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Astrophotography as a Medium for Affective Sustainability Communication in Alternative Tourism: A Qualitative Study Using Photo Elicitation

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Abstract

Sustainability communication in the tourism sector often faces challenges in fostering substantial public engagement, primarily due to a reliance on overly rational and academic approaches. This study aims to address this gap by exploring the potential of astrophotography as an effective visual communication medium for conveying sustainability values. Employing a qualitative approach, specifically through photo elicitation and a visual hermeneutics framework, this research analyzes how audiences interpret astrophotography images and the impact of these interpretations on their perceptions of environmental issues. The findings indicate that night sky imagery effectively elicits profound affective responses, such as experiences of transcendence, contemplation, and nostalgia. These responses contribute directly to an increased ecological awareness and a greater appreciation for preserving the night sky from light pollution. The study's findings affirm that astrophotography can function as a powerful visual bridge, connecting aesthetic beauty with the urgency of environmental conservation.

This research not only enriches the visual communication literature but also provides a practical foundation for tourism stakeholders to leverage astrophotography as an effective tool for promoting responsible tourism and enhancing environmental awareness.

Keywords: *Astrophotography, Sustainability Communication, Visual Hermeneutics, Sustainable Tourism, Photo Elicitation*

1. Introduction

Sustainability communication plays a crucial role in the tourism sector, acting as a catalyst for efforts aimed at environmental preservation, protection of social and cultural values, and economic growth (Golob et al., 2023; Marchi et al., 2023; Oratmangun et al., 2025). Despite the widespread adoption of sustainable tourism, the implementation of this concept encounters a fundamental challenge: effectively communicating its core values to the broader public (Hall, 2019; Hansen & Machin, 2013; Mihalic, 2024). In practice, sustainable tourism communication has been dominated by technocratic and rational-informative approaches (Cockburn-Wootten et al., 2018; Dias et al., 2024; Miller et al., 2010). While such approaches are essential for planning purposes, they often lack efficacy in fostering deeper public engagement (Naghizadeh, 2021; Ngurah et al., 2024; Szemző et al., 2024). This situation highlights the need for alternative communication strategies that can effectively link factual information with emotional experiences. Such strategies enable sustainability messages to be understood and internalized more effectively.

To address this, visual media, particularly photography, offer significant potential as an effective and engaging medium of communication (Balomenou & Garrod, 2019; Fernández-Vallejo, 2023; Kaewnopparat, 2017; Lund, 2023). Visual representations combine aesthetic, symbolic, and narrative elements to convey sustainability messages. These elements bridge complex technical issues and the audience's emotional understanding (Barton & Gutiérrez-Antinopai, 2020; Delamontano et al., 2025; Salvador Leon, 2017; Tiago et al., 2021). Photography, through its visual power, can function as a strategic tool to heighten ecological awareness and stimulate attitudinal change effectively (Khanya, 2024; Ngurah et al., 2024; Sabatini, 2024; Swanson & Ardoin, 2021).

Among photography genres, astrophotography, which documents night sky phenomena, holds a particularly relevant role in sustainability discourse (Artuner Özder, 2024; De Leo–Winkler et al., 2016; Iovenitti et al., 2021). This genre can directly spotlight environmental issues, such as light pollution, and promote the preservation of the night sky as a vulnerable natural resource (Bará & Falchi, 2023; Ngarambe et al., 2018; Zissis, 2020). Light pollution, often overlooked by the public, becomes tangible through the images produced by astrophotography (Hamacher et al., 2020; Kunz & Daab, 2024; Öksüz et al., 2025). Astrophotography thus serves as a visual bridge, connecting aesthetic appreciation with the urgency of environmental conservation.

Despite growing popularity, a critical gap exists in academic literature connecting astrophotography with effective sustainability communication. Most research focuses on astrophotography's technical aspects, such as astronomy education and scientific documentation (Collison & Poe, 2013; Jarrett et al., 2021; Marini et al., 2016; Poczekajlo & Suszynski, 2023). The potential of astrophotography as an effective medium for fostering ecological awareness remains underexplored. To address this deficiency, the present study adopts visual hermeneutics as its theoretical framework. This interpretive approach views astrophotography images not only as technical documentation but as visual texts rich in symbols and meanings, requiring interpretation (Müller, 2020; Prabhath et al., 2025; Salvador Leon, 2017; Stejskal, 2021). From this perspective, the study examines how

audiences' subjective interpretations of night sky images reveal deeper personal and spiritual meanings concerning the human relationship with the universe. The framework also provides a robust methodological foundation to understand the cognitive and affective processes elicited when an audience interacts with visual media, transcending mere aesthetic analysis.

Based on a thorough literature review, this research aims to fill the existing gap by deeply analyzing astrophotography's role as a visual communication medium for conveying sustainability values. The study explores how affective experiences derived from the hermeneutic process contribute to responsible awareness and behavior. This includes examining astrophotography's influence in the context of astrotourism as a form of alternative sustainable tourism. The study has two main objectives: first, to analyze how audiences interpret the emotional, symbolic, and ecological meanings embodied in astrophotography images using a visual hermeneutics framework; second, to evaluate the extent to which these visual interpretations affect audience perceptions of sustainability, particularly concerning nature and environment, which relate directly to alternative tourism practices. The expected outcome is to provide novel insights into astrophotography's potential as an effective and inclusive communication strategy, enriching visual communication literature, and offering practical guidance for tourism stakeholders. This guidance aims to utilize astrophotography as a powerful tool to advance environmental awareness and promote responsible tourism.

2. Method

2.1 Research Design

This study adopted a qualitative approach underpinned by a visual hermeneutic framework (Gillo, 2021; Paterson & Higgs, 2015; Salvador Leon, 2017). This design was selected to allow for a deep exploration of the meanings constructed by participants when interacting with visual imagery. Within this framework, images are treated as visual texts imbued with ecological, cultural, and affective symbolism, whose meanings are open to interpretation and unique to each individual (Hasanpur & Shahrebabaki, 2022; Müller, 2020; Prabhath et al., 2025; Stejskal, 2021). Astrophotography in this study is positioned not merely as an aesthetic product, but as a communication medium that symbolically and emotionally mediates sustainability narratives. To uncover these layers of meaning, the research utilized the photo elicitation method, in which astrophotography images were used to trigger in-depth dialogue and reflection from participants (Epstein et al., 2006; Harper, 2002; Kyololo et al., 2023; Meo, 2010). Thus, this research design focuses on a contextual and interpretive understanding of meaning-making, shaped by the audience's social, cultural, and emotional experiences.

2.2 Case Context and Site Selection

This research was situated in the urban and suburban areas of Greater Bandung, which were purposively selected as the study context. The choice of location was based on two primary considerations. First, as a hub for education and creative industries, Greater Bandung creates a demographic with high exposure to digital visual culture and sustainability discourse (Putri & Safeyah, 2020; Sulistyaningtyas et al., 2012; Warsana et al., 2021). Second, the region's significant levels of light pollution have led to limited direct public experience of the natural night sky (Admiranto et al., 2019; Prastyo & Herdiwijaya, 2018; Priyatikanto et al., 2019). Consequently, astrophotography serves as the primary visual source for urban audiences to access cosmic experiences. This context is highly relevant for examining how night sky visuals are interpreted by urban communities within a sustainability framework.

2.3 Data Collection and Participant Selection

Data were collected through photo elicitation interviews (PEI), a qualitative technique that uses photographs as stimuli to elicit participants' narratives, emotions, and interpretations (Harper, 2002; Kyololo et al., 2023; Meo, 2010). In this study, the researcher used four (4) self-produced astrophotography images. These photos were specifically curated to represent diverse and relevant content: (1) a night sky marred by urban light pollution, to symbolize environmental degradation; (2) a clear night sky, to evoke a sense of awe and the beauty of nature; (3) a visualization of the Milky Way and light pollution, to highlight the scale and fragility of the universe; and (4) a long exposure image showing the expanse of the galaxy, to depict the cycles of time and nature.

A total of 15 participants were recruited through purposive sampling. This sample size was considered adequate for a qualitative study, as it allowed for the collection of rich and in-depth data while also achieving data saturation, where no new themes or insights emerged from subsequent interviews (Dewi, 2021; Patton, 2002; Soleimani et al., 2019). Participants were selected based on two criteria: (1) active engagement with visual content on social media, and (2) a non-professional background in astronomy or photography, to ensure that the responses reflected general public interpretations.

Table 1. General Characteristics of Participants

Code	Age	Education Level	Occupation	Domicile
P01	30	Master	Lecturer	Urban
P02	23	Master	Student	Urban
P03	30	Bachelor	Government Employees	Suburban
P04	30	Bachelor	Teacher	Suburban
P05	40	High School Graduate	Entrepreneur	Suburban
P06	31	High School Graduate	Entrepreneur	Urban
P07	31	Bachelor	Freelance	Urban
P08	48	Bachelor	Freelance	Suburban
P09	23	Associate Degree	Freelance	Suburban
P10	28	Bachelor	Laborer	Suburban
P11	28	Bachelor	Research Assistant	Urban
P12	30	High School Graduate	Entrepreneur	Suburban
P13	30	Associate Degree	Nurse	Suburban
P14	28	High School Graduate	Laborer	Suburban
P15	31	Bachelor	Journalist	Urban

2.4 Data Analysis

Data were analyzed thematically using a visual hermeneutic approach (Gillo, 2021; Prabhath et al., 2025; Salvador Leon, 2017). The analysis followed a systematic procedure. First, all interview recordings were transcribed verbatim, and the researcher read the transcripts repeatedly to become deeply familiar with the data. Second, open coding was applied to identify patterns, keywords, and symbolic representations emerging from the participants' responses to the astrophotography images. Third, these initial codes were grouped into broader themes and subthemes that reflected the participants' understanding of the images about sustainability. Fourth, these themes were interpreted within the framework of the hermeneutic circle, where the researcher moved back and forth between individual statements and the broader interview context to generate a holistic and dynamic understanding (Putra, 2023). This rigorous analytical process ensured

that the resulting themes were directly grounded in the participants' narratives and accurately reflected their subjective experiences.

To maintain consistency of analysis, a portion of the transcripts was re-coded by the researcher at different times so that coding results could be compared. Limited discussions between researchers were also conducted to ensure that emerging themes were not biased toward a single perspective. Any differences in interpretation were resolved through consensus to achieve a stable understanding. In addition, reflexive notes were kept to examine the researcher's dual role as both photographer and interviewer. These steps were taken to enhance the credibility and dependability of the analysis.

2.5. Ethical Considerations and Researcher Reflexivity

This study adhered to the core ethical principles of qualitative research, including obtaining informed consent, ensuring participant anonymity, and respecting their right to withdraw at any time. The researcher was mindful of their dual position as both image producer and interpreter of meaning, which could potentially influence the interpretive process. To mitigate this bias, the researcher maintained a reflexive journal throughout the study. This practice involved documenting personal assumptions and consciously applying bracketing (suspending assumptions) during the analysis, ensuring that interpretations were based on the participants' narratives rather than the researcher's viewpoints (Pezalla et al., 2012; Thomas & Sohn, 2023).

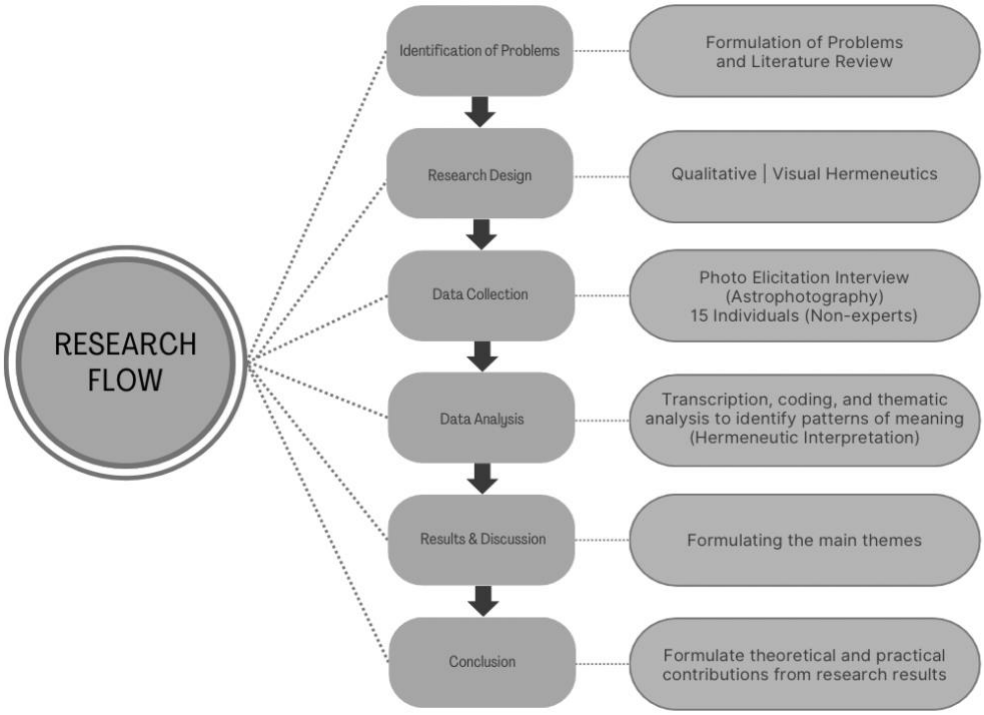

Figure 1. Research flows from problem identification to conclusion

3. Results and Discussion

The visual representation of astrophotography in this study reveals a layered interpretive landscape that extends beyond passive aesthetic appreciation. Images of the night sky emerged as symbolic spaces mediating the relationship between individuals, nature, and the cosmos. Through photo-elicitation interviews, astrophotography functioned as a catalyst for emotional engagement, memory recall, and ecological reflection. Thematic analysis identified five key themes: transcendence and contemplation,

nostalgia and visual memory, ecological awareness, astrotourism as a meaningful experience, and astrophotography as an educational and promotional instrument. These themes reflect how the meanings of sustainability are constructed through the interplay of visuals, participants' life experiences, and their socio-cultural contexts.

Figure 2. Distribution of Light Pollution in Urban Bandung
(Source: researcher's documentation)

3.1 The Night Sky as a Space of Transcendence and Contemplation

Participants consistently reported intense emotional engagement when viewing the expansive night sky, particularly photographs of the Milky Way (Figures 3, 4, and 5). P01 expressed, *"I feel emotional because I can't see a view like this at home,"* while P05 noted, *"The sky that has been so often ignored, it turns out, holds meaningful beauty."* These accounts highlight that astrophotography was not only viewed as aesthetic imagery but as a rare opportunity for reflection in urbanized daily life.

Specific visual elements were identified as triggers of transcendental experience. Images of the Milky Way were perceived as symbols of cosmic order, while star clusters suggested interconnectedness between humans and the universe. P12 described the starry sky as *"a silence that touches the soul."* The pattern was consistent: vast and complex cosmic visuals evoked spiritual and contemplative responses, while simpler images (Figure 2) provoked more immediate and personal emotions.

Figure 3. A Symphony of Stars and Mountains in the Visual Space of Sustainability (Source: researcher's documentation)

3.2 Nostalgia and Visual Memory of a Lost Environment

Photographs of a clear night sky dominated by the Milky Way (Figures 3, 4, and 5) strongly evoked nostalgia. Many participants associated these visuals with personal memories of times when skies were darker and less polluted. P09 remarked, *"This photo reminds me of my home at the foot of Mount Patuha,"* while P08 reflected, *"This image takes me back to my student orientation in Kiarapayung in 1995."* Such responses indicate that astrophotography activated authentic memories tied to ecological experiences increasingly absent in contemporary urban environments.

Nostalgia was not simply romantic longing but also a subtle critique of environmental degradation. Comparisons between past and present sky conditions highlighted the loss of natural darkness. Several participants lamented that *"a truly dark sky"* is now rare, particularly in cities. While the photographs did not explicitly depict pollution, participants inferred environmental change through the sense of loss embedded in the visuals. Nostalgia thus served as an emotional bridge connecting personal memory to abstract issues like light pollution and ecological decline.

3.3 The Night Sky and Ecological Awareness

Astrophotography also fostered ecological awareness, encouraging participants to reflect on their relationship with nature and time. The Milky Way visuals (Figures 3 and 4) prompted participants to acknowledge humanity's small place within a larger system. P04 said, *"This reminds me that we are all just a small part of a larger system,"* while P07 emphasized intergenerational responsibility: *"This natural beauty should be preserved so that it can be enjoyed by our children and grandchildren."*

These responses suggest that astrophotography positioned sustainability concerns within a cosmic and temporal framework. The Milky Way was interpreted not only as a visual spectacle but as a metaphor for continuity across generations. Participants perceived their actions today as carrying implications for the future, framing the night sky as a visual reminder of ecological responsibility.

Figure 4. Natural Night Skies and Nature-Based Tourism Activities
(Source: researcher's documentation)

3.4 Astrotourism as a Reflective Experience

The findings also revealed that astrophotography stimulated participants' desire to experience the depicted settings firsthand. However, this interest was not motivated by conventional tourist consumption but by the search for tranquility, silence, and a sense of connection with nature. P10 stated, *"This photo feels more emotional because it's not just about a tourist destination, but it presents an experience."*

Participants rarely mentioned well-known tourist sites or facilities, instead focusing on atmosphere and emotional quality. For them, the value of astrotourism lay in the rarity of authentic night skies. Astrophotography, therefore, was not viewed as simple documentation but as a representation of meaningful experience. The findings emphasize that astrotourism's significance is rooted not in the commodification of space but in the reflective quality of engagement with the cosmos..

3.5 Astrophotography as an Instrument for Education and Promotion

Participants also recognized astrophotography as a powerful communication tool for sustainable tourism. Several suggested that night sky images could be employed in digital campaigns, educational contexts, and public spaces due to their emotional resonance and accessibility. P03 noted, *"This image can be used as part of a digital campaign and education by showing cause-and-effect,"* underscoring the persuasive potential of visuals that bypass complex verbal explanations.

Astrophotography was seen not only as art but as a vehicle for ecological communication. Participants believed such visuals could help shape distinctive tourism identities centered on sustainability, particularly for non-academic audiences. The dual function of astrophotography, as an aesthetic appreciation and educational instrument, positions it as a central medium for sustainability communication.

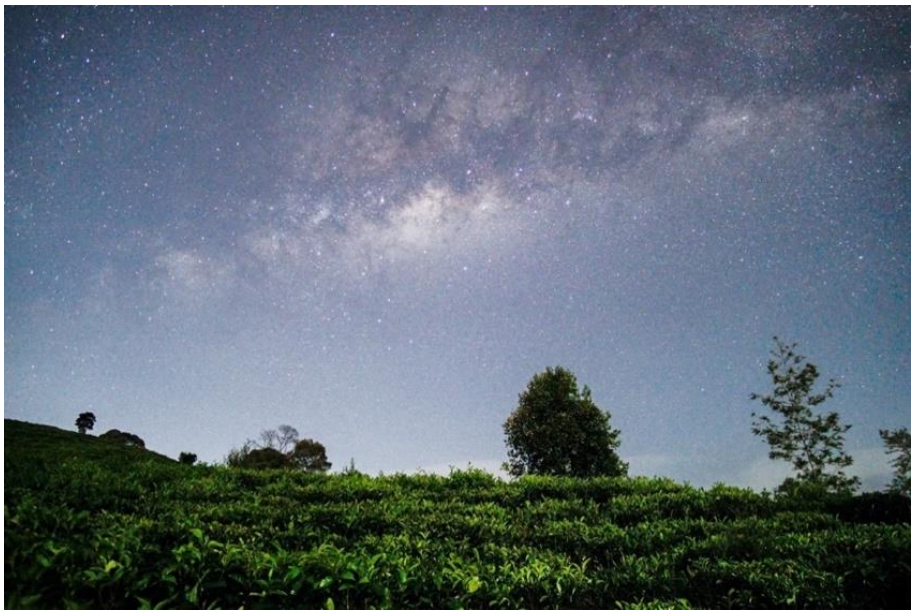

Figure 5. Visual Interaction between Terrestrial Nature and the Cosmic Sky (Source: researcher's documentation)

Discussion

The findings of this study demonstrate that astrophotography is not merely perceived as a visual representation of astronomy but also as a trigger for affective and symbolic experiences. Night-sky imagery evokes emotional resonance that strengthens human connectedness with nature while also stimulating spiritual and ecological reflection (Derrien & Stokowski, 2020; Gulliver et al., 2020; Stylos et al., 2022). This outcome aligns with the literature on environmental visual communication, which emphasizes the role of images in fostering emotions and ecological awareness (Hansen & Machin, 2013; Raappana-Luiro, 2024; Swanson & Ardoin, 2021).

The nostalgic reactions expressed by participants resonate with the concept of environmental generational amnesia, a condition in which the loss of intergenerational ecological experiences reduces society's capacity to recall the environmental quality of the past, particularly among younger generations (Craps, 2024; Straka et al., 2025; Walshe et al., 2024). However, this study indicates that astrophotography can serve as a medium to bridge that gap. Night-sky photographs not only reactivate personal memories but also generate symbolic resonance, enabling past ecological experiences to re-emerge in the collective consciousness across generations.

Previous research, such as De Leo–Winkler et al. (2016), primarily positioned astrophotography as a constructivist learning tool for non-STEM students. The emphasis was pedagogical, focusing on how celestial imagery enhances astronomy literacy and engagement in scientific activities, thereby situating astrophotography within the realm of structured formal education. In contrast, this study reveals another dimension: the capacity of astrophotography to evoke symbolic and affective responses. The difference stems from methodological and contextual variations; while prior work was classroom-based, this study employed photo-elicitation in an urban setting embedded in everyday experiences. These distinctions broaden the scope of interpretation, highlighting the multifunctionality of astrophotography: reinforcing science literacy on one hand while fostering sustainability communication through emotional and cultural engagement on the other.

In practical terms, these findings suggest the potential of hybrid approaches. Astrophotography education programs can be enriched with narrative-visual modules that foreground sustainability values. Likewise, environmental campaigns can leverage astrophotographic outputs not only to convey scientific messages but also to foster affective resonance, thereby deepening public engagement. Such strategies merit further testing through comparative experiments or practice-based interventions that assess the effectiveness of astrophotography in shaping sustainability-related attitudes and behaviors.

The notion of astrotourism as a reflective experience, as articulated by participants, reinforces findings by Artuner Özder (2024) and Á. Rodrigues & Loureiro (2024) highlight night-sky tourism as a form of emotional connectedness with nature. This study also extends the arguments of Vrdoljak Raguž et al. (2022), who emphasized the educational potential of astrotourism, by introducing contemplative and affective dimensions rarely addressed in prior research. Thus, astrotourism may be understood as a space of inner experience that transcends conventional destination-based consumption.

This study is not without limitations. The relatively small sample size and the focus on an urban context limit the generalizability of the findings. Interpretations may differ in rural areas or communities with strong cosmological traditions. Future research could adopt cross-cultural comparative approaches, involve participants with more diverse backgrounds, or employ quantitative methods to test the effectiveness of astrophotography in raising ecological awareness. Moreover, exploring other media, such as documentary films or virtual reality, could further expand our understanding of the role of visual communication in sustainability.

4. Conclusion

This study demonstrates that astrophotography is not merely an aesthetic representation of the night sky but also a symbolic medium that generates affective experiences, ecological reflection, and sustainability awareness. Through photo-elicitation interviews, five key themes were identified: transcendence and contemplation, nostalgia and ecological memory, ecological awareness, astrotourism as a reflective experience, and astrophotography as an educational and promotional tool. These findings highlight how night-sky imagery fosters emotional connections across generations and activates ecological memories that are increasingly eroded by modernity.

Theoretically, this research advances visual hermeneutics by positioning astrophotography as a symbolic language that integrates aesthetics, memory, and socio-cultural contexts in constructing meanings of sustainability. It enriches the field of visual environmental communication, which has often prioritized textual or verbal media, and contributes to sustainable tourism studies by introducing reflective and affective dimensions rarely addressed in prior literature. In doing so, the study broadens academic horizons on how visual experiences can shape sustainability communication.

From a practical perspective, astrophotography offers a unique contribution as a low-cost, accessible, and emotionally resonant medium. It can be integrated into environmental campaigns, educational curricula, destination branding, and public policy initiatives addressing light pollution. By combining aesthetic appeal with affective depth, astrophotography complements other visual media such as documentaries or immersive technologies, reinforcing sustainability messages while also supporting community-based tourism and urban governance. Importantly, it positions the night sky as both an ecological and cultural resource that warrants protection.

Nonetheless, this study has limitations, particularly the relatively small sample size and its urban-specific context, which constrain the generalizability of the findings.

Interpretations may differ in rural settings or within communities with distinct cosmological traditions. Future research could adopt cross-cultural or comparative approaches, engage larger participant groups, or employ quantitative methods to assess the effectiveness of astrophotography. Further exploration of other media, such as documentary films or immersive technologies, is also essential for expanding insights into the role of visual media in sustainability communication.

In conclusion, this study underscores that astrophotography is not simply an art form but a symbolic language with cross-cultural resonance that strengthens human–cosmos relationships. By eliciting emotional and reflective responses, astrophotography bridges cosmic aesthetics with ecological ethics. Positioned within the broader landscape of visual communication and sustainability discourse, it frames the night sky not only as a source of wonder but also as a shared ecological and cultural heritage that must be preserved for future generations.

References

Admiranto, A. G., Priyatikanto, R., Maryam, S., Ellyyani, & Suryana, N. (2019). A preliminary report of light pollution in Indonesia was based on sky quality observation. *Journal of Physics: Conference Series*, *1231*(1). https://doi.org/10.1088/1742-6596/1231/1/012017

Artuner Özder, C. G. (2024). *Astrotourism: A Growing Niche of Sustainable Tourism*. Detay Academic Publishing. https://www.detayyayin.com.tr/urun/astrotourism-a-growing-niche-of-sustainable-tourism

Balomenou, N., & Garrod, B. (2019). Photographs in tourism research: Prejudice, power, performance and participant-generated images. In *Tourism Management* (Vol. 70, pp. 201–217). Elsevier Ltd. https://doi.org/10.1016/j.tourman.2018.08.014

Bará, S., & Falchi, F. (2023). Artificial light at night: A global disruptor of the night-time environment. *Philosophical Transactions of The Royal Society B*, *378*. https://doi.org/10.1098/rstb.2022.0352

Barton, J. R., & Gutiérrez-Antinopai, F. (2020). Towards a visual typology of sustainability and sustainable development. *Sustainability (Switzerland)*, *12*(19). https://doi.org/10.3390/SU12197935

Cockburn-Wootten, C., McIntosh, A. J., Smith, K., & Jefferies, S. (2018). Communicating across tourism silos for inclusive sustainable partnerships. *Journal of Sustainable Tourism*, *26*(9), 1483–1498. https://doi.org/10.1080/09669582.2018.1476519

Collison, F. M., & Poe, K. (2013). "Astronomical Tourism": The Astronomy and Dark Sky Program at Bryce Canyon National Park. *Tourism Management Perspectives*, *7*, 1–15. https://doi.org/10.1016/j.tmp.2013.01.002

Craps, S. (2024). Lost Words and Lost Worlds: Combating Environmental Generational Amnesia. *Memory Studies Review*, *1*(1), 36–55. https://doi.org/10.1163/29498902-20240001

De Leo–Winkler, M. A., Canalizo, G., & Wilson, G. (2016). Astrophotography is a portal for engaging non-STEM majors in science. *International Journal of STEM Education*, *3*(1). https://doi.org/10.1186/s40594-016-0053-0

Delamontano, E., Cipta Endyana, Yunus Winoto, & Evi Novianti. (2025). Youth Engagement Strategies in Citarum River Cleanup Campaigns via Instagram: A Mixed-method Content Analysis. *INJECT (Interdisciplinary Journal of Communication)*, *10*(1), 1033–1052. https://doi.org/10.18326/inject.v10i1.4666

Derrien, M. M., & Stokowski, P. A. (2020). Discursive constructions of night sky experiences: Imagination and imaginaries in national park visitor narratives. *Annals of Tourism Research*, *85*. https://doi.org/10.1016/j.annals.2020.103038

Dewi, I. G. A. A. O. (2021). Understanding Data Collection Methods in Qualitative Research: The Perspective of Interpretive Accounting Research. *Journal of Tourism Economics and Policy*, *1*, 23–34. https://doi.org/10.38142/jtep.v1i1.102

Dias, Á., Viana, J., & Pereira, L. (2024). Barriers and policies affecting the implementation of sustainable tourism: the Portuguese experience. In *Journal of Policy Research in Tourism, Leisure and Events*. Routledge. https://doi.org/10.1080/19407963.2024.2314514

Epstein, I., Stevens, B., McKeever, P., & Baruchel, S. (2006). Photo Elicitation Interview (PEI): Using Photos to Elicit Children's Perspectives. In *International Journal of Qualitative Methods* (Vol. 5, Issue 3).

Fernández-Vallejo, A. M. (2023). Visual strategies of sustainability communication on corporate websites: A critical multimodal discourse analysis in the hospitality sector. *Iberica*, *2023*(45), 109–137. https://doi.org/10.17398/2340-2784.45.109

Gillo, M. D. (2021). Fundamentals of Hermeneutics as A Qualitative Research Theoretical Framework. *European Journal of Education and Pedagogy*, *2*(3), 42–45. https://doi.org/10.24018/ejedu.2021.2.3.43

Golob, U., Podnar, K., & Zabkar, V. (2023). Sustainability communication. *International Journal of Advertising*, *42*(1), 42–51. https://doi.org/10.1080/02650487.2022.2144035

Gulliver, R., Chapman, C. M., Solly, K. N., & Schultz, T. (2020). Testing the impact of images in environmental campaigns. *Journal of Environmental Psychology*, *71*. https://doi.org/10.1016/j.jenvp.2020.101468

Hall, C. M. (2019). Constructing sustainable tourism development: The 2030 agenda and the managerial ecology of sustainable tourism. *Journal of Sustainable Tourism*, *27*(7), 1044–1060. https://doi.org/10.1080/09669582.2018.1560456

Hamacher, D., Mott, B., Hamacher, D. W., & De Napoli, K. (2020). Whitening the Sky: light pollution as a form of cultural genocide. *Journal of Dark Sky Studies*, *1*. https://doi.org/10.48550/arXiv.2001.11527

Hansen, A., & Machin, D. (2013). Researching Visual Environmental Communication. *Environmental Communication*, *7*(2), 151–168. https://doi.org/10.1080/17524032.2013.785441

Harper, D. (2002). Talking about pictures: A case for photo elicitation. *Visual Studies*, *17*(1), 13–26. https://doi.org/10.1080/14725860220137345

Hasanpur, M., & Shahrebabaki, A. N. (2022). Photo Hermeneutics: Strategies and Approaches. *Bagh-e Nazar*, *109*(19), 63–78. https://doi.org/10.22034/BAGH.2022.278124.4840

Iovenitti, S., Righi, C., Orsenigo, S., & Sgarro, R. (2021, August). Astro-photography as an effective tool for Outreach and Education: IACT in exposition. *International Cosmic Ray Conference (ICRC 2021)*. https://doi.org/doi.org/10.48550/arXiv.2108.08032

Jarrett, T. H., Comrie, A., Marchetti, L., Sivitilli, A., Macfarlane, S., Vitello, F., Becciani, U., Taylor, A. R., van der Hulst, J. M., Serra, P., Katz, N., & Cluver, M. E. (2021). Exploring and interrogating astrophysical data in virtual reality. *Astronomy and Computing*, *37*. https://doi.org/10.1016/j.ascom.2021.100502

Kaewnopparat, J. (2017). *The Impact of Photography on Tourism: Photography Construction Perspective* [University of Tennessee, Knoxville]. https://trace.tennessee.edu/utk_graddiss

Khanya, R. (2024). Influence of Media Framing on Public Perception of Climate Change. *Journal of Communication*, *5*(2), 1–13. www.carijournals.org

Kunz, M., & Daab, D. (2024). Cartographic Visualisation of Light Pollution Measurements. *Urban Science*, *8*(4). https://doi.org/10.3390/urbansci8040254

Kyololo, O. M., Stevens, B. J., & Songok, J. (2023). Photo-Elicitation Technique: Utility and Challenges in Clinical Research. *International Journal of Qualitative Methods*, *22*. https://doi.org/10.1177/16094069231165714

Lund, K. A. (2023). Co-Creating Nature: Tourist Photography as a Creative Performance. *Humanities (Switzerland)*, *12*(6). https://doi.org/10.3390/h12060141

Marchi, V., Marasco, A., & Apicerni, V. (2023). Sustainability communication of tourism cities: A text mining approach. *Cities*, *143*. https://doi.org/10.1016/j.cities.2023.104590

Marini, D. L. R., Bonanomi, C., & Rizzi, A. (2016, February). Processing astro-photographs using Retinex-based methods. *IS and T International Symposium on Electronic Imaging Science and Technology*. https://doi.org/10.2352/issn.2470-1173.2016.6.retinex-023

Meo, A. I. (2010). Picturing Students' Habitus: The Advantages and Limitations of Photo-Elicitation Interviewing in a Qualitative Study in the City of Buenos Aires. *International Journal of Qualitative Methods*, *9*(2), 149–171. https://doi.org/https://doi.org/10.1177/160940691000900203

Mihalic, T. (2024). Trends in Sustainable Tourism Paradigm: Resilience and Adaptation. *Sustainability*, *16*(17), 7838. https://doi.org/10.3390/su16177838

Miller, G., Rathouse, K., Scarles, C., Holmes, K., & Tribe, J. (2010). Public understanding of sustainable tourism. *Annals of Tourism Research*, *37*(3), 627–645. https://doi.org/10.1016/j.annals.2009.12.002

Müller, M. R. (2020). Image Clusters. A Hermeneutical Perspective on Changes to a Social Function of Photography. *Forum: Qualitative Social Research*, *21*(2). https://doi.org/https://doi.org/10.17169/fqs-21.2.3293

Naghizadeh, R. (2021). Semiotic Analysis in Tourism. *Journal of Tourism & Sports Management (JTSM)*, *4*(2), 415–422. https://www.researchgate.net/publication/350950359

Ngarambe, J., Lim, H. S., & Kim, G. (2018). Light pollution: Is there an Environmental Kuznets Curve? *Sustainable Cities and Society*, *42*, 337–343. https://doi.org/10.1016/j.scs.2018.07.018

Ngurah, G., Kade, A., Arsana, D., Bethany, L., & Smith, O. (2024). Empowering Tourism Communication for Sustainable Village Development. *Startupreneur Business Digital (SABDA Journal*, *3*(2), 123–130. https://doi.org/10.330550/sabda.v3i2.560

Öksüz, B., Demir, Ş. Ş., & Özdemir, N. (2025). Astro-tourism: Discovering a whole new world under the stars. *Journal of Tourism Theory and Research*, *11*(1), 17–26. https://doi.org/10.24288/jttr.1631484

Oratmangun, D., Widaningsih, T. T., & Murtiningsih, B. S. E. (2025). Sustainable Ecotourism Communication Framework Based on Social and Cultural Capital to Build Community Engagement in Ecotourism Practices, Rutong Tourism Village, Indonesia. *Journal of Environmental Management and Tourism*, *16*(2). https://doi.org/https://doi.org/10.14505/jemt.v16.2(78).08

Paterson, M., & Higgs, J. (2015). Using Hermeneutics as a Qualitative Research Approach in Professional Practice. *The Qualitative Report*. https://doi.org/10.46743/2160-3715/2005.1853

Patton, M. Q. (2002). *qualitative-research-evaluation-methods-by-michael-patton* (3rd Edition). Sage Publications, Inc.

Pezalla, A. E., Pettigrew, J., & Miller-Day, M. (2012). Researching the researcher-as-instrument: An exercise in interviewer self-reflexivity. *Qualitative Research*, *12*(2), 165–185. https://doi.org/10.1177/1468794111422107

Poczekajlo, P., & Suszynski, R. (2023). An attempt at the possibility of using multi-output paraunitary filters for image processing for astrophotography trackers. *Procedia Computer Science*, *225*, 2754–2762. https://doi.org/10.1016/j.procs.2023.10.267

Prabhath, S., Kulkarni, U., Lakshmi R V., Patra, B., K E., Prabhu, D. A., & Nayak, K. R. (2025). Visual hermeneutics as a tool to introduce empathy and core physician attributes in the doctor-patient relationship for first-year medical undergraduate students. *BMC Medical Education*, *25*(1). https://doi.org/10.1186/s12909-025-06742-6

Prastyo, H. A., & Herdiwijaya, D. (2018, July 31). Analisis Dinamika Polusi Cahaya di Sekitar Observatorium Bosscha Berdasarkan Citra Satelit VIIRS-DNB. *Seminar Nasional Penginderaan Jauh ke-5*. https://www.researchgate.net/publication/327384914

Priyatikanto, R., Admiranto, A. G., Putri, G. P., Elyyani, Maryam, S., & Suryana, N. (2019). Map of sky brightness over Greater Bandung and the prospect of astro-tourism. *Indonesian Journal of Geography*, *51*(2), 190–198. https://doi.org/10.22146/ijg.43410

Putra, B. A. (2023). International relations and the concentric hermeneutic circle: Wendt's constructivism and the inevitability of circular interpretations. *Cogent Social Sciences*, *9*(2). https://doi.org/10.1080/23311886.2023.2272325

Putri, A. I. K., & Safeyah, M. (2020). Kajian Estetika Visual Bandung Creative Hub sebagai Representasi Identitas Kota. *BORDER Jurnal Arsitektur*, *2*(1), 37–44.

Raappana-Luiro, L. (2024). Miracle of nature—a dialogue with nature through artistic creation. *Frontiers in Communication*, *9*. https://doi.org/10.3389/fcomm.2024.1440368

Rodrigues, Á., & Loureiro, S. M. C. (2024). Exploring Community Self-efficacy to Light Pollution Mitigation in A Tourism Destination. *Tourism Planning and Development*. https://doi.org/10.1080/21568316.2024.2332243

Sabatini, D. (2024). Visualising the universe: The role of pictures in mediating people's relationship with outer space. *Journal of Material Culture*. https://doi.org/10.1177/13591835241298064

Salvador Leon. (2017). The Semiotics of Photography: Towards Objective Hermeneutics. *Philosophy Study*, *7*(12). https://doi.org/10.17265/2159-5313/2017.12.002

Soleimani, S., Bruwer, J., Gross, M. J., & Lee, R. (2019). Astro-tourism conceptualisation as a special-interest tourism (SIT) field: a phenomenological approach. *Current Issues in Tourism*, *22*(18), 2299–2314. https://doi.org/10.1080/13683500.2018.1444021

Stejskal, J. (2021). Visual style hermeneutics: from style to context. *World Art*, *11*(2), 201–227. https://doi.org/10.1080/21500894.2021.1899984

Straka, T. M., Glahe, C., Dietrich, U., Bui, M., & Kowarik, I. (2025). From nature experience to pro-conservation action: How generational amnesia and declining nature-relatedness shape behaviour intentions of adolescents and adults. *Ambio*, *54*, 1165–1184. https://doi.org/https://doi.org/10.1007/s13280-025-02135-7

Stylos, N., Ding, K., & Yao, Y. (2022). Cognitive image, affective image, cultural dimensions, and conative image: A new conceptual framework. *Frontiers in Psychology*, *13*. https://doi.org/10.3389/fpsyg.2022.935814

Sulistyaningtyas, T., Jaelani, J., & Waskita, D. (2012). Perubahan Cara Pandang dan Sikap Masyarakat Kota Bandung Akibat Pengaruh Gaya Hidup Digital. *Jurnal Sosioteknologi*, *27*(27).

Swanson, S. S., & Ardoin, N. M. (2021). Communities behind the lens: A review and critical analysis of Visual Participatory Methods in biodiversity conservation. *Biological Conservation*, *262*. https://doi.org/10.1016/j.biocon.2021.109293

Szemző, H., Turai, E., & Berta, G. (2024). Challenges in Developing Sustainable Tourism Locally: Viewpoints from the Ground. In B. Neuts, J. Martins, & M. Ioannides (Eds.), *Advances in Cultural Tourism Research* (pp. 3–17). Springer Nature Switzerland. https://doi.org/10.1007/978-3-031-65537-1

Thomas, S. P., & Sohn, B. K. (2023). From Uncomfortable Squirm to Self-Discovery: A Phenomenological Analysis of the Bracketing Experience. *International Journal of Qualitative Methods*, *22*. https://doi.org/10.1177/16094069231191635

Tiago, F., Gil, A., Stemberger, S., & Borges-Tiago, T. (2021). Digital sustainability communication in tourism. *Journal of Innovation and Knowledge*, *6*(1), 27–34. https://doi.org/10.1016/j.jik.2019.12.002

Vrdoljak Raguz, I., Krajnović, A., & Hordov, M. (2022). Strategic Development of Astrotourism in The Republic of Croatia – Comparative Analysis. *DIEM: Dubrovnik International Economic Meeting*, *7*(1), 114–129. https://doi.org/10.17818/DIEM/2022/1.12

Walshe, R., Law, L., & Evans, N. (2024). Understanding environmental generational amnesia through urban school garden learning experiences in Gimuy/Cairns, Australia. *Local Environment*. https://doi.org/10.1080/13549839.2024.2394678

Warsana, D., Nafsika, S. S., & Undiana, N. N. (2021). Komunikasi Seni: Representasi Masyarakat Urban di Kota Bandung dalam Bingkai Karya Seni Karya Mufty Priyanka. *Komunikasiana: Journal of Communication Studies*, *3*(1), 16–34. https://doi.org/https://doi.org/10.24014/kjcs.v3i1.13233

Zissis, G. (2020). Sustainable lighting and light pollution: A critical issue for the present generation, a challenge to the future. In *Sustainability (Switzerland)* (Vol. 12, Issue 11). MDPI. https://doi.org/10.3390/su12114552