Instagram filter with AR technology as an innovation for introducing fauna to Generation Z in Indonesia

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ABSTRACT

Fauna preservation is a crucial undertaking necessary for sustaining the survival of animal species globally. However, the issue of wildlife conservation often lacks widespread recognition, particularly among individuals aged between 13 and 28 years old, commonly referred to as Generation Z. To address this gap, the author proposes a solution utilizing Augmented Reality (AR) technology through Instagram filters to introduce fauna to the Generation Z demographic in Indonesia. Employing the Double Diamond method, consisting of four key stages (Discover, Define, Develop, and Deliver), the author aims to develop an effective solution for fauna preservation in Indonesia. The research findings indicate that Instagram filters incorporating AR technology significantly enhance the public's understanding of fauna in Indonesia. Furthermore, these filters successfully capture the attention of the public, particularly the younger generation, known for their preference for engaging and captivating content. Consequently, Instagram filters leveraging AR technology emerged as an innovative solution for fauna preservation in Indonesia.

INTRODUCTION

Indonesia boasts abundant biodiversity, spanning its entire territory, owing to its geographical location in the tropical region. As a low country, Indonesia harbors high biodiversity and ranks among the nations rich in biological resources. One manifestation of this natural wealth is biodiversity, encompassing a diverse range of fauna comprising various animal species on Earth. Indonesia exhibits extensive faunal diversity despite occupying only 1.3 percent of the Earth's surface area. Approximately 12 percent of mammals, 16 percent of reptiles and amphibians, and 17 percent of bird species originate from Indonesia (Guntur & Slamet, 2019). Biodiversity, a term denoting the variety of life forms on Earth, includes habitat variation, species diversity, and genetic differences within existing species (Siboro, 2019). The presence of these faunal species is paramount for maintaining ecosystem balance, habitat regeneration, and ensuring the survival of the food chain. Additionally, certain faunal species hold significant cultural value in Indonesian society (Arifani, 2016).

Despite its reputation for extremely high biodiversity, Indonesia is confronted with a high rate of biodiversity decline. The country ranks second in terms of the number of endangered species, with

583 species at risk, notably with mammals topping the count at 191 species, followed by birds at 160 (Setiawan, 2021). The most substantial decline in wildlife populations occurs in tropical areas, witnessing a decrease of up to 56 percent. This underscores Indonesia's pivotal role as the world's largest low archipelagic country in the global decline of fauna populations (Budianto et al., 2020). The alarming state of wildlife in Indonesia is primarily attributed to excessive natural exploitation, mainly through deforestation, which is the primary driver of fauna population decline in the country. Despite possessing vast forests, including some of the world's most extensive, Indonesia experiences significant and escalating deforestation yearly. Deforestation, defined as the loss of forest cover and its contents, results in damage to the structure and function of the forest due to human activities (Chakimi & Abidin, 2022). Research by Forest Watch Indonesia reveals an increasing trend in deforestation over the years. The average forest loss was 1.1 million hectares yearly in 2000-2009, escalating to 1.4 million hectares annually in 2009-2013. In the period 2013-2017, deforestation reached a staggering 5.7 million hectares. Apart from deforestation, Indonesia grapples with various other environmental issues, including wildlife hunting, leading to the rarity or endangerment of many species. While hunting practices were historically driven by consumption, contemporary hunting serves purposes such as obtaining body parts for crafts, medicines, and cosmetics (Aristides et al., 2016). Another pressing environmental concern is the declining number of species in Indonesia due to the trade in protected wildlife (Nuraeni et al., 2018). Wildlife trade, with its lucrative potential, is driven by the higher prices associated with rarer species. Threats to wildlife populations emerge from hunting and forest fires, illegal logging, and urban development, collectively posing an imminent threat to their existence. Despite its crucial role in global natural wealth, this data underscores Indonesia's vulnerability to wildlife extinction.

Introducing fauna to the public, particularly in Indonesia, is critical. Public awareness regarding the importance of fauna preservation remains low, as evidenced by habitat destruction and the excessive exploitation of native fauna habitats. Therefore, concerted efforts are needed to elevate public awareness about preserving fauna and their habitats, particularly among Generation Z, the nation's future generation (Arifani, 2016). Raising public awareness about the existence and preservation of fauna in Indonesia can be achieved through various means, including educational programs, socialization campaigns, and developing more creative and effective learning methods and media (Sanaky, 2013). In the evolving landscape of technological advancements, conventional learning methods are often perceived as dull, and the presented material is less easily comprehended (Hidayat & Sriyanto, 2015).

To address this issue, the author researched to create and test an Instagram filter using Augmented Reality (AR) technology, aiming to innovate in introducing fauna to Generation Z. Generation Z is the target demographic due to their status as individuals born in the late 20th and early 21st centuries, allowing them to leverage technological changes in various aspects of their lives. Additionally, AR technology is undergoing rapid development, with one of its applications in the educational field being an interactive learning tool. This facilitates student interaction and social communication (Gudoniene & Rutkauskiene, 2019). As a technology, AR combines two or three-dimensional virtual objects into a natural three-dimensional environment, projecting these virtual objects in real-time (Paramarta et al., 2022). In application, AR can display information, such as labels or virtual objects, visible only through the camera on a mobile phone or computer, providing a more interactive and enjoyable experience for users (Saefudin & Ekasari, 2017). AR refers to an environment formed by merging the natural and virtual worlds through computer technology, blurring the boundary between the two (Kirana et al., 2023).

AR facilitates user interaction with the natural environment through displayed objects, enabling them to gain new perspectives (Ismayani, 2020). Objects previously confined to the virtual world can be seamlessly integrated into the real world in AR systems (Mustika et al., 2015). AR systems' primary focus is producing an interactive and realistic experience to aid users in various activities, such as gaming and education (Sufiatmi et al., 2020). Three main characteristics must be present in technology to implement AR. Firstly, the technology must merge the natural and virtual worlds, enabling users to see virtual objects in the context of the reality around them. Secondly, AR technology must provide information interactively and in real-time, allowing users to interact with

virtual objects. Finally, AR technology must display virtual objects in three dimensions, enabling users to view the object from various perspectives (Mustaqim, 2016). With these three characteristics, AR technology can provide an interactive and realistic experience, aiding users in multiple activities such as gaming and education. AR technology requires an object affected by detection distance indicators and light intensity to trigger the display of virtual objects within it. A marker is a real object in the environment used as a reference to bring up an object in AR applications, thus producing a Virtual Reality experience. Using this marker, AR technology can help users visualize virtual objects more realistically and integrate them with the surrounding environment (Hidayatullah et al., 2022).

Social media, an internet-based communication technology, is often called online media. Evolving with changing human needs, social media has transformed into a platform for entertainment, exhibitions, information dissemination, and marketing (Putra & Astina, 2019). The widespread global use of the Internet has significantly influenced social interactions between individuals, communities, and societies (Zolkepli & Kamarulzaman, 2015). Instagram stands out as one of the popular social media applications, accessible to various groups and boasting a high frequency of use (Lim et al., 2021). As a digital platform, Instagram facilitates real-time communication, allowing users to share content such as text, photos, and videos. Notably, Instagram features are usable by all users, prevalent among millennials who share their daily stories through temporary posts (Kylena et al., 2023). Instagram introduced its latest innovation in August 2017, namely Instagram Stories. This feature allows users to take photos and videos with digital filters and share them with followers. Using this feature is quite simple, just by opening the Instagram Stories icon and selecting the desired filter (Setiawan & Audie, 2020). This Instagram filter with AR technology is expected to help increase user interaction and memory in fauna recognition and become a fun educational tool for the Indonesian community. The author created a fauna recognition filter in a quiz or guessing format. In this format, a question box will appear above the audience's head for 5 seconds to guess the answer. After 5 seconds, the answer will be displayed so the audience can learn about the types of fauna in Indonesia.

Spark AR Studio is software enabling users to create unique face filters and special effects applicable on Facebook and Instagram social media platforms. Introduced in 2017, Spark AR initially functioned as a camera effect in a closed beta version, accessible only to an internal team for development targeting brands, celebrities, public figures, and other significant individuals (Sufiatmi et al., 2020). Later, Spark AR expanded into an open beta version in 2019. Compatible with both Windows and Mac operating systems, Spark AR is employed to create AR for the camera filter feature on Facebook and Instagram, focusing on AR development with a similar function to Photoshop or Sketch (Chacon, 2019). The open beta phase of Spark AR saw an increase in User-Generated Content (UGC), allowing users to contribute to the development of AR applications applied to the camera (Dwityas, 2016). With the introduction of Spark AR in the open beta phase, filter development for Facebook and Instagram cameras became more open to users. The User-Generated Content (UGC) concept, about collecting information from many users, has gained prominence on social media platforms and websites. Social media UGC has become a valuable source of knowledge for conceptualizing processes related to natural environmental sustainability (Sultan et al., 2021). This concept has brought about changes in website functionality, transitioning from a "Read Only" model to a "Read and Write Interaction," enabling users to create, evaluate, and distribute internet content and adapt internet applications to their needs.

Upon comparing various studies, it becomes evident that the three journals' analysis and results sections share a common focus on AR. Some studies even employ the same Spark AR application, publishing their results on Instagram. For instance, a survey by Baharuddin & Kusuma (2021) successfully developed the AR Instagram filter BPAC (Basic Physical Activity Challenge), emphasizing Instagram as one of the most frequently used and active applications for various purposes. Another study by Sartika et al., (2021) designed an AR-based Instagram filter for promoting soy milk products. Lastly, Kausad et al., (2022) created an AR filter for mental health education during the pandemic, demonstrating that filters are well-received by the public and are enjoyable to use. From these three studies, it can be concluded that Instagram, with its AR-assisted filter features, holds advantages in terms of widespread acceptance and use by the community,

facilitating the introduction of various phenomena such as products, programs, or, in this case, fauna to the community, especially to the Generation Z age group, whose daily lives are intricately tied to the Instagram social media platform.

Based on the background above, the research problem in this study revolves around understanding how Instagram filters with AR technology can effectively innovate in introducing fauna to Generation Z in Indonesia. The research aims to design and develop an Instagram filter, testing its effectiveness in introducing fauna to the Indonesian audience. The author will undertake several research stages to achieve this goal, including creating an Instagram filter with AR technology using Adobe Illustrator and Spark AR software. The filter will then be uploaded to the Meta Spark Hub for viewing and use by the audience. Subsequently, the filter will be tested by an audience comprising individuals from various backgrounds in Indonesia. The test results will undergo analysis to ascertain the effectiveness of Instagram filters with AR technology in introducing fauna to the audience. Thus, the research strives to examine the effectiveness of Instagram filters with AR technology as an innovative means of introducing fauna to Generation Z in Indonesia, with the hope of contributing to the development of education regarding the conservation of Indonesian fauna.

METHOD

In this research, we examined a population of 2600 individuals, with a sample of 412 avid users of the social media platform Instagram, representing various backgrounds, using the Double Diamond method. The Double Diamond is a holistic design model that divides the design process into four creative stages: discovery, definition, development, and delivery, as shown in Figure 1 (Gumulya, 2017). This model was first introduced by the Design Council in 2005 (Indarti, 2020). The method is named Double Diamond because its pattern resembles two adjacent diamonds. The visualization of the double diamond is used to represent divergent-convergent thinking, which is the method's core (Hananto et al., 2020). This method allows designers to avoid unnecessary constraints and evaluate existing designs. The goal is to identify weaknesses and strengths in the design so that improvements can be made, making it more suitable for the intended purpose (Priyantono & Ardiansyah, 2020).
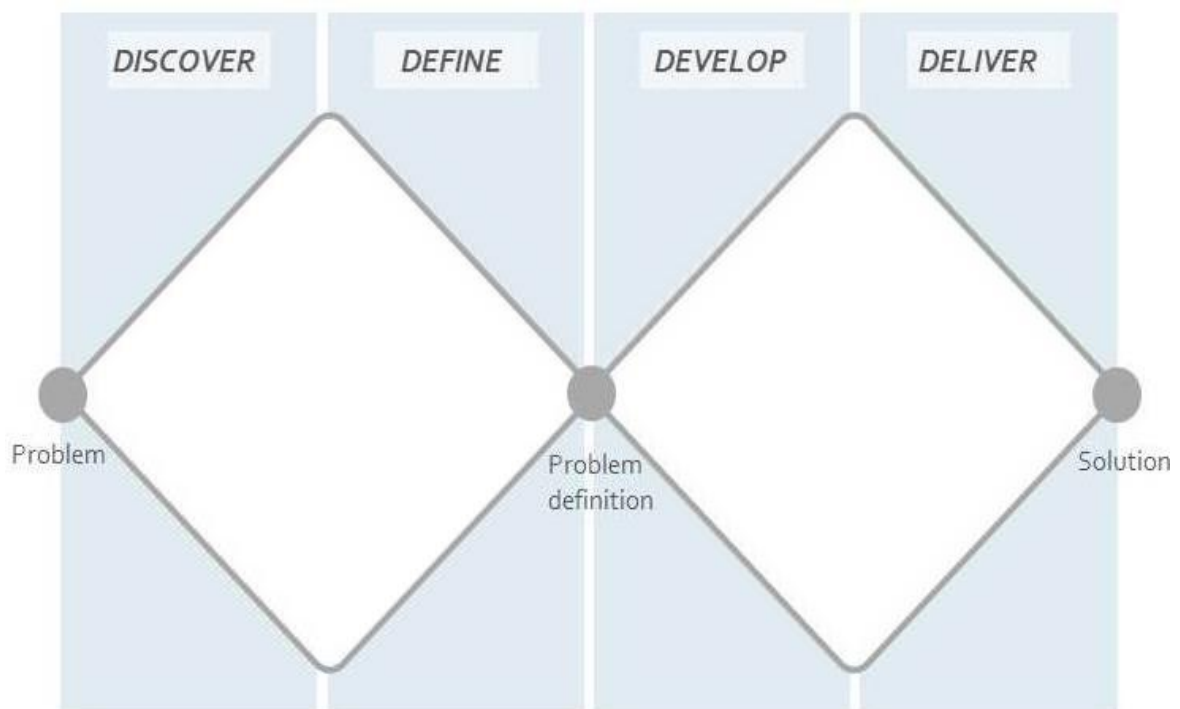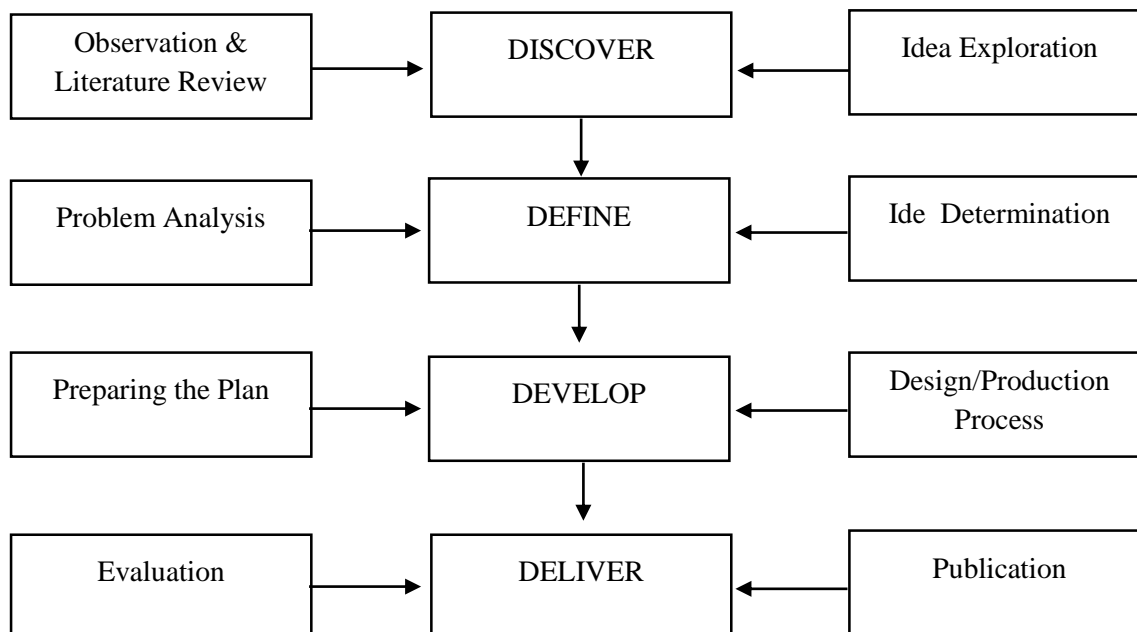

Figure 1. Double Diamond Method

This research's framework is based on the four major stages of the Double Diamond method. These stages include discovering, Defining, Developing, and Delivering in Figure 2, which generate outcomes from the provided input (Putra, 2020).

Observation & Literature Review	→	DISCOVER	←	Idea Exploration
Problem Analysis	→	DEFINE	←	Ide Determination
Preparing the Plan	→	DEVELOP	←	Design/Production Process
Evaluation	→	DELIVER	←	Publication

Figure 2. Framework of Thinking

RESULTS AND DISCUSSION

Results

The first stage, discovery, is conducted to understand better Instagram users' needs and interests regarding fauna introduction in Indonesia. The author performs observations and literature reviews related to the behavior and usage patterns of Instagram by the Indonesian population, AR technology, and existing Instagram filters. Additionally, the author gathers information about the fauna that would be introduced through this filter. This ensures that the created AR filter will provide accurate and helpful information regarding fauna in Indonesia. Here, the author compiles information about several animals with distinctive characteristics. Subsequently, idea generation is carried out through brainstorming to produce creative ideas related to the design and features of the AR filter.

The second stage defines and analyzes the problem to be addressed through this AR filter: the lack of knowledge regarding fauna in Indonesia among the younger generation. The author selects the most relevant idea that aligns with the problem to be addressed: introducing fauna in Indonesia through AR filters. The author designs an AR filter for guessing the names of fauna in Indonesia by providing the audience with questions about the characteristics of the animals. The audience is then asked to assume which animal possesses those characteristics.

The third stage, development, is carried out by creating the design for the AR filter, including its features and the technology to be used. The author designs an Instagram filter system with AR filter technology that can be used as an educational medium for fauna introduction as in Figure 3, Figure 4, and Figure 5. This AR filter is designed with several features in mind, such as image recognition of animals, guessing the names of animals, and providing brief information about the animals. The author also plans an intuitive and user-friendly interface for the Instagram filter to be used by audiences with various skill levels. Adobe Illustrator software creates graphic assets, such as frames, question boxes, and answer boxes, with attention to detail for each element to achieve an aesthetic and attractive appearance. Furthermore, in designing the Instagram filter mechanism, the author utilizes Spark AR software launched by Meta, allowing the filter to be published on Instagram, as in Figure 7.

Figure 3.The process of creating Question Box and Answer Box Assets
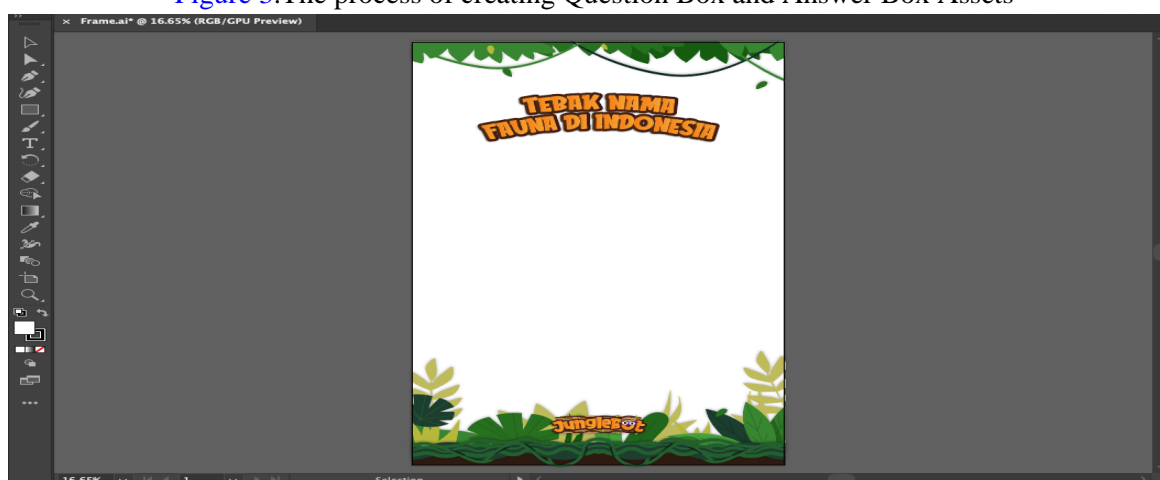

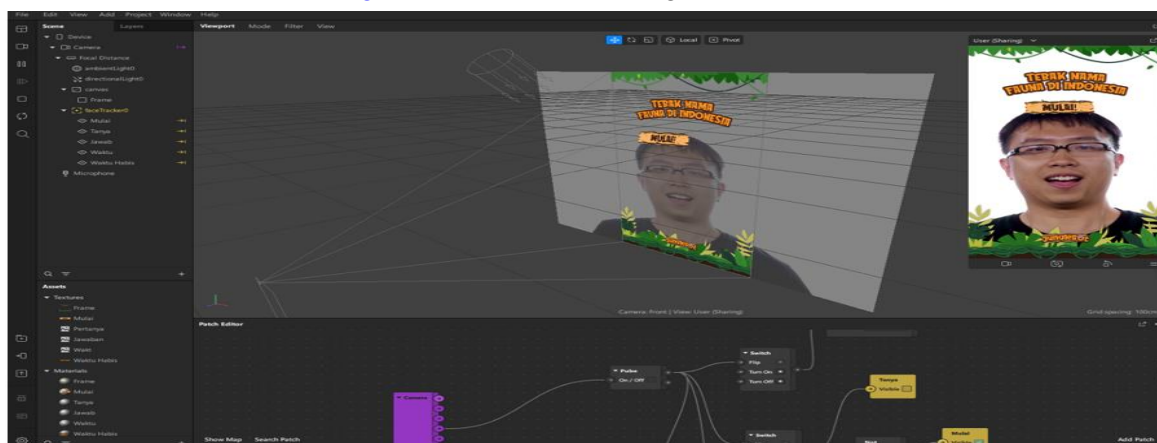Figure 4. Process of Creating Frame Assets

Figure 5. The Process of Creating Instagram Filters uses Spark AR

The fourth stage, deliver, is executed by publishing the AR filter to the Instagram platform through Meta Spark Hub so the audience can use it. The author has tested several audiences to evaluate the filter's effectiveness. The mechanism for using this Instagram filter involves presenting quizzes about the fauna that can be identified using AR technology when users press the "record store" button on the Instagram app, as in Figure 6 and Figure 7. The audience will be prompted to answer the given question within 5 seconds. After 5 seconds, the correct answer and information

about the fauna will appear, allowing the audience to evaluate their responses. The author also considers the audience's satisfaction with the Instagram filter using AR technology, as in Figure 8.

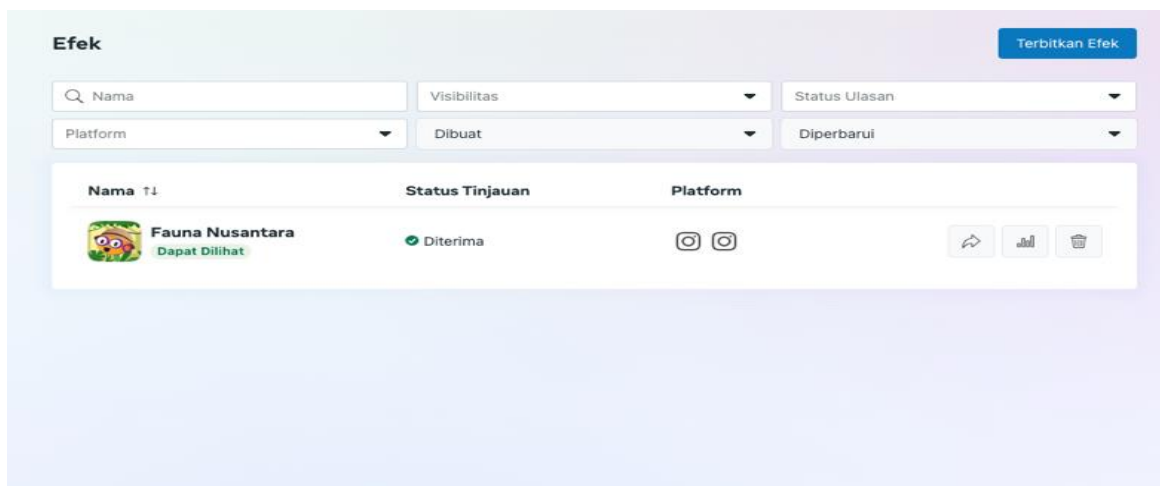Figure 6. Fauna Nusantara AR Filter Display on Instagram

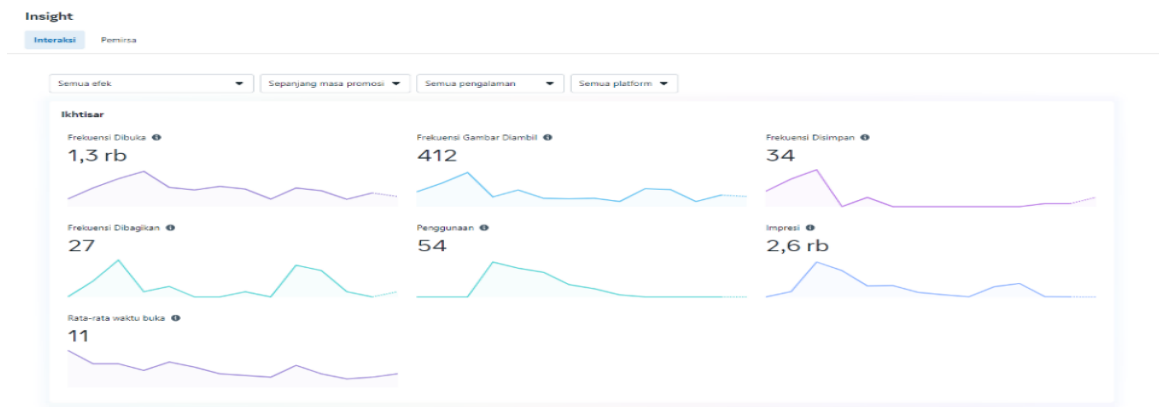Figure 7. Publication Process via Meta Spark Hu

Figure 8. Insight Results from Fauna Nusantara's Instagram AR filter via Meta Spark Hub

The Instagram filter "Fauna Nusantara" utilizes AR technology as an innovation for introducing fauna to Generation Z in Indonesia. This filter takes the form of a guessing game about the names of fauna in Indonesia by presenting questions about the characteristics of the fauna and prompting users to guess the names of the fauna. The mechanism for using this filter is quite simple. The audience is invited to answer the given question within 5 seconds. After 5 seconds, the correct answer and information about the fauna will appear, allowing the audience to evaluate their responses. After completing the guessing game, users can save the filter used and share it to enhance public knowledge and awareness of fauna. In developing this filter, research and data collection on fauna in Indonesia were conducted, including names, characteristics, habitats, and unique features of each fauna type. This data was then processed and designed into engaging and informative user guessing games. The filter also includes attractive images of fauna to support the user's learning process.

Discussion

Based on the data from Meta Spark Hub, the Instagram filter "Fauna Nusantara" with AR technology has shown positive results in enhancing public knowledge and awareness of fauna in Indonesia. The filter was opened 1300 times, 412 times for picture taking, 34 times for saving, 27 times for sharing, and 2600 impressions during its average 16-second open period. These statistics show that the filter is widely used, drawing attention from the public and being valued by Instagram users. Additionally, the data analysis findings show how efficient this filter is at raising public awareness of Indonesia's fauna. The large number of image grabs implies that viewers are drawn to the wildlife on exhibit and are eager to learn more about it. The high frequency of saves and usage also suggests that the audience uses the filter frequently, which makes a consistent improvement in public knowledge and awareness possible.

However, this evaluation also suggests that efforts are still needed to enhance the filter's effectiveness as an educational tool. This could be accomplished by offering prizes or incentives to users who tell their friends about the filter. More research is also required to determine how well the audience understood the fauna shown and how the filter affected the general public's understanding and awareness of Indonesian wildlife. Overall, the results of this evaluation are crucial for enhancing the quality and effectiveness of the filter as an educational tool for introducing fauna to Generation Z in Indonesia. This evaluation can provide valuable input for the future improvement and development of the filter. By continually enhancing the quality and effectiveness of this filter, it is expected to positively impact increasing public knowledge and awareness of fauna in Indonesia.

CONCLUSION

Based on the results obtained from the Meta Spark Hub insights, it can be concluded that the Instagram filter with AR technology developed is quite popular and attracts the audience's attention. The high frequency of image captures indicates that the audience is interested in the displayed fauna and wants to learn more about these animals. Furthermore, the high frequency of saves and usage suggests that the audience finds the helpful filter and uses it frequently. However, attempts to raise the low sharing frequency are required to improve this filter's efficacy as a teaching tool. This can be accomplished by offering prizes or incentives to viewers who tell their friends about this filter. Overall, the study's findings suggest that using Instagram filters with augmented reality could be a novel way to introduce Indonesia's Generation Z to wildlife. The filter is quite effective in increasing knowledge and awareness of Indonesian fauna. However, efforts are still needed to improve the sharing frequency and audience interaction with this filter to enhance its effectiveness as an educational tool.

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