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Bridging the Gap Between Education and Experience: A Comparative Analysis of IPB University Museum's Visitor Experience

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Notes

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ABSTRACT

The IPB Museum, located on the Darmaga Campus of IPB University, serves as a platform to showcase its rich history, developments, and future aspirations. University museums are vital institutions, embracing innovation and fostering communities of knowledge. Previous research emphasizes the impact of visitor experience on satisfaction and loyalty, highlighting the advantages of interactive technologies in museums for improved engagement and education. Evaluating technology's impact is crucial, and this study utilizes The Museum Tourism Experience and Experiential Value questionnaire to provide a baseline measurement and benchmark for future interventions, enabling a comprehensive evaluation of technology's impact on visitor experiences and satisfaction. In this study, 103 undergraduate students from the User Experience Design Course were invited to visit the IPB Museum to assess their experience using The Museum Tourism Experience and Experiential Value (MTEEV) questionnaire, which evaluates five aspects of the visitor experience. The students completed the questionnaire both before and after their visit, aiming to measure the impact of the museum visit on their perception and evaluate the effectiveness of the IPB Museum. The museum received lower ratings in visual appeal, entertainment, escapism, willingness to pay more, and imaginary vividness compared to visitors' past experiences, indicating potential areas for improvement to enhance the overall visitor experience. Lastly, we present our participatory strategy using MBKM and the capstone program to improve the museum experience.

Keywords: Museum; university museum; user experience

1. INTRODUCTION

The Museum of Bogor Agricultural Institute (IPB), located on the Darmaga Campus of IPB, occupies the historic Landhuis building complex that was once the residence of the GW Van Motman family, owners of a rubber plantation in West Java during the Dutch East Indies era. Retaining its original design and layout, the museum was revitalized to preserve its significant historical value in Indonesia. As the oldest agricultural higher education institution in the country, IPB has documented its birth and development in a six-volume IPB History Book series, a meticulous process that began in 2013 and continues today. In an effort to pass on the lessons and values of IPB to future generations, the university initiated the construction of the IPB Museum, showcasing a modern and dynamic representation of its history that combines the past, present, and future. Inaugurated on January 12, 2023, by Prof. Dr. Arif Satria, MSc, the museum aims to provide both the IPB academic community and the general public with a platform to appreciate IPB's history, developments, and future aspirations.

University museums are urgently relevant in today's world. With unequaled access to academic expertise and a head start in the electronic revolution, these museums have embraced innovation (Stanbury, 2000). While new initiatives to open them to the public are plentiful, their long-term impact and ability to meet expectations are often overlooked (Ferri et al., 2021). University College London exemplifies how participatory approaches create communities of knowledge where skilled experts share an understanding of cultural objects (Were, 2010). These museums serve as vital knowledge repositories and engage diverse communities, making them indispensable institutions.

The significance of technology in enhancing museum satisfaction is undeniable, as evidenced by the substantial efforts being dedicated to this endeavor. Prominent examples include the ImersifA installation in the National Museum of Indonesia and the ArtScience Museum in Singapore, where technology is leveraged to enrich the visitor experience. Devine and Tarr (2019) shed light on the relationship between satisfaction, willingness to pay more, and visiting frequency, emphasizing the crucial role of the tourist experience in shaping satisfaction and subsequent loyalty. Furthermore, Harrington *et al.* (2019) emphasize the unique and important aspects of the AR Perpetual Garden App, which employs immersive augmented reality for informal learning, extending the educational impact of museums like the Carnegie Museum of Natural History. Augmented reality has also been successfully implemented to enhance the insect museum experience at IPB University (Karomi and Ridha, 2022) and engage visitors with Chinese art pieces (Gong et al., 2022). Museum professionals have identified several advantages of virtual reality, including increased engagement with collections, visitor attraction, accessibility, education, immersion, customized experiences, and technology reliability (Shehade and Stylianou-Lambert, 2020). By embracing technological innovations, museums can substantially enhance visitor satisfaction while providing enriched educational and immersive experiences to a broader audience.

While the development of technology in museums is crucial, it is equally important to evaluate its impact. Othman et al. (2011) have introduced the Museum Experience Scale (MES) and the Multimedia Guide Scale (MGS) as quantitative measures to assess visitors' experiences, complementing qualitative information. Damala et al. (2019) propose the MUSETECH model, a comprehensive framework for evaluating museum technology from multiple perspectives, including cultural heritage professionals, institutions, and visitors. This model covers a wide range of digital technologies, such as augmented reality, virtual reality, and online approaches for museum education. Bideci and Albayrak (2018) analyzed data from tourists visiting the Antalya Historical and Archaeological Museum, revealing dimensions of the museum

experience, including edutainment, comfort, escape, and aesthetics, with aesthetics being identified as the most important aspect. Furthermore, He et al. (2018) provide The Museum Tourism Experience and Experiential Value questionnaire, offering a tool to measure the impact of technology on museum experiences. By employing these evaluation methods and frameworks, museums can gain valuable insights into the effectiveness and outcomes of technology implementation, ensuring that it enhances visitor satisfaction and contributes meaningfully to the overall museum experience.

Efforts are underway to enhance the interactivity of the IPB Museum using technology to engage visitors and increase their satisfaction. Therefore, this study aims to bridge the gap between the educational objectives of the IPB Museum and the actual visitor experience during their visits. However, to effectively measure these technological interventions' success, it is crucial to establish a baseline measurement during the early stages of the museum's development. This baseline measurement can also guide setting technology goals. In this context, a study was conducted to assess the perception of student visitors toward the museum and compare it with their past museum experiences. The study utilized The Museum Tourism Experience and Experiential Value questionnaire developed by He et al. (2018). The results of this study serve as a benchmark for measuring the effectiveness of future interventions in the IPB Museum, enabling a comprehensive evaluation of the impact of technology on visitor experiences and overall satisfaction.

2. METHODS

This study engaged 103 undergraduate students from the User Experience Design Course, inviting them to visit the IPB Museum. The purpose of the study was to assess the students' experience using The Museum Tourism Experience and Experiential Value (MTEEV) questionnaire, which evaluates five aspects of visitor experience: Visual Appeal, Entertainment, Enjoyment, Escapism, Willingness to Pay, and Imaginary Vividness. The Indonesian translation of the questionnaire is presented in Table 1. These questions are Likert-scale questions from 1 to 7, with 1 indicating the lowest score.

Early in 2023, a quantitative survey was given to participants to collect data. Before they visited the museum, the students were provided with a briefing about the objectives of the visit and were asked to complete the MTEEV questionnaire to assess their past museum experiences. Additionally, they were asked questions about their previous museum visits, their most memorable experiences, and the purpose of their visit to the IPB Museum. Subsequently, the students had the opportunity to explore the IPB Museum for approximately 60 minutes (Figure 1). Following their visit, they were requested to complete the MTEEV questionnaire again to measure their current experience at the IPB Museum. By comparing the responses before and after the visit, the study aimed to examine the impact of the museum visit on the students' perception and evaluate the effectiveness of the IPB Museum in terms of the measured aspects of the visitor experience.

Figure 1. The student's visit to IPB Museum

Table 1. The museum tourism experience and experiential value

Category	Question (Indonesian)
Visual Appeal	The museum displays exhibits are interesting
	The museum experience was enjoyable for me
	I loved the atmosphere of the whole experience I had at the museum
Entertainment	I found the exhibits in the museum very entertaining
	The enthusiasm for museums caught my attention
	Museums not only display art, they entertain me
Enjoyment	I was happy to have the experience of visiting a museum
	I thoroughly enjoyed the experience of visiting the museum
	The experience of visiting the museum was fascinating
	I was satisfied with the activity of visiting the museum
Escapism	Having such a museum experience keeps me away from distractions and life pressures
	Having a museum experience like that makes me feel like I'm in a different world
	I feel so immersed in the museum atmosphere that I forget everything else
Willingness to Pay More	I will continue to visit the museum, even if the ticket prices are increased
	I am willing to pay a higher price for that museum compared to other similar museums in the area
Imagery vividness	The image that appears in your mind is very powerful
	The image that appears in your mind feels alive
	The image that appears in your mind is very vivid

3. RESULTS AND DISCUSSION

83 of the 103 students said they had previously visited a museum. 44 (or 53%) visited the museum as part of their school study tour. 23 of them (28%) went there with their families. And last, 16 of them (19%) went there on their initiative. 26.51% of students said they had previously visited a museum twice, while 22.89% said they had done so three times. A significant portion (19.28%) indicated they had only visited a museum once. The frequency decreases progressively as the number of past visits increases, with smaller percentages reported for four (10.84%), five (6.02%), six (8.43%), and seven (2.41%) museum visits. Only a few students reported having visited the museum eight or nine times, representing 2.41% and 1.20% of the participants, respectively. These findings provide insights into the distribution of past museum visit experiences among the surveyed students, highlighting the varying levels of exposure and familiarity with museum settings.

Table 2 compares the ratings of visitors' previous experiences at the IPB Museum across various categories (N = 83 students who had previously visited one museum). These categories encompass visual appeal, entertainment, enjoyment, escapism, willingness to pay more, and imaginary vividness. Each category was measured using a Likert scale ranging from 1 to 7, where higher scores indicated a more positive experience. Regarding visual appeal, the IPB Museum received a rating of 4.26, which is lower than the rating assigned by visitors to their past experiences (5.69). Similarly, regarding entertainment, the museum received a lower score of 4.06 compared to the rating for visitors' past experiences (5.29). However, the museum fared better in the enjoyment category, receiving a rating of 4.78, surpassing the rating for visitors' past experiences (5.66).

In addition, the IPB Museum scored lower in the category of escapism with a rating of 3.73, compared to the rating for visitors' past experiences which was 4.86. Furthermore, the willingness to pay more for the museum experience was also lower, receiving a rating of 2.69, in contrast to the past experience rating of 4.06. In terms of imaginary vividness, the museum received a rating of 3.77, which is lower than the rating for past experiences which was 4.76. Overall, the average rating for the IPB Museum across all categories was 3.88, indicating a lower score compared to the average rating for visitors' past experiences, which was 5.05. This suggests that there is room for improvement in various aspects of the museum to enhance the visitor experience and meet their expectations.

Table 2. The comparison result of the MTEEV questionnaire between student's past museum visits with their visit to IPB Museum (N= 83), scale from 1-7

Category	Past Experience	IPB Museum
Visual Appeal	5.69	4.26
Entertainment	5.29	4.06
Enjoyment	5.66	4.78
Escapism	4.86	3.73
Willingness to Pay More	4.06	2.69
Imaginary Vividness	4.76	3.77
Average	**5.05**	**3.88**

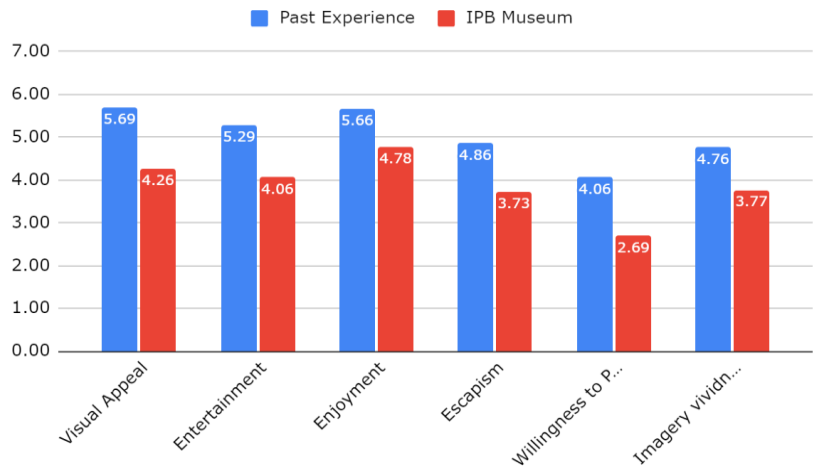

Figure 2. The comparison of the MTEEV questionnaire between students' past museum visits with their visit to the IPB Museum (N= 83)

According to the participants, a prevalent sentiment among their previous visit experience was astonishment at the remarkable exhibits, with the atmosphere akin to transcending into an alternate realm. As one respondent articulated, "*The items presented are amazing, the atmosphere is like entering another world*." Furthermore, the participants acknowledged the abundance of antiquities, ancient artifacts, and historical objects, all meticulously arranged within the museum space. They emphasized the importance of not touching these artifacts, appreciating the elegant display and the aesthetically pleasing ambiance that enhanced their overall museum experience. A respondent said, *"I found lots of antiques, ancient items, ancient artifacts, and all other historical items. Most of these items should not be touched. The room is elegantly arranged and made as beautiful as possible so I like being in the museum area".*

On the other hand, the two most recurring suggestions about IPB Museum centered around the need for more interactive experiences and a reduction in textual information. As one respondent pointed out, *"More exhibitions, less text, if possible add more technology, like virtual reality instead of just text which makes people lazy to read it and makes them bored"*. This sentiment highlights the desire for a more immersive and technologically-driven approach to captivate visitors' attention. Another participant proposed the incorporation of interactive media, such as virtual reality or touch screens, to supplement the traditional displays. By introducing these interactive elements, visitors would not only passively observe walls and read textual information but also actively participate in the exploration, fostering a sense of curiosity and leaving them eager to revisit.

Considering Table 1 and Figure 2, it is evident that future research should emphasize enhancing visual appeal, entertainment, and escapism in the IPB Museum. These categories exhibit significant disparities between visitors' past experiences and their ratings of the museum, indicating a remarkable opportunity for improving these aspects to enhance visitor satisfaction and the overall museum experience. While there is also a considerable gap in the willingness to pay, previous studies suggest that it is closely linked to other factors. Therefore, the willingness to pay will also increase by enhancing the three categories above.

Firstly, to enhance visual appeal, entertainment, and escapism in the IPB Museum, it is crucial to understand the perceived advantages and challenges of recent technologies. In a study conducted by Shehade and Stylianou-Lambert (2020), the advantages of current

technologies, such as virtual reality (VR), were categorized into engagement with collections, visitor attraction, accessibility, education, immersion, customized experiences, and reliable technology. These advantages highlight the potential benefits of incorporating VR technologies in the IPB Museum to create captivating visual experiences, increase visitor engagement, and provide immersive and personalized encounters with the exhibits.

In addition, Trunfio and Campana (2020) proposed a new museum business model that integrates multimedia technology with heritage elements. This integration aims to revitalize the museum's visual appeal and entertainment aspects by combining authenticity and innovation. By reevaluating the role of multimedia technologies and embracing edutainment and heritage valorization, the IPB Museum can provide unique and immersive cultural experiences that attract and engage visitors. Furthermore, the effective interaction between humans and technology in the museum setting can contribute to the preservation of heritage, enhance virtual accessibility, and facilitate the diffusion of culture. By leveraging these aspects, the IPB Museum can improve visual appeal, entertainment, and escapism and fulfill its broader mission of promoting sustainable local development and enriching the overall visitor experience.

In order to enhance visual appeal, entertainment, and escapism in the IPB Museum, this study proposes a program in line with the capstone as a part of the *Merdeka Belajar Kampus Merdeka* or Independent Learning Independent Campus (MBKM) program (Asfarian *et al*. 2020), involving students in making interactive technologies through an open creative capstone course. This study also describes several interactive prototypes to be used in the museum, including a VR tour using a VR headset, a computer vision-based installation to interact with IPB University historical data, and a digital museum tour using a 360 camera and mobile applications to interact with IPB University history by walking around the university.

One implementation that the study concerns about is a virtual reality field trip. Previous studies such as Makransky and Mayer (2022) and Cheng and Tsai (2019) suggest immersive virtual reality field trips can have positive longitudinal effects on learning and increase the engagement and satisfaction of students. Hence, using the capstone format, we recruit students to collaborate in creating the early prototype IPB Virtual Field Trip using Meta Quest 2 (Figure 3).

The virtual field trip format offers several advantages over a fully three-dimensional world, including its ease and cost-effectiveness in creation and development. Using a 360 camera makes capturing images convenient, portable, and viable even in remote regions. At IPB University, renowned for its expertise in agro-maritime studies, the potential for integrating these field trip experiences into the IPB Museum is significant. Furthermore, with ongoing research focusing on digital twins for agriculture, led by Asfarian and Wulandari (2023), we anticipate the emergence of more tailored content generation specifically designed for virtual field trips and simulation applications. This synergy between virtual field trips and agricultural innovation holds promising prospects for enriching the offerings of the IPB Museum and enhancing visitor experiences.

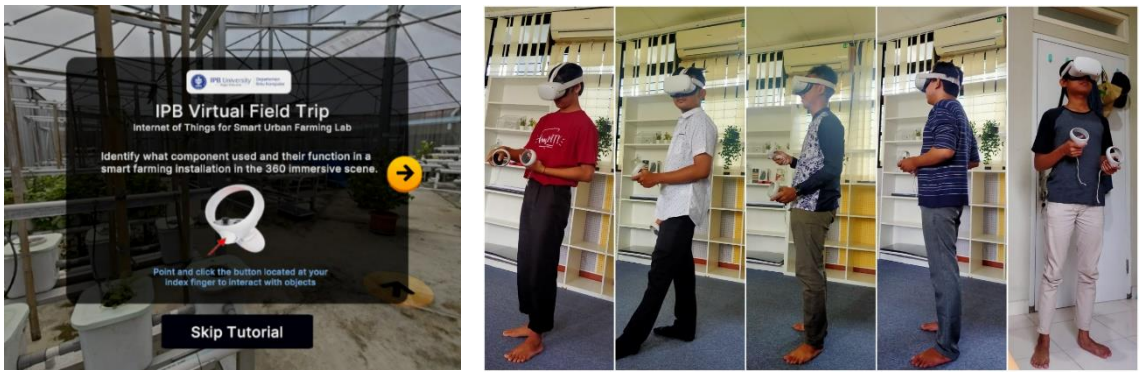

Figure 3. Several scenes of the IPB Virtual Field Trip to the urban farming laboratory and their early usage by students. In the future, the system will be tested in the IPB Museum setting, and the impact will be measured using MTEEV and compared with the current baseline

In this research, the museum has been successfully used as a project-based learning as one of the outputs of this activity. In the future, integrating the MBKM program and project-based learning holds immense potential for developing and enriching museum content. Students can effectively utilize the museum's cases as valuable resources as part of their capstone or project-based learning. This approach enables students to actively engage with the museum's content, fostering a deeper understanding and connection to their academic pursuits. Furthermore, students enrolled in MBKM programs such as community services or research activities can actively contribute to developing and enhancing museum content more relevant to students' current characteristics.

4. CONCLUSION

The analysis of the survey responses from 103 undergraduate students visiting the IPB Museum provides valuable insights into their past museum visit experiences and their ratings of the IPB Museum across different categories. Among the surveyed students, a significant majority (83 out of 103) had visited a museum before, indicating considerable exposure and familiarity with museum settings. Notably, most of these students (53%) visited a museum as part of their school study tour, highlighting the educational context of their museum visits. When comparing the ratings of visitors' past experiences with the IPB Museum using MTEEV, several areas emerged as focal points for improvement. The museum received lower ratings in visual appeal and entertainment compared to visitors' past experiences at other museums. However, the museum performed relatively better in terms of enjoyment, suggesting positive elements in the visitor experience. The ratings for escapism and willingness to pay more were also lower for the IPB Museum, indicating areas where enhancements can be made to create a more immersive and valuable experience for visitors. This number serves as a benchmark for measuring the effectiveness of future interventions in the IPB University Museum, enabling a comprehensive evaluation of the impact of technology on visitor experiences and overall satisfaction. Lastly, the study presents the participatory strategy with the utilization of MBKM and the capstone program to improve the museum experience, which includes a virtual field trip application using a virtual reality headset.

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