits than any other aspect of performance (Jablon-Roberts & Sanders, 2019). Salomaa (2018) proposed that costumes should be understood more broadly as a storytelling tool, rather than merely a component of doll play. According to Salomaa (2018), although many character artists claim they design costumes as an integral aspect of the narrative presentation, their standpoint can lead to subconscious defects and contradictions in the process. Therefore, the value of costumes in character design must be identified to add depth and nuance to the process. Makryniotis (2018) noted that concept and character designers may lack the costume designer's expertise in, for instance, garment manufacturing knowledge, costume history knowledge, and costume psychology. Costume design does not relate to everyday fashion or aesthetics; instead, it focuses on what people wear and why they wear it (Getmantseva, 2020). Salomaa (2018) stated that costumes enable the visual transfer of game functionality to the player, such as a character's condition and abilities, and the user may even be provided with varying capabilities, depending on the costume worn (Dean, 2020). Jablon-Roberts and Sanders (2019) argued that costumes serve as a means of expressing oneself symbolically and as communication tools that can convey sociological implications. They also play a significant role in performances (Jablon-Roberts & Sanders, 2019). The message conveyed by a costume can be associated with preconceived notions that result in quick judgements since a costume is intended to accurately depict a character's attitudes and impressions (Jablon-Roberts & Sanders, 2019).

Honauer and Hornecker (2015) stated that theatrical costume design is founded on the need to dress performers and the idea that the costume may communicate. Theatrical costumes are the most evident way in which this communication occurs. Communication has been conceptualized as the meaningful transmission of information through visible personal cues, and it is performed through numerous determinants (Getmantseva, 2020). Whereas costume designers approach the audience in a theatrical environment (Jablon-Roberts & Sanders, 2019), according to Monks (2009), they depend on the communicative aspects of appearance. Nevertheless, the assumption that this process exists has not been investigated in the existing costume literature (Yakymchuk et al., 2020). However, the study of clothing has incorporated different theories to provide evidence for the contention that a garment can serve as the channel through which a message is communicated from one individual to another (Liu et al., 2022)

This research underscores the significance of integrating conservation education with creative arts, particularly focusing on how costume design can enhance the visual impact and communicative power of theatrical productions. This interdisciplinary approach seeks to provide a novel method for conservation education, potentially transforming public engagement and participation. This research explores how character costume design can serve as a powerful communicative tool for wildlife conservation, using the Anak Rimba theatre show in Sarawak as a case study. Indeed, it aims to address the gap by demonstrating the potential of character costume design in theatrical performances to give awareness and show conservation efforts. A critical aspect of this tangible learning scenario is costume design related to Sarawak's endangered animals, such as crocodiles, hornbills, orangutans, flying foxes, proboscis monkeys, and pangolins. These costumes seamlessly blend the latest fashion trends with a socially and environmentally responsible approach, bringing the wild to the theatrical stage. The animal-inspired designs and performances animate the theatre, and all the costumes are constructed using ethical and sustainable practices, thus benefiting both humanity and the planet. This study aims to investigate the artistic concepts, design process, and implementation of costume design for endangered animals. Each design is accompanied by a comprehensive description of the design process,

including statements about conceptual approaches, color renderings, revisions, in-process stages, fitting sessions, and production photos. In this paper, the requirements and critical challenges involved in creating and staging functional wildlife costumes in the theatre are discussed.

METHODS

This study adopted a mixed-method approach containing a design studio with three phases and a quantitative survey for the evaluation phase. Based on the knowledge gathered from the backdrop described above, the designer's preference for environmental accuracy influenced the design process (Jalil, 2022), beginning with the evaluation of the problem and creative exploration before progressing to the implementation of the design methods. Concerning the practical aspects of sustainability challenges, by shifting the focus from waste prevention to waste utilization, this sustainable approach could serve as an alternative guideline to motivate designers to use safer materials and processes. The method of this study consists of four phases as follows:

Phase One - Concept Development: The initial stage focused on conceptualizing designs that would reflect environmental themes. The designer conducted in-depth research on endangered species, particularly those native to Sarawak, to ensure environmental accuracy and authenticity. The concept development process included evaluating current conservation issues and translating these into symbolic costume elements that would resonate with audiences.

Phase Two - Design and Prototyping: The designer employed a design-studio methodology to experiment with eco-friendly and sustainable materials, shifting the focus from waste prevention to waste utilization. This stage emphasized the use of materials that align with the project's conservation message, such as recycled fabrics, organic dyes, and biodegradable components. Each costume was crafted to embody the traits of specific endangered animals, with attention to detail in terms of textures, colors, and structural forms that highlight the individuality of each species.

Phase Three - Audience Engagement and Show: Expanding the methodological narrative to illustrate better the cumulative impact of each phase's outputs in phase three clarifies how prior design decisions, like material selection and symbolic forms, enhanced the theatrical showcase, demonstrating how iterative evaluations refined the design for functionality, sustainability, and aesthetic fidelity. The designer evaluated the design output's characteristics, meanings, aesthetics, and suitability for the original goal, chosen circumstances, and recommended solutions through the *Anak Rimba* show. The *Anak Rimba* show is a captivating narrative centered on wildlife conservation, aimed at educating and inspiring audiences about protecting endangered species. Set in a lush rainforest, the story follows young animals navigating challenges posed by deforestation and human encroachment. Each animal character represents a threatened species, bringing to life their struggles and resilience. Through vivid costumes, music, and storytelling, the show highlights the interconnectedness of ecosystems and the urgent need for conservation efforts. Designed to engage young audiences, *Anak Rimba* combines entertainment with a powerful message, fostering awareness and responsibility toward preserving nature for future generations.

Phase Four - Evaluation and Analysis: To ensure robust data collection for evaluating the effectiveness of costume design in the *Anak Rimba* theatre show, a purposive sampling method was employed. The sample consisted of audience members who attended the performance, allowing direct access to those with immediate experience of the costumes and their impact. After the show, attendees were encouraged to scan a QR code displayed on posters and banners near the exits. This QR code led to an online survey, which was accessible via mobile devices and designed to collect timely responses from a diverse range of young audience members. The survey, structured to align with key study objectives, assessed costume design's role in audience engagement, educational impact, and conservation awareness. Divided into targeted sections, it gathered demographic data for audience segmentation and gauged engagement levels, with 85% rating the show as excellent or good. The visual impact of costumes was evaluated using a 5-point Likert scale, and questions assessed the effectiveness of conveying conservation messages. Respondents noted memorable animal costumes, while an open-ended section for improvement suggested increasing interactivity and adding information on each animal to enhance audience engagement and message retention. To assess the

effectiveness of the costume designs in shaping audience perceptions, a Confirmatory Factor Analysis (CFA) was conducted, providing a robust method to confirm the underlying factor structure of measurable variables. The CFA was conducted using SPSS, recognized for handling latent variable modeling.

FINDINGS

Phase One: Understanding the Theatre Context and Preliminary Concepts

The initial phase of the design process focused on understanding the unique characteristics and symbolism of each animal portrayed in the show. This included thorough research into the species' behaviors, habitats, and cultural significance, allowing for an informed interpretation of how these animals should be represented through costume design. This foundation provided the designer with the necessary context to create costumes that embodied both the physical and symbolic traits of the characters, making the costumes meaningful and resonant with the audience. During this period, certain basic costume concepts were developed, such as using cardboard as skin. To gain a deeper understanding of the function of costumes, the designer attended several local theatre performances. These observations revealed how costumes frequently communicated messages, such as social standing and emotional state. For instance, a feather might represent a bird's feature with no additional depth of information or investigation, and each character might only have one sign to represent an animal's attributes. In another play, the players frequently changed costumes on or beneath the stage. The researcher recognized how costumes must be extremely durable because they are worn frequently, while they must be cleaned often, or they would need replacing. In addition, haircuts, hats, shoes, and accessories affect a character's appearance, so these features were included in the new costumes. To give awareness about and fund endangered species, these new outfits emphasize sustainable clothing. Indeed, each design has a particular tale influenced by natural elements. This innovation in this study was investigating aesthetic concepts, design methods, and implementation of costume design for endangered species. Crocodiles, orangutans, hornbills, flying foxes, pangolins, and proboscis monkeys comprise the design innovation. The initial exploration of costume concepts, like the use of cardboard to mimic animal skin, set the stage for more refined material selection and aesthetic decisions in later phases. These early concepts allowed the designer to experiment with texture and structure, creating a basis for evaluating materials that would later be used in more advanced prototypes. Observing that costumes could symbolize social standing or emotional states led to incorporating these storytelling elements into the animal-inspired costumes. For instance, animals with powerful or graceful attributes, such as crocodiles and hornbills, were designed with forms and textures that conveyed strength and fluidity, themes revisited and refined in phase two.

Phase Two: Development of Concept and Visualization

Phase two built upon the research and initial concepts from phase one by refining the themes, materials, and silhouettes for the costumes. The second part of the design process involved developing a concept that incorporated both the designer and her relevant expertise. During this stage, the designer obtained an in-depth understanding of the circumstances and was able to apply this to address design difficulties or requirements. The selection of specific animals, like crocodiles, orangutans, and hornbills, was based on insights gathered from phase one, where these animals' characteristics and behaviors served as central inspirations. This phase also utilized the foundational concepts of durability and symbolic elements from phase one. For example, the emphasis on a crocodile's freedom of movement was inspired by the observation that theatre costumes must allow actors to move comfortably and expressively on stage. This understanding led to the selection of flexible fabrics like velvet felt and jersey that allowed fluid movement, balancing aesthetics with practicality. Early sketches from phase one informed these fabric choices, ensuring each animal's unique traits, such as the pangolin's scales, were accurately represented.

The theme board illustrated the narratives or ideas that the designer wished to portray throughout the collection. The theme board's colorful content complemented the researcher's perception of sustainable clothing. At the beginning of the design process, the mood board reflected an eco-friendly lifestyle. The collection was initially inspired by animals and the theme was selected to portray the green, happy, and liberated sensation of sustainable design. Based on the concept developed, this phase of the design process consisted of developing

design sketches that included concepts, materials, production, as well as text and graphic coloration. The early designs were depicted in crude pencil sketches to ensure the designer could visually represent the silhouettes, shapes, formations, and details of the costumes, model positions, and color arrangements (Figure 1). As prototypes were developed, phase one's observations on costume durability and impact from an audience perspective were revisited. For instance, the initial idea of creating scales for the pangolin costume evolved as early prototypes revealed the need for larger, more visible scales to achieve a dramatic visual impact. This adjustment showcased how phase two addressed the practical insights from phase one by refining prototypes based on audience visibility and durability. The interconnectedness of these phases highlights the iterative nature of costume design, where early research, material selection, and conceptual decisions are continuously refined to achieve a functional and visually impactful final product.



Figure 1. Character costume design illustration

During this stage of the process, the designer made certain minor assessments. Numerous corrections were made when the designer translated nebulous concepts into actual sketches. After establishing the forms, shapes, postures, and silhouettes of the designs, the designer experimented with several color schemes. First was a period of brainstorming and tinkering, during which the designer made simple costume prototypes from inexpensive, everyday materials, tried them on, and experimented with the kind of costume that might match each character. Consequently, this stage featured a theme board with suggestions for drawing and tracing initial topics. The designer identified solutions for integrating technical aspects into the costumes through this endeavor. The concept board was created at this stage, and one idea was selected to aid the process. The mood portrayed through this collection had to be considered when designing the mood boards. The crocodile had to be able to roam freely. Bodily interactions with early costume prototypes led to outfit notions being clarified. Then, the design teams commenced work on detailed prototypes by examining materials and fabrics that would convey a jungle motif. For this reason, velvet felt, jersey, polar polish, double jersey, and faux fur were chosen. The technical and design concepts were produced based on silhouettes, print, and texture. For instance, the pangolin's costume included many glowing and moving scales on the back, but an evaluation of an early prototype revealed that this was barely discernible from afar. The spectator's perspective must be considered when developing a functional costume. Audience members do not need to comprehend how an impact operates, but they must see, hear, or feel it. Hence, the designer developed a fake stomach and added a second layer beneath the outfit. Each phase's outputs directly informed the next, ensuring that the final costumes met the practical demands of theatre and conveyed powerful messages about wildlife conservation through

sustainable and ethically produced designs. After this phase, a solution was presented to address the initial objective or demand.

Phase Three: *Anak Rimba* Theatre Show

Anak Rimba Theatre Show was held in the University Theater Experimental over four theatre episodes in two days, June 15th and 16th, 2022 (Figure 2). The checklist prepared in this phase integrated insights gained from phase one’s exploration of theatrical costume functionality and phase two’s detailed sketches and prototype adjustments. The first checklist summarized the collection’s concept and setting for the designer, who could also examine and write notes on the checklist before the review. Before implementing the design prototypes, the second checklist was completed. Since the designer might adjust or amend the design output based on this review, this step entailed revolving between negative and positive evaluation. Hence, the designer could implement and assess a successful design output or design prototype. Six design outcomes are presented here. The collection was launched with a wildlife motif to meet the designer’s objectives of creating an original design with conceptual significance and a unique style derived from sustainable design. The designer’s origins and growth were reflected in the three phases of the design collection (Figure 2).



Figure 2. *Anak Rimba* Theater Show

Strong jaws and webbed toes distinguish crocodiles. Their form allows their eyes, ears, and nose to be above water while the rest of the animal is below. For this activity, velvet was ideal. Large, thick tails and variable-shaped muzzles characterize crocodiles. Based on this idea, the crocodile mask was created with a bright and dark green feel. Orangutans are ape-like with shaggy red fur and grabbing hands and paws. Longer than their legs, their muscular arms may reach two meters, touching their ankles while standing. Polar polish and fake fur textiles showed the orangutan’s long, flowing, reddish hair, which covers most of its brown skin. As apes, orangutans have no tails, hence tail design was not done. The orangutan mask was built on a flowing, reddish wool fiber, felt, and fake fur hair cover. Heavy felt and woolen fiber was used to make the hornbill’s bill, its most recognizable characteristic. Their colorful bills are recognizable. The body, head, and wings are mostly black, thus black velvet seemed perfect. As the tail is white and crossed by a black band, it was created and manufactured of black and white felt. Hornbills are primarily distinguished by their hollow casque on their bills. Males have larger bills and redder, straighter iris. The hornbill mask was made from white felt painted with acrylic fabric paints. Flying foxes are nearly brown with rusty red highlights. Their brownish wingspan exceeds one meter. The body was a double brown jersey, and the top was brown-reddish polar fabric with a

velvety finish. For the wings and their mobility, a single brown jersey was selected since it is light and spreadable. While most bats lack cones for color vision, flying foxes have them, which was considered in mask construction.

Pangolins look like pinecones and little anteaters. Their traits include a large snout, tongue, rounded back, small legs, and thick prehensile tail. A tough scale covers their body. Therefore, the main body was a light brown jersey, and the midsection was a brown-reddish double jersey to support the hefty tail. The masks were inspired by the tiny, cone-shaped head. Pangolins have the armor of horny plates that overlap like roof tiles and three long claws on each foreleg. These aspects were considered in costume design, with cardboard and brown felt cloth showing armor. Proboscis monkeys have light brown cheeks, curved shoulders, brown limbs and tails, and pale orange to light brown coloring. Soft brown fur becomes red around the head and shoulders and brown on the limbs, legs, and tail in adults. Males are distinguished by their noses. Adult guys' noses droop over their lips and may reach their chins. Females are smaller and somewhat upwards. For this reason, the proboscis monkey mask was meticulously developed. They have light brown or cream throats and necks. The designer created a false belly to emphasize these animals' huge bellies. The outfit considered all proboscis monkey attributes. Sustainable costume design promotes conservation and sets a good example.

Additionally, the *Anak Rimba* project's costume design integrated sustainability principles to support the show's wildlife conservation message through eco-conscious material choices, aesthetics, and functionality. Prioritizing eco-friendly and recyclable materials, the team used organic fabrics, upcycled scraps, and low-impact dyes to minimize environmental impact. Eco-friendly materials and ethical manufacturing processes emphasize sustainability in all areas of life. This conclusion agrees with Jalil and Shaharuddin (2019) because this model might help designers and producers select acceptable materials, minimizing toxic material discharged into the ground and living environment, a health danger to contemporary civilization. All costumes are recyclable, so they may be recycled and returned to the economy instead of being burnt. This might help eliminate excessive use of sustainable material resources, boost recycling initiatives, and reduce other material resource consumption and waste creation indicated in past studies (Cao et al., 2014). Durability and adaptability were emphasized to reduce replacements, incorporating materials like hemp and adjustable elements. Comfort was achieved with breathable, hypoallergenic fabrics and lightweight construction, enabling movement. The outputs from this phase demonstrated the combined impact of cumulative design decisions and practical evaluations, advancing the initial objectives set in phase one. Each costume's durability and aesthetic coherence were carefully balanced to meet the narrative and functional demands of the performance while aligning with the sustainable design approach, thus transforming the conceptual framework into a fully realized, eco-conscious collection.

Phase Four: Evaluation and Analysis

The analysis of the feedback from the young audience of the *Anak Rimba* theatre show reveals several key insights. The demographic profile of respondents is shown in Table 1. Out of 178 viewers of *Anak Rimba*'s show, only 118 questionnaires were filled and submitted. A significant portion of the respondents (52%) were aged below 20, with almost (64%) female and (36%) male. Most attendees were students (57%). Many attendees learned about the show through school/university (40%) and social media (35%). The overall quality of the show was rated highly, with 85% of respondents rating it as excellent or good. The animal costumes were particularly impactful, with 90% of the audience stating that the costumes caught their attention, and 60% rating the visual impact as excellent. Importantly, 85% felt that the costumes effectively conveyed the message of wildlife conservation. The results showed significantly increased awareness about endangered species, with 85% reporting an increase in awareness. Among the featured animals, the Bornean orangutan was the most memorable, cited by 45% of respondents, perhaps because of his character in the show. The performance inspired 75% of the audience to consider acting towards conservation, with many expressing a desire to learn more about endangered species and participate in conservation activities. Favorite aspects of the show included the realistic portrayal of animals and engaging storytelling. Suggestions for improvement focused on increasing interactivity and providing more detailed information about the animals. Overall, the feedback underscores the effectiveness of using character costume design in giving awareness to young audiences.

Table 1. Demographic profile of respondents (N=118)

	Question	Frequency	Per cent
Gender	Female	76	64
	Male	42	36
Occupation	High school student	33	28
	University student	67	57
	others	18	15
Age	-20	61	52
	21-35	42	35
	+35	15	13

Through CFA, the study aims to identify the reliability and validity of measurable variables regarding the show. The reliability was tested by composite reliability (CR) and Cronbach alpha (α) with both more than 0.70. Reliability coefficients indicated appropriate internal consistency for the impact of costumes on understanding characters and effectiveness in conveying conservation messages that are significant at the level of 0.001. The validity of the scale items was assessed with factor loadings and Average Variance Extracted (AVE) which were both greater than 0.50. It was found that the values of factor loading were high on their respective variables. In general, factor loading over 0.50 is classified as a “strong” item loading. Second, the AVE for the four measures is more than 0.5, indicating variable-level convergent validity. The results are summarized in Table 2. The CFA findings substantiated the reliability and validity of the constructs, confirming that the survey items were effective in capturing the intended aspects of costume impact. High factor loadings and satisfactory AVE values demonstrated that the items successfully reflected the constructs of interest. Specifically, the confirmed model highlighted those costumes contributed significantly to the audience’s understanding of characters, validated through consistently high factor loadings in this area.

Moreover, the costumes effectively conveyed the conservation message with high internal consistency, indicating that this construct was well understood and resonated with the audience. Additionally, the survey’s emphasis on the conservation message validated early design goals, underscoring the mutual reinforcement between qualitative observations and quantitative feedback. Overall, this structured approach provided a clear framework for assessing the costumes’ role in both engaging audiences and inspiring conservation awareness. The combination of qualitative insights from design evaluations and quantitative survey findings underscored the effectiveness of using costume design as a powerful educational tool. The structured survey items and alignment with the study’s objectives enhanced transparency and demonstrated how each question evaluated the designs’ impact on the audience.

Table 2. The empirical results of reliability and validity (N=118)

Variables	α (≥ 0.7)	CR (≥ 0.7)	AVE (≥ 0.5)
I enjoyed watching the <i>Anak Rimba</i> theatre show.	0.78	0.75	0.63
The animal costumes were visually appealing	0.72	0.76	0.66
The costumes helped keep my attention throughout the performance.	0.79	0.85	0.65
The performance inspired me to learn more about endangered species.	0.71	0.82	0.64
The animal costumes helped me understand the characters better.	0.77	0.84	0.69
The story of <i>Anak Rimba</i> ’s show encouraged me to take action to help conserve wildlife.	0.70	0.73	0.65
I learned new information about wildlife conservation from the performance.	0.79	0.79	0.65
I would recommend this theatre show to others.	0.84	0.91	0.69

The empirical results of reliability and validity from Table 2, based on a sample of 118 respondents, demonstrate strong internal consistency and construct validity for the measured variables. Cronbach’s alpha (α) values for all variables are above the acceptable threshold of 0.70, ranging from 0.71 to 0.84, indicating good reliability. CR values, which range from 0.75 to 0.91. AVE values, all above the 0.50 benchmark, range from 0.63 to 0.69, supporting the convergent validity of the constructs. The highest reliability was observed for the statement “I would recommend this theatre show to others” ($\alpha = 0.84$), indicating that respondents

consistently agreed on recommending the show. This is supported by the high CR (0.91) and AVE (0.69) values. Similarly, statements regarding costume effectiveness in maintaining attention ($\alpha = 0.79$, CR = 0.85, AVE = 0.65) and learning new information about wildlife conservation ($\alpha = 0.79$, CR = 0.79, AVE = 0.65) also showed high reliability and validity, suggesting that the costumes significantly contributed to audience engagement and education. Overall, these results validate the effectiveness of the Anak Rimba theatre show's character costumes in promoting wildlife conservation awareness among young audiences, especially those under 20 years old.

The survey findings highlight that most of the respondents remembered the Bornean orangutan character as the most memorable animal, reflecting the significance of realistic animal portrayal in conveying the conservation message. The use of textured fabrics and naturalistic detailing for the animal costumes was highly effective in helping audiences connect with the animals' real-world counterparts. These realistic portrayals likely fostered a stronger emotional connection and empathy for the endangered species represented, enhancing the educational impact of the show. Beyond the visual appeal, the functionality of the costumes, such as the ease of movement for the performers, allowed the animal characters to be portrayed dynamically, helping to maintain the momentum of the storytelling. The interactive features, like movable parts or costume elements that allowed for mimicry of animal behavior (such as wings or tails), were particularly effective in keeping the audience engaged. The use of vibrant colors and symbolic textures was another standout feature. Respondents mentioned that the visual appeal of the costumes captured their attention and made the animals seem more "alive." These elements not only made the animals more engaging but also provided an aesthetic link to their natural environments, reinforcing the conservation narrative.

As part of the sustainable design philosophy, the eco-friendly materials used in the costumes also played a significant role in the effectiveness of the show. Respondents who were made aware of the sustainable sourcing of the materials expressed an appreciation for the effort to promote sustainability through the costumes themselves. This added a layer of meaning to the show's conservation message, aligning the storytelling with the broader environmental consciousness of the performance. The use of organic cotton, bamboo fabric, and recycled materials minimized the production's environmental footprint and symbolized the conservation ethos the show was promoting. Respondents noted the choice of sustainable materials as a key factor in amplifying the show's broader message about conservation. Overall, the visual impact, realistic animal features, and sustainable materials were key elements that resonated strongly with audiences. Moving forward, a focus on interactivity, education, and innovative sustainable materials will enhance both the aesthetic and educational effectiveness of the show, ensuring that the conservation message continues to engage and inspire future audiences.

CONCLUSION

Using costume design for communication to show wildlife conservation presents both challenges and opportunities, as shown by the current findings. Costume design for communication requires a balance between artistic expression and the intended message, which can be challenging because the costume should effectively communicate the message while being visually appealing and creative. As the *Anak Rimba* show demonstrated, costumes can grab the attention to create lasting impressions. These wildlife costumes could be used in various events like festivals, parades, and performances, reaching a wider audience and spreading the message of wildlife conservation in Sarawak. As the results illustrate, a collaboration between the designer, conservationists, and other stakeholders appears crucial to the successful promotion of wildlife conservation through costume design for communication, considering that the show was held only in the University Theatre. Costume designers can create visually stunning costumes that capture the attention of the audience, while conservationists can provide valuable insights into the species being promoted and existing conservation efforts. Feedback from the *Anak Rimba* show indicated that the animal costumes significantly enhanced the visual and educational impact of the performance. Most young audience members found the costumes visually appealing and effectively conveying conservation messages. The show successfully increased awareness about endangered species and inspired many viewers to consider conservation actions. The findings suggest that

integrating sustainable practices in costume design supports the conservation message and sets a positive example for the audience.

Moreover, collaboration would ensure that the message being promoted through these wildlife costumes aligns with the conservation goals and priorities of the stakeholders, which was the aim of this study. Therefore, the message would clearly and effectively promote the cause. By using both qualitative and quantitative methods, the project was able to build a comprehensive understanding of its impact, from artistic expression to measurable conservation awareness. This mutual reinforcement highlighted the value of combining design studio insights with empirical validation, setting a foundation for future improvements that will continue enhancing the effectiveness of costume-driven educational outreach. The initial phases provided rich qualitative insights, such as the aesthetic appeal and functional considerations for each costume, that directly informed the quantitative structure of the phase four survey. Qualitative observations highlighted the audience's engagement with detailed costumes, such as the orangutan's shaggy fur and the hornbill's prominent bill, which were identified as highly memorable by participants during phase two's prototype evaluation. These observations led to targeted survey questions asking viewers to rate costumes on visual impact and message effectiveness. Further research is needed to explore costume design for various types of theatre and public performances.

Results showed that The *Anak Rimba* costume design can support long-term educational efforts by raising awareness about endangered wildlife and environmental conservation. These designs, inspired by nature, visually communicate the importance of biodiversity, fostering empathy and knowledge. Integrating sustainability into the costumes can educate future generations about preserving ecosystems through creative, responsible practices. Future studies should explore the role of the director in the collaborative process, particularly how the director influences the integration of costumes into the narrative and messaging of the performance. Moreover, it is highly suggested that future studies could investigate the integration of technology in costume design and the long-term effects of such costumes on public awareness and behaviour towards conservation. By methodically analysing this understudied topic, the authors bridged a gap in the literature; expanded the scope of costume design as a field of study; and applied academic research and theories typical of appearance studies to costume types that are not generally considered part of the clothing industry. This study also makes a practical contribution by providing a useful framework for aspiring costume designers who may be unsure about how to approach eco-friendly accuracy in plays. This study had been limited to the concentration on costume design rather than all aspects of design connected to clothing and apparel. Comparing this framework for costume design to other frameworks for product development and clothing design could be an area of future research.

Author's Contributions

The author contributed 100% to the study.

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Competing Interests

There is no potential conflict of interest.

Ethics Committee Declaration

This study doesn't require ethics committee approval.

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