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Analysing the Effectiveness of Visual Aids for Learning in Kuala Lumpur Bird Park

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ABSTRACT

This study explored the effectiveness of visual aids in enhancing learning experiences at the Bird Education Centre in Kuala Lumpur Bird Park, an informal educational setting aimed at promoting bird conservation awareness. The research focuses on visual learning tools such as egg incubator display, educational illustrated wall, data table, and documentary video, and how these tools influence visitor understanding, engagement, and retention. A quantitative research method was used, and data were collected through a structured survey questionnaire involving 55 visitors of varying demographic backgrounds. The results showed that visual materials such as data tables and illustrated walls were rated as the most engaging and helpful in supporting bird education. However, documentary videos were found to be the least preferred, which contrasts with previous research emphasizing the role of documentaries in wildlife education. The study also revealed that gender and age groups slightly influenced preferences and learning engagement, with female and younger visitors showing higher interaction levels with visual aids. Overall, the findings suggest that well-designed, accessible visual materials significantly improve visitor learning in nature-based environments. These insights may benefit educators, exhibit designers, and park planners in developing more effective and engaging educational tools for environmental awareness.

Keywords: *Visual Aids, Visual learning, Birdlife education, Educational nature park, Learning engagement.*

1 INTRODUCTION

Birdlife education plays an important role in promoting awareness and appreciation of fauna. Kuala Lumpur Bird Park serves as an important platform for educating visitors about the various bird species, their natural habitats and the significance of conservation efforts (Mace, Balmford, Leader-Williams, Manica, Walter, West, & Zimmerman, 2007). With the changing needs of the digital native generation, there is an increasing opportunity to increase educational experiences by including more engaging and interactive learning methods.

Visual aids are materials that use images, graphics, videos, animations or objects to help explain or support information during learning. It has been widely recognized for its ability to grab attention, simplify complex information and improve knowledge retention (Mayer, 2009). Tools such as animations, projection mapping, augmented reality (AR) and virtual reality (VR) have shown

potential in supporting learning especially in fields such as birdlife education (Parong & Mayer, 2018; Wojciechowski & Cellary, 2013). Although KL Bird Park provides many informative activities, there remains a chance to evaluate the effectiveness of visual aids in improving visitor engagement and understanding of bird-related knowledge.

Visual aids can make birdlife education more memorable and effective. By visual tools such as interactive displays, visitors may have a more enjoyable learning experience about bird species, habitats and conservation (Falk & Dierking, 2018). Understanding how visual media impacts visitor learning and interest can provide useful benefits for improving educational efforts and increasing public connection to fauna and environmental awareness (Ballantyne & Packer, 2011).

1.1 Research Objective

The objective of this research was to evaluate the effectiveness of visual aids on visitors understanding and nurture of bird-related knowledge at KL Bird Park. This research focused on assessing how visual aids impacts visitors' understanding of bird species, habitats, and conservation topics at KL Bird Park. It evaluated that visual and interactive educational methods help visitors process and retain bird-related information more effectively. Through this evaluation, the study aimed to see if visual aids can nurture greater awareness and appreciation for birdlife among the public.

1.2 Problem Statement

In the context of fauna education in Bird Education Centre at KL Bird Park, there is still a lack of adaptation visual aids approaches that effectively engage visitors with different backgrounds and learning preferences. Similar to the findings by Zainuddin, Rahmat, Sabri, Yusof, Alwi, Rosnon, and Nor Peah (2023), where visual alternative modules were proven effective in enhancing the interest of Orang Asli students in science education. This showed that adaptation visual strategies can enhance learning engagement. This study highlighted the importance of using visual-based methods to meet various learner needs, which is still not fully engaged in fauna education settings such as KL Bird Park. It is important to analyse how visual aids could support birdlife education and improve visitor learning experiences.

Furthermore, in the field of fauna education at Bird Education Centre, KL Bird Park, visual strategies remain insufficient usage, particularly in engaging visitors with environmental and wildlife-related knowledge. This identified a gap in the development of impactful visual learning tools for fauna education and ecological awareness. Abu Bakar, Mohd Pahroraji, Tan, Ramli, and Talukder (2023) also pointed up the importance of visual communication in raising public awareness about sustainable living to show the strong visual elements can help people better understand and remember important messages. Their findings suggested that without effective visual communication, efforts to promote awareness change may fall. This highlighted the need for KL Bird Park to boost its visual aids methods to have a better connection to educate its visitors.

2 LITERATURE REVIEW

Visual aids are widely recognized as effective tools in education due to their ability to improve understanding and retention. They can simplify complex information, support different learning preferences, and make learning experiences more engaging. Research by Zainuddin, Rahmat, Sabri, Yusof, Alwi, Rosnon, and Nor Peah (2023) highlights how visual learning strategies, such as alternative visual modules, improved the teaching process and increased interest in science education among Orang Asli students. This demonstrates how tailored visual strategies can address diverse learning needs and improve educational outcomes.

In the context of public education and awareness, Abu Bakar, Mohd Pahroraji, Tan, Ramli, and Talukder (2023) emphasized that visual communication plays a crucial role in promoting sustainable

living. Their study shows how visual elements can influence public understanding and behaviour, which aligns with the goals of birdlife education and conservation awareness at KL Bird Park. These findings support the integration of visual aids in informal education environments to improve public engagement with environmental topics.

Visual aids have also been used effectively in informal education places like zoos and parks. These environments benefit from using edutainment strategies (education + entertainment), which help visitors enjoy learning through fun and interactive means. Informal learning environments like KL Bird Park can benefit from integrating visual aids to help visitors connect with content about bird species, their habitats, and conservation. Despite this potential, many educational programs still underuse visual aids, which limits engagement and comprehension. More research is needed to understand how these tools can be applied effectively in fauna education for various audiences, especially visitors.

2.1 Visual Learning in Educational Nature Parks

Educational nature parks collectively serve a vital informal learning environment that implements visual aids including signage, exhibits and multimedia to promote ecological awareness and uniquely contribute to environmental education by combining recreation with meaningful learning experiences (Davis & Thompson, 2025). These nature-based attractions help to promote biodiversity conservation and sustainability, enhancing public understanding of ecological systems through visual educational tools. The educational nature parks enable us to foster a deeper appreciation for nature among visitors of all ages, making them essential platforms for environmental awareness and lifelong learning. Visitors benefit when they encounter clear interpretive materials integrated into their own experiences. When visual information is tailored to different visitor profiles and learning styles, it increases engagement and supports long-term behavioural change (Davis & Thompson, 2025). Facilities in the educational nature park offer close-up views of life cycle, and educational signage, providing rich visual contexts that deepen visitors learning about species and their habitats. These parks demonstrate that integrating visuals into park infrastructure through walls, infographics, educational videos, and hands-on exhibits can effectively personalize and enhance learning experiences by appealing to multiple senses and age groups. According to Xie, Zhao, Li, Tang, Meng, and Ding (2023), visual interpretation materials significantly influence visitors' emotional engagement and learning when tailored to their behaviours and experiences. Similarly, when visual information is adapted to different visitor profiles and learning styles, it can increase attention, engagement, and the likelihood of long- term behavioural change. These findings support the idea that educational nature parks, including Kuala Lumpur Bird Park and others within the Perdana Botanical Garden area, play an important role in promoting environmental awareness through carefully designed visual education strategies.

2.2 Visitor Profile

In informal learning settings like zoos and bird parks, understanding visitor demographics is key to creating effective educational experiences. Falk and Dierking (2013) note that factors such as motivation, prior knowledge, and cultural background shape how visitors engage with content. At the Bird Education Centre in KL Bird Park, tailored visual materials including egg incubator displays, documentary video, data table and illustrated educational walls to suit different age groups and education levels can enhance learning. For instance, younger visitors or those without much science knowledge may benefit from colourful, simple, and interactive visuals, while older or more educated visitors may prefer detailed facts and documentaries. This aligns with Mota, Braga-Pereira, Azeredo, Lopez, and Alves (2023), who emphasized the importance of audience-matched tools, and Egger, Härtel, and Randler (2024), who found that age and background influence bird knowledge. Adopting this approach can help KL Bird Park make bird education more engaging and effective for all.

2.3 Visual Exposure

At Bird Education Centre in KL Bird Park, using a variety of visual aids such as egg incubator display, documentary video, data table and illustrated educational wall, these materials play an important role in helping people learn about birds' physical features, behaviours, food habits, and life cycles. For example, a video showing a bird hatching from an egg or a display showing different types of beaks can give visitors a better picture of how birds live and survive in nature. When visitors can see, read, and interact with these visual elements, they become more interested and focused. This kind of visual exposure helps them understand the message better compared to just reading plain text. As a result, visual tools not only support learning but also create a deeper awareness about bird species and the importance of protecting them. Wright, Crooks, and Balgopal (2022) found that wildlife photography used in place-based education can strengthen emotional connections with nature, encouraging people to care more about wildlife and their conservation. Visual media such as photographs help learners develop empathy, which plays a crucial role in encouraging behavioural change and long-term learning. In addition, Mohamed, Mohamed, and Al-Rached (2024) demonstrated that wildlife documentaries are effective in raising awareness about animal species and their habitats. Documentaries offer real-life visual experiences such as nesting or feeding behaviours that visitors may not witness directly, thus providing a broader understanding of bird life and the importance of preserving their ecosystems. Interactive exhibits also serve as powerful educational tools. Overall, visual exposure through diverse media formats makes educational content at Kuala Lumpur Bird Park more engaging, accessible, and impactful. It not only improves learning outcomes but also promotes stronger connections between visitors and the natural world, which is essential for fostering long-term conservation awareness.

2.4 Engagement and Appeal

Engagement and appeal are critical factors in determining how visitors interact with and respond to educational content in informal learning settings. Engaging visual media captures attention, stimulates curiosity, and encourages deeper cognitive processing, all of which are vital in enhancing learning outcomes (Falk & Dierking, 2013). Visual aids play a crucial role in improving learner engagement and increasing the overall appeal of educational content. Shabiralyani, Hasan, Hamad, and Iqbal (2015) highlight that well-designed visual materials help make information clearer and more interesting, thereby supporting better understanding. This is especially important in informal learning environments like zoos and bird parks, where visitors engage with educational content voluntarily and often for brief periods. Among the various types of visual aids, data tables serve a unique function by presenting factual information in a concise, structured format that allows visitors to quickly compare, analyse, and extract key details. When thoughtfully designed with colour coding, icons, and visual hierarchy, data tables can enhance clarity and make complex information more accessible to a broad audience, including children and casual learners. According to Jee and Anggoro (2021), the science museum exhibits that present information using structured, comparative formats such as side-by-side visual arrangements or data tables support relational learning by enabling visitors to more easily identify patterns, differences, and conceptual links. In alignment with this approach, the incubation period data table displayed in the Bird Education Centre, KL Bird Park presents specific incubation durations for various bird species in a clear, tabular format. This allows visitors to quickly grasp biological variation across species, reinforcing understanding through structured comparison. The effectiveness of visual aids depends on several key design factors, including clarity, relevance, colour, and interactivity. This study aims to address the existing gap by examining how visual aids influence visitor engagement and appeal, thereby enhancing the overall learning experience within the Bird Education Centre. In the context of KL Bird Park, the ability of visual aids to attract visitors, sustain their attention, and leave a lasting impression is essential for reinforcing bird education messages. Therefore, understanding which visual features promote engagement and emotional resonance can contribute to the design of more impactful and meaningful educational experiences.

2.5 Preference and Retention

Visitor preference for specific types of visual media plays an important role in determining the success of educational tools in informal learning settings. Preferences often depend on age, familiarity with technology, and personal learning styles, with younger audiences showing greater interest in digital and interactive formats such as augmented reality (AR), animated videos, and gamified learning elements (Mayer, 2009). When visitors are allowed to choose or engage with content that matches their preferences, they are more likely to remain attentive and absorb the information presented (Hidi & Renninger, 2006). Retention of educational content is also closely linked to how engaging and meaningful the visual experience is. According to Clark and Mayer (2016), visuals that combine text, animation, and narration in a balanced format improve memory by reducing cognitive load and increasing dual-channel processing. In zoo and park settings, retention can be reinforced through repeated exposure, interactivity, and emotionally resonant storytelling. In Bird Education Centre in KL Bird Park, offering a range of visual edutainment options that cater to different visitor preferences may enhance not only satisfaction but also long-term understanding of bird species, habitats, and conservation. Thus, evaluating which formats visitors prefer and remember most is crucial for optimizing the impact of visual education tools. The study revealed that learners tended to prefer infographics due to their visual clarity, organized structure, and engaging presentation style. These features helped reduce cognitive overload, allowing learners to focus on core content more efficiently. Information in the Bird Education Centre is often presented in public displays or exhibition panels, using visually appealing and well-structured materials can encourage visitors' preference and improve the overall learning experience.

3 RESEARCH METHODOLOGY

This research was developed using a quantitative research design to analyse the effectiveness of visual aids in bird education learning, a method commonly used in educational and social research for measuring variables and analysing trends statistically (Creswell, 2014; Babbie, 2020). A structured close-ended online survey featuring visual aids such as images was selected as the primary research tool, early findings that visual materials significantly enhance attention and retention in learning and further supported by Mayer's (2009) cognitive theory of multimedia learning. The target population included both on-site visitors at the Bird Education Centre in KL Bird Park and online respondents. The research used a convenience sampling technique with a sample size of 55 respondents, which is considered appropriate for small-scale educational research (Creswell, 2014) and commonly used in exploratory studies for ease of access and practicality (Etikan, Musa, & Alkassim, 2016).

For data collection, Google Forms was used as the online survey platform, a widely accepted tool for digital data collection due to its accessibility and ease of use (Wright, 2005). The surveys were distributed both on-site and online. The surveys employed a close-ended questionnaire format to ensure consistency and improve the reliability of responses, as recommended for structured quantitative studies (Cohen, Manion, & Morrison, 2018). The results were presented visually using column charts, pie charts, and bar graphs to clearly and effectively interpret the findings.

4 RESEARCH DESIGN

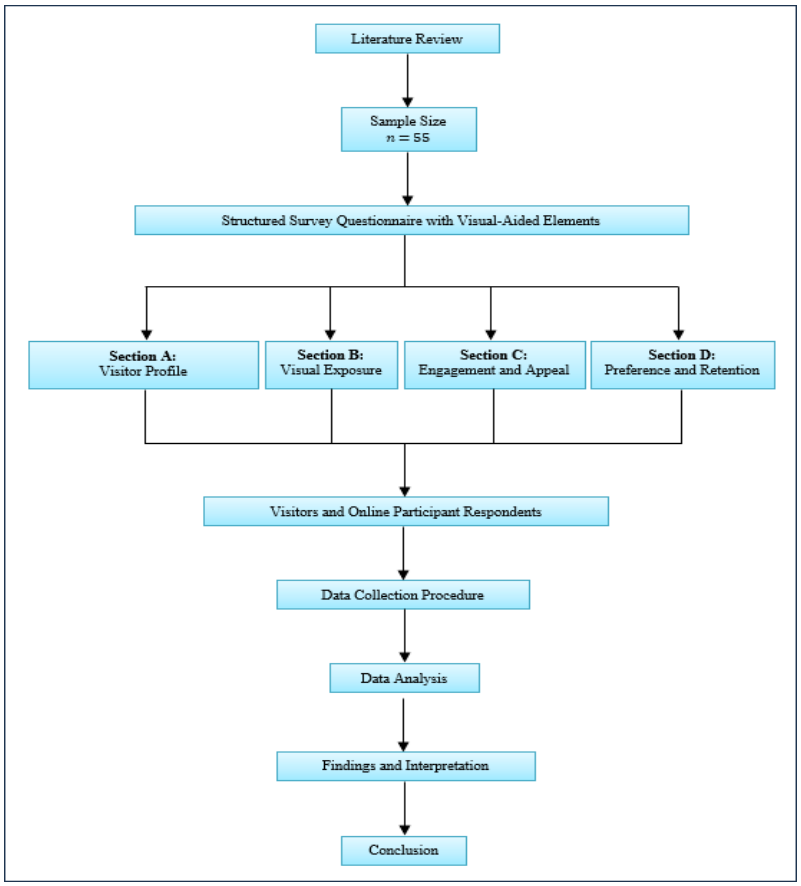

Figure 1 Research Flow Diagram

5 INSTRUMENTS

For this research, a structured survey questionnaire using Google Forms was developed and divided into four sections: Section A, Section B, Section C, and Section D. Section A collected demographic and background information of the respondents, including gender, age group, visitor type, and whether they had previously visited KL Bird Park. Section B focused on respondents' exposure to visual educational aids within the bird education building, covering four types of visual media. Section C assessed respondents' engagement and perceived appeal toward each of the four visual aids. Section D gathered respondents' preferences and their perceive retention of information based on the visual aids. According to Falk and Dierking (2000), visitors learning in informal education settings such as parks, zoos, and museums is strongly influenced by visual materials and experiential interactions. The questionnaire items were adapted based on the core theory that supports the use of multiple media types in educational settings (Mayer, 2009). This research uses a quantitative method supported by the sample size calculated based on Cohen's (1992) guidelines for determining the sample size to achieve reliable results.

5.1 Participants and Sample

To collect the data, 55 visitors from KL Bird Park's Bird Education Centre were selected as respondents for this study using a convenience sampling technique. The respondents consisted of both on-site visitors who were physically present at the Bird Education Centre and online participants who responded through a distributed Google Form survey. The structured survey questionnaire included visual-aided elements of the educational materials to ensure all participants whether on-site or online had access to the same visual references. These visual aids were also available to on-site participants as part of the structured survey to ensure consistency in the visual exposure across both groups.

5.2 Procedure for Data Collection

During the initial stage, visitors were approached either directly at the Bird Education Centre in KL Bird Park or contacted through online platforms. They were briefly informed about the aim of the study and provided guidance on how to complete the survey, which focused on evaluating visual aids used in bird-related learning. To ensure ethical research practices, all participants were clearly informed about the voluntary nature of their participation and assured of their anonymity. The structured online questionnaire included visual references to the four types of educational materials namely the egg incubator display, documentary video, data table, and illustrated educational wall to allow both physical and online respondents to give informed and accurate feedback. Participants were then given access to a Google Form and invited to share their perceptions based on their exposure to or viewing of these visual materials.

6 DATA ANALYSIS

After all respondents completed the structured survey, the data was downloaded from Google Forms and organized in Excel for record-keeping. Descriptive statistical analysis, including frequencies, means, and standard deviations, was then performed.

7 RESULTS AND FINDINGS

7.1 Participant Characteristic

The survey collected responses from 55 participants of different gender and age groups to understand their perspectives better. The results are presented below:

Table 1.1 Frequency Distribution Based on Gender and Age Group

	Respondent Characteristic	Total (N)	Percentage (%)
Age Group	13 – 17 years old	4	7.27
	18 – 25 years old	24	45.45
	26 – 30 years old	10	16.36
	31 – 35 years old	3	5.45
	36 – 40 years old	5	9.09
	41 – 45 years old	1	1.82
	46 – 50 years old	3	5.45
	50 years and above	5	9.09
Gender	Male	11	20
	Female	44	80

As shown in Table 1.1, the majority of respondents were female, which is 80%, while male respondents constituted a smaller proportion which is 20%. This gender imbalance may have influenced the data trends, particularly in the perception and engagement levels with visual learning aids at the Bird Education Centre, KL Bird Park. In terms of age distribution, the highest number of respondents fell within the 18–25 years old age group with 45.45%, followed by the 26–30 years old group with 16.36%. Other age groups were represented in smaller numbers, including 13–17 years old with 7.27%, 31–35 years old with 5.45%, 36–40 years old with 9.09%, 41–45 years old with 1, 1.82%, 46–50 years old with 5.45%, and 50 years and above with 9.09%. The dominance of respondents aged between 18 and 25 suggests a younger demographic that is potentially more receptive to visual and interactive learning materials. This trend provides valuable context for interpreting the findings, especially in understanding how different age groups respond to visual aids in an informal educational setting like KL Bird Park.

7.2 Evaluation of The Overall Effectiveness of Visual Aids

There were primary findings that were examined to analyses how visitors perceived the value of visual aids in educational settings and how they viewed the application of these visuals in enhancing bird-related knowledge. The outcome is presented below:

Table 1.2 Minimum and maximum scale value for overall visual aids effectiveness by respondents in the Bird Education Centre

	N	Minimum (Scale)	Maximum (Scale)	Mean (μ)	Standard Deviation (σ)
Visual Aids Effectiveness	55	1	5	2.0727	1.3329
Valid N (listwise)	**55**				

Table 1.2 shows the minimum scale value for visual aids effectiveness is 1, means the lowest possible rating scale from the respondents and the maximum scale value for visual aids effectiveness is 5, means the highest possible rating scale of respondents. The survey used a 5-scale where 1 = *"Not effective at all"* to 5 = *"Extremely effective"*, respondents would pick a value from 1 to 5. Scale was measured with the *"Do you feel the current visual aids at Bird Education Centre are effective overall in educating visuals?"*, coded from 1 (not effective at all) to 5 (extremely effective.) As can be observed, the descriptive statistics for the observation of the effectiveness of visual aids used for bird education learning reveal an overall mean score of 2.0727 and a standard deviation of 1.3329.

7.3 Distribution of Visuals Most Clearly Remembered by Respondents

To assess the effectiveness of different visual materials, respondents were asked to indicate which two visuals they remembered most clearly from the Bird Education Centre in KL Bird Park, with multiple selections allowed. Respondents could select up to two options, so the total number of selections exceeds the number of respondents. Percentages are calculated based on total respondents. This section presents the results, highlighting which formats had the greatest impact on recall and engagement.

Table 1.3 Frequency distribution of visual aid that respondents remember most clearly, as participants were allowed to choose more than one option.

Visual Aid	Frequency (*f*)	Percentage (%)
Egg Incubator Display	25	45.5
Documentary Video	23	41.8
Data Table	22	40
Illustrated Educational Wall	25	45.5
Total	**95**	
Number of Respondent	**55**	

As shown in Table 1.3, 55 respondents provided a total of 95 selections, since each participant could choose up to two visuals they remembered most clearly. The results indicated that egg incubator display and illustrated educational wall were the visuals most frequently recalled, each selected by 45.5% of respondents (n = 25). Documentary video was chosen by 41.8% of respondents (n = 23), while data table were remembered by 40.0% (n = 22). It should be noted that because multiple responses were allowed, the total number of selections exceeds the total number of individual respondents (Mayer, 2009). This indicates the value of combining multiple visual strategies to cater to diverse visitor preferences and learning styles.

7.4 Effectiveness of Each Visual Aids in Capturing Respondent Attention

The evaluation of environmental interpretation involved in assessing the key attributes and effectiveness of visual education aids using categorical frequency data. By analysing the external behavioural responses visual exposure of visitors to Kuala Lumpur Bird Park after experiencing visual interpretation materials, this study aims to determine the effectiveness of these visual aids. The findings will serve as a valuable reference for enhancing future environmental education strategies and interpretive planning within the park. Respondents could select up to two options, so the total number of selections exceeds the number of respondents. Percentages are calculated based on total respondents.

Table 1.4 Categorical frequency data of visual aid noticed by respondents.

Visual Aid	Frequency (*f*)	Percentage (%)
Egg Incubator Display	26	25
Documentary Video	22	21
Data Table	20	19
Illustrated Educational Wall	36	35
Total	**104**	
Number of Respondent	**55**	

Frequency is calculated based on the total selections rather than total number of respondents, as participants were allowed to choose more than one option.

As shown in Table 1.4, 55 respondents provided a total of 104 selections, since each participant could choose up to two visuals they noticed and observed. Respondents were asked to identify the types of visual aids they observed within the Bird Education Centre, KL Bird Park. The most frequently selected was illustrated educational wall, chosen by 36 respondents, indicating strong visibility or impact. The least selected data table, with only 20 respondents, suggesting lower recognition or usage. This distribution helps highlight which elements of the display are most effective in capturing visitors' attention. The data suggests that visual aids with illustrations may be more noticeable and effective in attracting attention compared to other formats. This aligns with the findings of Shabiralyani, Hasan, Hamad, and Iqbal (2015), who emphasized that visual aids, particularly those containing images and illustrations, enhance students' focus and improve their ability to retain and understand information by making content more engaging and easier to interpret.

7.5 Respondent Perception of Visual Aids for Bird Learning

This section describes respondents' perceptions of how engaging and visually appealing the visual aids were in supporting bird learning at Kuala Lumpur Bird Park. The findings reflect how the visual elements contributed to capturing attention and enhancing the educational experience. The data highlights how well the visual materials captured visitors' attention, maintained their interest, and supported a more enjoyable and meaningful bird learning experience at Kuala Lumpur Bird Park.

Table 1.5 Descriptive statistic for perception towards the effectiveness of visual aids for bird learning.

	N	Minimum (Scale)	Maximum (Scale)	Mean (μ)	Standard Deviation (σ)
Egg Incubator Display	55	1	5	1.95	1.2
Documentary Video	55	1	5	2.07	1.25
Data Table	55	1	5	1.87	1.01
Illustrated Educational Wall	55	1	5	1.96	1.04
Valid N (listwise)	**55**				

Scale was measured with how visually effective each visual aid, coded from 1 (not effective at all) to 5 (extremely effective.) The minimum scale value recorded was 1, which corresponds to *"Not effective at all."* This scale also had the highest frequency among all responses, indicating that most respondents perceived the visual aids as not effective. The concentration of responses at the lowest end of the scale highlights a critical issue in the visual engagement or clarity of the display. Based on Table 1.5 on the descriptive statistics for perception towards the effectiveness of visual aids for bird learning it is shown that visual aid A2, which is the statement 'Documentary video is not interested at all in bird education learning', has the highest mean value compared to the other three statements. In contrast to the findings of Mohamed, Mohamed, and Al-Rached (2024) reported that wildlife documentaries played a significant role in raising awareness and understanding of animal conservation, the results of this study revealed that documentary video was the least engaging visual aid among visitors at Kuala Lumpur Bird Park. Statistical data indicated low levels of interest and perceived learning value from the documentary segment, suggesting that, within this context, such videos may not effectively capture attention or support learning.

8 CONCLUSION

In conclusion, the study's findings demonstrated how visual aids, when integrated into educational environments like Bird Education Centre in KL Bird Park, can significantly enhance the learning experience about birds. The results showed that visual elements such as egg incubator display, documentary video, data table and illustrated educational wall contribute to better understanding, engagement, and information retention among visitors. These visual tools foster curiosity and a deeper connection with the subject, particularly when they are thoughtfully designed and presented in an accessible way. The research also highlighted the importance of considering visitors' background such as age and education level when developing visual content, as these factors influence how information is received and understood. The findings suggested that incorporating more engaging, hands-on, and visually clear materials can lead to a more impactful and meaningful learning journey for diverse audiences. These insights had practical implications for educators, exhibition designers, and fauna park planners who aim to improve fauna education. By focusing on visually rich and well-designed learning aids, they can create more memorable, inclusive, and educational visitor experiences that also support fauna especially in bird learning education.

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