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## The Role of Digital Design in Preserving the Integrity of the Natural Heritage

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### Abstract

Natural heritage refers to fundamental elements such as biodiversity and natural resources. With the increasing threat of climate change, the development of infrastructure, and the deterioration of the environment, a growing need exists to protect the integrity of the world's natural heritage. Digital design, including virtual reality, augmented reality, and interactive displays, are technological advancements adopted by domains such as marketing and education that can offer immersive and engaging experiences that educate and inspire people to care for natural heritage. The study's objective is to explore the potential of digital design in transmitting and safeguarding natural heritage, assessing its contribution to promoting environmental consciousness. The research employs qualitative research methods to interpret digital design's role in natural heritage preservation, using empirical materials such as case studies. The secondary data collected from articles provide a descriptive analysis of digital design's role in natural heritage preservation efforts. The research investigates how digital design can create effective communication channels and promote sustainable behavior amongst the audience exposed to digital design strategies. The

communication channels include extended reality platforms such as social media and other interactive forms of visual communication. This study reviews related articles and case studies and consists of a qualitative analysis. Findings begin with the past development of the digital design field, followed by current updates related to digital design and natural heritage preservation. This article contributes to the field of digital design by highlighting the growing relevance and roles of digital design concerning the protection of natural heritage.

**Keywords** Digital design; Natural heritage; Heritage preservation

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## **Introduction**

Natural resources and biodiversity are vital components of the environment. A growing need to safeguard the integrity of the world's natural heritage has arisen due to the threat posed by climate change, the expansion of infrastructure, and environmental deterioration. As a result, preserving the natural heritage suggests cohabitation between humans and the environment, which is crucial for the planet's ecological, cultural, and economic systems and is critical for our well-being and the well-being of future generations.

Digital design, such as virtual reality, augmented reality, and interactive displays, are examples of technological advancements adopted by sectors like marketing and education that may offer immersive and engaging experiences that educate and inspire people to conserve the environment. The objective of this study is to explore how audience exposure to digital design methods for fostering sustainable behaviour and open with effective communication channels. The first section of the present article introduces the background of the study, and then followed by the problem statement. It then explains the methods of conducting the review or secondary research such as the data source, procedures, analysis and presentation of data. The final few sections present the results by highlighting some case studies, and finally the conclusion.

## **Problem Statement**

Climate change, infrastructural expansion, mining, poaching, and other concerns are growing strain on natural heritages, including animals, ecosystems, and natural resources (Osipova et al., 2017). Since these threats might have serious repercussions, action is needed, and digital design has a role in the preservation efforts.

In correlation to technology development, various domains utilize digital designs, particularly marketing, and education (Elmqaddem, 2019). However, as common with the all-new developments, uncertainty exists over the importance of these digital design strategies in relation to fostering sustainable behaviours, conveying environmental problems and global impact, and motivating people to take action to preserve the natural heritage. In order to understand the ramifications of using digital design in preserving natural heritage, a study is required to examine the potential for digital design to transmit and safeguard natural heritage.

## Method

The research utilizes data collected from secondary resources such as articles and case studies. The investigation begins by identifying the main concepts within the literature. The research first provides a descriptive overview of the concept of digital design by providing descriptive details on its history and development and transition into the new digital age. This is followed by focused research identifying and providing insight into the various digital design cases that carry significant roles in natural heritage protection efforts. This overview is followed by descriptions detailing the key concepts regarding natural heritage and conservation efforts. The investigation notably explains the efforts put forward by the notable International governmental organization, the United Nations, specifically the sustainable development goals (SDG), which have been a guiding force in the worldwide emphasis on natural heritage preservation.

## Data Analysis and Findings

The findings unveil that the preservation of natural heritage is rapidly utilizing virtual reality (VR), augmented reality (AR), and mixed reality (MR) technology to improve tourist experiences, improve information sharing, and support conservation efforts. The results also show that the use of VR, AR, and MR technologies in the protection of natural heritage places has the potential to draw in a larger audience, especially generations who are more and more influenced by digital experiences. The long-term sustainability of conservation efforts and the ongoing preservation of the natural heritage can both be supported by this increased reach and engagement.

### *Impact of Digital Designs in Communicating the Preservation of the Integrity of Natural Heritage*

The article written by Kotler et al. (1971) provides an overview of the potential approach for organizing and implementing social change also known as social marketing. The channels segment evident in Figure 1 reveals the connection of specialized and mass media in the deliverance of messages. The article unveils the social impact of the method in which the messages are delivered plays. In the context of digital design, these would encompass all digital design mediums such as extended reality, social media etc. These digital design platforms now play a vital role in influencing social behaviour and attitudes, making social marketing efforts more successful in this present era.

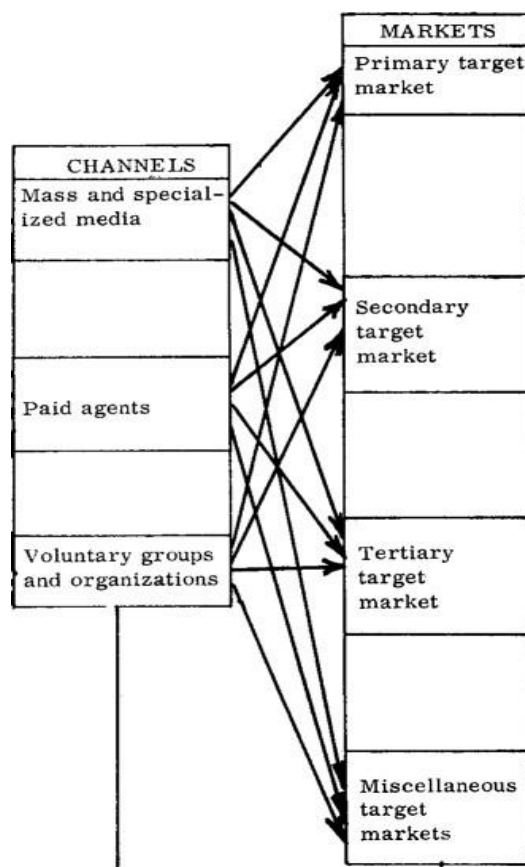


Figure 1 Close-up on Channels: Social Marketing and Planning Systems (Kotler et al., 1971)

Social marketing and planning systems involve implementing change and encouraging the behavioural impact of the consumers. Here under the segment “mass and specialized media”, digital design plays the role of the “medium” in which the message is used to be delivered to the targeted audience. As coined by the Canadian communication theorist McLuhan (1964) “medium is the message” which suggests that here, the digital design medium is an integral part of the message intended to be delivered. The digital design media delivering the environmental message applies a filter to the content of the message and consequently has a big impact on how it is perceived acting as a catalyst in encouraging a social change. It implies that the digital design medium used here is an essential component of the content being conveyed.

### ***Case Study by Lukovic and Kostic (2018)***

The research delves into the role of digital design in natural heritage preservation efforts. In-depth research by Lukovic and Kostic (2018) examines how digital technology is employed in Serbia’s protected areas and other portions of the tourism sector to conserve the natural world. Lukovic et al.’s work presents materials linked to nature protection regarding tourism offerings

and databases that the public may access through the digitized online register of natural heritage. Based on this, the research also reveals that the national park actively uses digital design to create a geographic information system.

According to the research, the scanning and geo-referencing phases of the digitization and geo-referencing of forest maps are currently still underway. Utilizing the digital design technologies available, once the system is finished, the “National Park Djerdap” will provide the following advantages: better and more long-lasting conservation of the park’s biodiversity, better and more efficient management of the national park, and better and more excellent protection of natural assets. The research suggests that virtual technology (geared towards travel), environmental management systems (EMSs), destination management systems (DMSs), the use of games GISs, or geographic information systems GPSs are the two technologies that are most frequently used in protected areas around the world including the protected nature heritage site Djerdap.

These technologies aid in protecting natural heritage sites by providing ease of tracking natural elements thriving in those regions, such as vegetation, water sources, and wildlife. Through the visualization of these sites, locating prevailing problems threatening the natural heritage sites can easily be identified and dealt with based on the individual situation.

### ***Case Study by Nelson’s Research Team: Digital Designs Role and Its Impact***

Anecdotal evidence from charitable fundraisers, according to Nelson et al. (2020) case study reveals that virtual reality (VR) technology improves empathy and can motivate individuals to act in a pro-environmental manner. The research unveils that virtual reality is frequently used by non-profit organizations to promote their causes, and many claim that doing so improves donations. In the case study, the viewers participate in virtual reality (VR) experiences that are intended to feel more like the real world through technology, such as 360-degree films watched with 3D headgear that block out visual and audio distractions. Figure 2 showcases the images used in the case study to display the usage of digital design in communicating the importance of natural heritage.

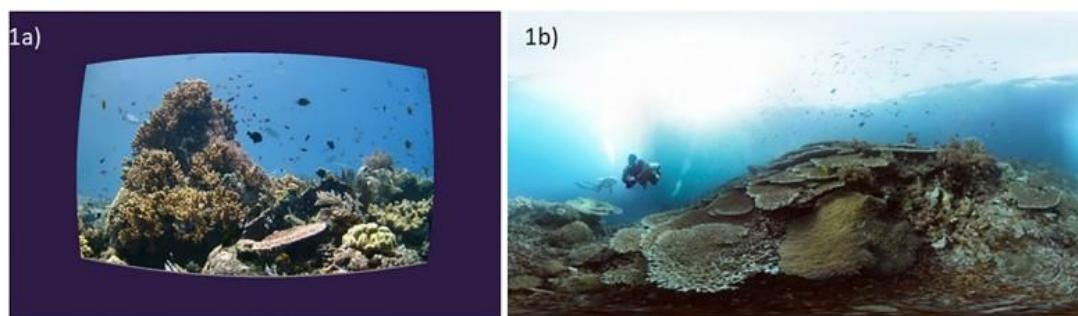


Figure 2 The View of Natural Heritage through VR Still Image vs. VR Digital Technology (Nelson et al., 2020)

According to the case study, (1a) displays a screen capture of the field of view of unidirectional film and (1b) showcases the 360° film seen by the viewers while wearing the VR headset. Nelson et al.'s research indicates that digital design in all forms (classic unidirectional video and 360° VR video, as seen in Figure 2 are correlated to a notable increase in the donations collected for the environmental causes compared to their control group has not been exposed to any digital design communication tools. The research also highlights that the 360° VR treatments resulted in a more immersive experience, reflecting on the audience's emotive response, whether it is the shocking expression on their faces during the immersive experience or, as Nelson et al. describe "shrieks of shock" at how realistic the underwater experience through digital technologies felt which resulted in immediate responses.

As a final evaluation, this case study suggests communicating the crisis of coral reefs as part of natural heritage using digital technologies is related to an increased sense of presence and emotion, with the highest scores in the 360° VR treatment. Nelson et al.'s study supports that the use of digital design, such as 360° video using VR head-mounted devices, is highly related to the potential to attract more people to donate, increase donations and, overall, increase in heritage protection awareness.

## Discussions

The research reveals that the roles of digital design in preserving the integrity of natural heritage increase in prominence as technology develops. As evident in the research conducted by Lukovic et al. (2018), the integration of digital design technologies, such as extended reality, is applied throughout various fields concerning the protection of natural heritage sites, such as protected nature parks. The scanning and geo-referencing phases of the digitization and geo-referencing of

forest maps are now underway. The “National Park erdap” mentioned in the case study by Lukovic et al. (2018) provides the following advantages: better and more long-lasting conservation of the park’s biodiversity, better and to more efficient management of the national park and better and more excellent protection of natural assets. The research suggests that virtual technology (geared towards travel), environmental management systems (EMSs), destination management systems (DMSs), the use of games GISs, or geographic information systems GPSs are the two technologies that are most frequently used in protected areas around the world. Based on this, this case study suggests that digital design bridges the gap between awareness creation and action-based solutions involving other domains such as IT & education. As the gap is reduced, what is evident is an increase in the prominence and efficiency of digital design and a more impactful form of communication regarding natural heritage preservation.

In addition, digital design has become a significant instrument for communicating, raising awareness, and spurring action in the field of protecting natural heritage. The need to protect natural heritage has been effectively communicated via various digital design platforms. Internet platforms such as social media are essential for making information easily accessible, highlighting natural heritage sites' beauty and ecological importance, and advocating for sustainable practices. Through virtual tours, individuals can now experience natural heritage sites via technologies like maps as suggested in both case studies, which fosters a sense of connection and appreciation. Social media channels are becoming crucial for sharing visual content, creating stories, and spreading awareness of environmental issues. Videos, animations, and infographics all provide interesting and simple-to-understand forms to inform and motivate audiences.

## **Conclusion**

In conclusion, this study has delved into the realm of digital design with a focus on its pivotal role in communicating and safeguarding our natural heritage. It has underscored the growing significance of digital design in contemporary society and explored a diverse array of channels and mediums, encompassing websites, interactive maps, virtual tours, and social media platforms, all of which contribute to the dissemination of knowledge and the promotion of sustainable practices.



Of particular note is the study's emphasis on the indispensable role of extended reality, such as virtual reality and immersive experiences, in conveying the intrinsic value of our natural heritage. Furthermore, it has elucidated how digital design serves as a potent tool for fostering a profound sense of connection, empathy, and comprehension of natural ecosystems. Equally vital is its effectiveness in disseminating educational resources and raising public awareness, thereby fostering a collective commitment to conservation.

Nevertheless, this study acknowledges its limitations, notably the necessity for a more robust research methodology for a nuanced understanding of the various roles and impact of digital design. To advance our scientific comprehension and inform practical strategies for preserving our natural heritage, future research endeavours should be directed towards addressing these deficiencies. In doing so, we can better harness the power of digital design to protect and cherish the precious wonders of our natural world.

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### **Authors' Bio**

Nur Hatice Zaim, an advertising design student from Istanbul, Turkey, blends her Malay and Turkish heritage to infuse creativity into her work. With her communication skills, she brings a unique perspective to the design process, aiming to captivate global audiences through compelling and culturally diverse creations.