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Geocultural Interactions in Minoan Crete: An Environmental Education Perspective through Drama Techniques

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Abstract: This paper explores an innovative educational program designed to protect and promote the geocultural heritage of Minoan Crete. The program applies environmental education and sustainability principles while integrating theater in education, a novel approach that significantly impacts participants' perspectives. By effectively combining these elements, the program fosters environmental awareness, deepens cultural appreciation, and instills sustainable behaviors in both the local population and visitors. This interdisciplinary approach, blending geocultural heritage into environmental education, promotes an understanding of the delicate balance between nature and human interaction during the Minoan era. The paper also examines the program's potential for broader community engagement and policy influence, emphasizing how its educational outcomes could result in meaningful changes at both community and policy levels. We advocate for the preservation of Minoan Crete's geocultural heritage and its sustainable future through a unique blend of educational strategies, marking a milestone in heritage conservation.

Keywords: Minoan Crete; geocultural heritage; environmental education; sustainability; theatre in education; interdisciplinary approach; community engagement

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1. Introduction

The term 'geoculture' refers to the fusion of cultural and natural elements within a given spatial scale, emphasizing the dynamic relationship between humans and their environment (Figure 1). According to Reynard and Giusti [1], cultural geology and cultural geomorphology are disciplines dedicated to exploring the connections between culture and geology. The central focus is on how culture shapes the management of Earth systems, with a particular emphasis on how the perception of Earth is influenced by intangible cultural elements like values, symbols, and traditions. In turn, Earth systems exert diverse influences on cultural systems, impacting aspects such as hazards, resources, and threats. "Geoheritage" is a new term that encompasses a complete perception of humanity relative to nature and the environment [2]. It refers to the collection of geotopes, deposits, forms, and processes that comprise the geological history of each region, and the concept of preserving geological and geomorphological heritage as a cultural concept [3]. When geoheritage intersects with cultural assets in specific locations, a distinct classification of sites emerges, known as geocultural sites. Therefore, the term 'geocultural heritage' encompasses tangible and intangible aspects of a region's history and culture, illustrating the deep connection between human societies and their surroundings. It shapes regional identity, facilitates historical understanding, and provides insights into human creativity and societal evolution [4–6].

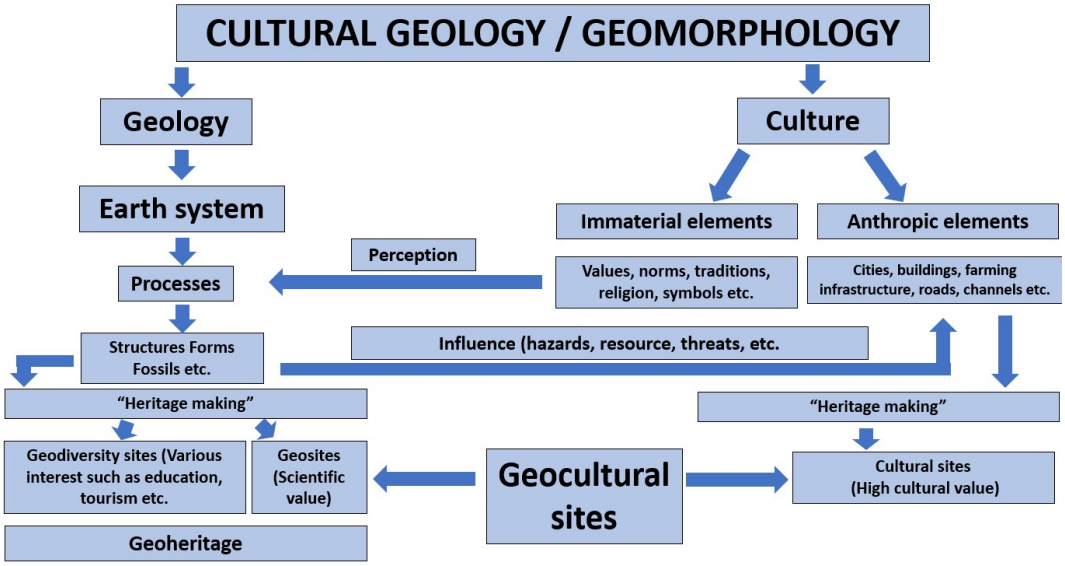

Figure 1. This flowchart depicts the dynamic interplay between culture and geology and how cultural influences and Earth systems converge at geocultural sites (after [1]).

Preserving and highlighting the geocultural heritage is vital for its unique historical insights and educational value [6]. Studying the intricate relationships between human societies and their environments fosters multidisciplinary understanding. Beyond cultural preservation, it promotes environmental awareness, encourages sustainable practices, and contributes to responsible tourism and local economies [4]. Geocultural heritage serves as a source of a scientific inquiry, offering valuable lessons from the past to guide present and future endeavors in sustainability [7].

Crete, the largest Greek island, is a geographic crossroad, strategically located at the nexus of Europe, Africa, and Asia (Figure 2) [8]. Predominantly mountainous in terrain, it features rich biodiversity, unique flora, and fauna [9]. Over the centuries, this island has been influenced by various cultures, including the Minoans, Venetians, Byzantines, Arabs, and Ottomans, creating a rich tapestry of history and heritage [9].

Figure 2. Location of Crete in relation to the rest of the Mediterranean (source: https://commons.wikimedia.org/wiki/File:Mediterranee_02_EN.jpg#/media/File:Mediterranee_02_EN.jpg (accessed on 10 January 2024).

Emerging around 3200 to 1100 BC, the Minoan civilization represents the genesis of Crete's history and stands as a unique case study for the fusion of cultural and geological elements. Therefore, the preservation of Minoan Crete's geocultural heritage is of paramount importance, shedding light on daily life, religious practices, trade networks, and technological advancements [10,11].

This paper elucidates the intricate network of geocultural interactions during the Bronze Age Minoan civilization, employing an environmental education perspective and drama techniques for a comprehensive understanding. The adoption of these innovative approaches underscores the interdisciplinary nature of understanding Minoan culture.

At the core of this inquiry lies the exploration of how the Minoan civilization's geocultural interactions influenced Earth system management, particularly through its distinctive approach to architecture and advanced technologies [12–15]. This study endeavors to unravel the harmonious relationship that the Minoans maintained with the natural world, setting them apart from their contemporaries. It accentuates their resilience and adaptability in the challenging Aegean environment, with a specific focus on how these interactions shaped their societal and environmental ethos.

In addition to providing historical and archaeological insights, this paper underscores the significance of environmental education. It explores the utilization of drama techniques to vividly portray the geocultural legacy of Minoan Crete. By integrating drama into environmental education, this study aims to cultivate a deeper understanding of Minoan culture, fostering environmental consciousness and promoting sustainable behaviors among both locals and visitors. This approach ensures the preservation of Minoan Crete's unique heritage in the context of contemporary challenges and opportunities.

2. Literature Review

2.1. Minoan Civilization and Geocultural Legacy

The Minoans, well-known for their marine skills [8,16,17], strategically settled in fertile places, recognizing the importance of geomorphology in their economic and political activities. Thriving in the unstable Aegean environment, their collapse around 1600–1500 BCE is attributed to the Thera volcano explosion, which impacted the region. Economic causes, growing new civilizations, and possible internal issues all led to their demise, with the Mycenaean Greeks rising to influence the weakened Minoan society [18].

The Minoan palaces, which were fundamental to political, economic, and religious life, were built concurrently approximately 1900 BC in urban centers such as Knossos, Phaistos, Malia, and Zakros [19,20] (Figure 3). In particular, Knossos Palace, the largest palace located strategically atop Kefala Hill, endured various hardships yet remained significant throughout the Minoan era. The palaces acted as economic hubs, complete with courtyards, staircases, storage, and residential spaces [13]. Ongoing research focuses on the significant relationship between cultural and geological factors in Minoan Crete, as evidenced by palaces and artifacts that shed light on daily life, religious ceremonies, and technological achievements.

The physical landscape of Minoan Crete was greatly influenced by its geological composition, which consisted primarily of carbonate rocks and conglomerates. Carbonate rocks, particularly limestones, together with gypsum, which covered 75% of the island's surface, proved to be important components for Minoan architecture. The deliberate use of Neogene-age limestones and gypsum for building and artistic purposes demonstrates a symbiotic interaction between geological features and cultural preferences. Limestone-dominated landscapes have high porosity and a karstic nature, allowing for fertile alluvial and colluvial deposits that are important for regional agricultural production.

Some areas with ophiolitic bodies have significant concentrations of steatite, a stone that has been widely used in jewelry since the Early Minoan (EM) and Middle Minoan periods [22]. The presence of greenish steatite near water sources highlights its possible symbolic value. The soils around Minoan sites consist mainly of terra rossa, a type of mountainous soil formed by the disintegration of limestone. Despite the stony appearance,

the region possesses several small to microscopic colluvial humus-rich soil layers, which provide a stable base for small-scale agriculture.

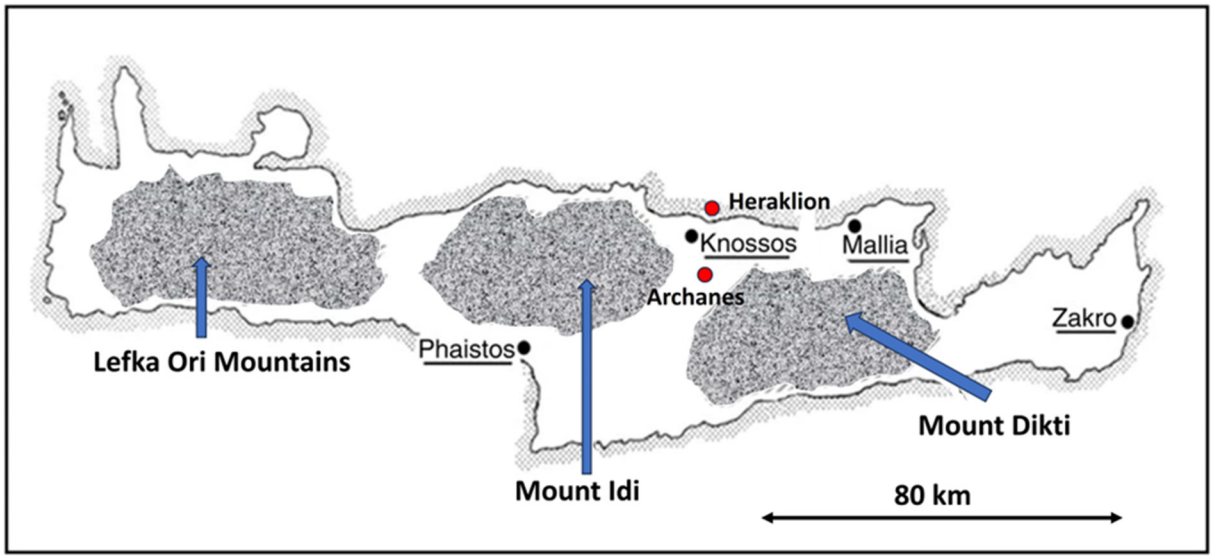

Figure 3. Map of Crete with the Minoan palaces mentioned in the text (after [21], modified).

The 4.2 ka BP aridification episode occurred between 2200 and 1900 BC, causing extensive aridity over the world and affecting major civilizations [23,24]. Limited pollen core evidence for Bronze Age Crete reveals that the island was not immune to climate change. Research in West Crete during the Middle Bronze Age suggests that the landscape transformed into a steppe, which influenced Minoan agriculture [25].

Minoan Crete's coastline suffered relative land and sea level variations as a result of eustatic and tectonic processes. Tectonic shifts are indicated by coastal notches in western Crete that can be up to three meters deep [26,27]. Recent investigations showed evidence of tidal notches rising and dropping, changes in beachrock formations, and the remains of old coastal structures [28]. Over the course of time, the western section of the island witnessed uplift and subsidence, which had an impact on sea level.

One example is Phaistos Palace in the Messara Plain, which is recognized for its unique Minoan geomorphology. According to research [29], coastline changes and sea level changes had an impact on the palace's stability and accessibility. When interpreting archaeological data related to coastal structures, it is important to take into account geological shifts, climatic consequences, and environmental changes.

The study of stratigraphic sections and boreholes in the Messara Plain indicated a freshwater lake from about 2100–2000 BC to 1200–1100 BC, which then transformed into swampland until around 700 BC. A lake retreat between 1200–1000 BC corresponds to the 3.2 cal kyr BP abrupt temperature change, indicating regional climate changes and local tectonic activity. Pollen study reveals a shift from a limnic to swampy environment around 1100 BC, indicating an interruption in human activity following the Minoan civilization's fall [30].

The Minoans' construction material choices were significantly influenced by the geological setting [31–33]. Neogene rocks, notably serpentinites, were used for building and artistic purposes [34]. Serpentinite outcrops correspond to the spread of Minoan settlements [35–38]. Stone vases were sculpted from serpentinite, and recent discoveries in Knossos' "House of the High Priest" highlight the stone's intended use. The vast range of rocks used to make stone tools indicates the Minoans' profound awareness of their geological surroundings.

2.2. Enhancing Environmental and Historical Awareness through Theatre

Environmental education is a multidisciplinary approach aimed at fostering an understanding of the natural world, human–environment interconnections, and the importance of sustainable practices [39,40]. It equips individuals with the knowledge, skills, values, and attitudes necessary for environmental protection and sustainable development [41].

Preserving the environment is vital, particularly as the climate crisis intensifies. This calls for a collaborative effort involving cultural values, artistic expression, and social practices. Recognizing the interconnection between environmental preservation and cultural expression is crucial for promoting sustainable practices [42,43].

Dramatic art in education (DAE) plays a pivotal role in this endeavor, highlighting environmental concerns and influencing human behavior, shaping values, attitudes, and beliefs towards sustainability [44–49]. In the context of environmental education (EE), DAE equips students with ecological knowledge and encourages peaceful coexistence with the environment. By engaging students in DAE, they can reassess their perceptions and develop actionable solutions for environmental challenges and global issues [50,51]. Scholars have found that DAE in the context of EE leads to positive outcomes, including changes in attitudes and behaviors towards the environment, increased environmental sensitivity and empathy, and the cultivation of environmentally friendly attitudes and values [52–55].

Throughout history, theatre has been a significant medium for artistic expression. It originated from ritual performances and evolved into a tool for educating and transmitting knowledge [44].

Augusto Boal's contributions, including Theatre of the Oppressed, are particularly significant. This form of theatre raises awareness of social realities and empowers individuals to effect change. It involves active spectator engagement, fostering participation and action [56].

Boal also introduced Legislative Theatre, which democratizes politics by involving various social groups in dramatizing and solving problems. These performances take place in public spaces, encouraging interaction with the audience and the implementation of legislative or political actions.

Forum Theatre, another method proposed by Boal, addresses everyday problems. Participants dramatize their experiences, seeking solutions and inviting audience members to propose alternatives [56]. These techniques delve into society's essence by transforming individual stories into collective experiences [57].

Drama education encompasses various forms of communication and interaction, leading to the development of dramatic art in education (DAE). DAE combines artistic and pedagogical theatre, fostering interdisciplinary and intercultural approaches to knowledge [54]. It promotes social awareness, aesthetic experiences, critical thinking, and creative learning [52,58,59]. In particular, DAE plays a significant role in developing critical thinking and historical understanding. It combines thinking with knowledge, aesthetic with kinesthetic experiences, and decision-making with an understanding of complex historical events. Historical empathy is effectively cultivated through experiential exercises and dramatic techniques.

Therefore, theatre, especially in an educational context, holds immense potential for promoting environmental awareness, sustainable practices, and historical understanding.

3. Study Area

Crete, located in the central Mediterranean, sits north of the active Hellenic Subduction Zone (AHSZ), where the African and Eurasian tectonic plates converge [60,61] (Figure 4). Its geological history involves the formation and collapse of an accretionary prism, influenced by neotectonic faults and Mediterranean sediment subduction [60]. Crete's uplift and development, driven by Gondwana and Eurasia convergence, led to its current geological state [60].

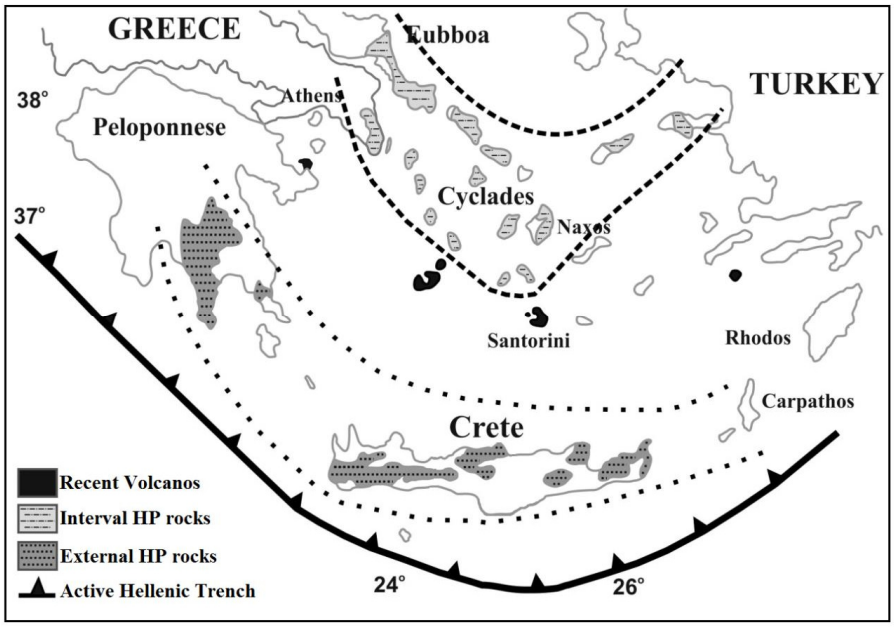

Figure 4. Geodynamic position of Crete [60,61].

The island's orogeny initiated around 65 to 50 million years ago, with a significant phase occurring in the Late Oligocene–Early Miocene times [60]. Throughout the middle to late Miocene, continuous tectonic processes shaped the landscape and formed the present Aegean Sea and its islands [62]. The Pliocene marked shifts from intense subsidence to uplift [60,63–65].

Since the late Pliocene, Crete began gradually uplifting, forming marine Pleistocene terraces, coastal deposits, high mountains, and deep gorges [60–66]. It fragmented into at least six tectonic blocks, displaying distinct tectonic behavior and varying uplift rates [67]. Crete's uplift, shaping its final form over the last million years, continues in the present day [67].

During the Pleistocene, the island's fragmentation and uplift persisted [68]. Crete's rapid uplift is attributed to the continuous underplating of subducted sediments beneath the crust [68]. Tectonic blocks separated along the Spili fault, indicating both arc-parallel and arc-normal extension [69,70]. In the Holocene, Crete transitioned from uplift to subsidence [71–73].

The region experiences substantial seismic activity due to crustal shortening and the subduction of African oceanic lithosphere beneath the Aegean microplate, evident in the Wadati–Benioff seismic zone [74]. Geodetic and seismic data indicate ongoing crustal deformations, with the Aegean microplate showing relative movement with respect to Africa.

Historically, Crete has been subject to significant seismic events, with notable examples including the Minoan earthquakes of 1700 BC and 1450 BC [74,75]. Crete, located to the south of the Thera (Santorini) volcano, offers a unique opportunity to study the Bronze Age eruption that occurred between 1630 and 1525 B.C. [76–78].

The eruption, occurring between 1630 and 1525 B.C., unfolded in four phases and generated massive waves. Tsunami deposits, discovered in Crete, offer insights into the eruption's geographical impact, particularly at the Minoan archaeological site of Palaikastro [79,80]. The magnitude and characteristics of the tsunami remain subjects of ongoing research and debate [81].

4. Methodology—Environmental Education Curriculum Development

Developing an environmental education program is a systematic and deliberate process. It involves creating educational materials and activities with the aim of nurturing

environmental awareness, knowledge, attitudes, and skills among learners. This program has a specific focus: it seeks to promote and preserve Minoan Crete's geocultural heritage through environmental education, sustainability, and theatre in education. These elements are intertwined with environmental education principles, emphasizing the unique geocultural heritage of Minoan Crete.

The program was conducted for both high school and lyceum students, within the framework of their educational visits to the Environmental Education Center in Archanes. It was also offered to teachers participating in the 2nd Summer School of Education for the Environment and Sustainability, which had a theme centered around the "Sustainable management of land and natural resources in the Sitia Geopark, from the Minoan civilization to today". This summer school aimed to introduce participants to the natural environment of the Sitia Geopark, as well as the archaeological and cultural aspects of Minoan civilization and its sustainable management.

The program's development commenced by involving 50 teachers of various specialties from Primary and Secondary Education. This step is crucial as the experiential method, a primary component of non-formal education, is first tested on teachers who can subsequently implement it with their students [82]. It is worth noting that the program was initially introduced in stages to students.

These teachers, comprising 35 women and 15 men with an average age of around thirty-five, had diverse backgrounds. Around 80% of them were camping and outdoor enthusiasts, while the remaining 20% had no prior experience in outdoor summer schools. Interestingly, 15 of the participants came from outside of Crete, with three having Crete as their place of origin.

The program's development journey initiated with a comprehensive needs assessment. This assessment sought to gain insights into the target audience's knowledge level, interests, and environmental challenges related to Minoan Crete's geocultural heritage.

To this end, the participants were given a questionnaire, before their participation to the program. It played a vital role in identifying the core focus areas and defining clear, measurable learning objectives for the curriculum. These objectives were closely aligned with the broader mission of safeguarding Minoan Crete's geocultural heritage and promoting environmental stewardship. Specifically, the participants were asked about the level of their understanding and knowledge concerning the Minoan civilization, whether they would describe environmental education and theater as an effective tool for training individuals and communities to a sustainable management of a region's rich geocultural heritage such as Crete's, whether there could be an understanding and appreciation of Minoan culture that might promote environmental awareness and sustainable behaviors locally, through the interdisciplinary approaches of theater and environmental education/sustainability education, among natives as well as visitors, and whether they would parallel the course of the Minoan civilization with the modern course of human civilization.

The same questionnaire was given to the participants at the end of the program, as a post evaluation tool, in order to measure view changes and assess the needed adjustments to effectively achieve goals. Also, after the educational activity, "Last night I dreamt", there was an extra feedback activity called "Ariadne's thread" (see Figure 5), the results of which were integrated in the assessment as they were an instant sample of empathy and Minoan times and civilization.

Concerning the curriculum content, it was thoughtfully crafted to encompass pertinent information about Minoan Crete's cultural significance, its historical context, and the environmental issues affecting the region. Additionally, it incorporated essential concepts related to sustainability, biodiversity, conservation, and environmental management. To provide a holistic understanding of the geocultural heritage, the program adopted an interdisciplinary approach by integrating elements from history, archaeology, geography, ecology, and other relevant fields.

Figure 5. "Ariadne's thread" feedback game.

Crucially, experiential learning methods played a pivotal role in the program. These methods engaged participants in hands-on activities, enabled visits to archaeological sites and natural landscapes, and facilitated interactive learning experiences. This hands-on approach enhanced participants' comprehension and created a deep emotional connection to Minoan Crete's geocultural heritage.

Moreover, the program integrated theater into education techniques to enhance creativity and engagement. Participants were encouraged to explore historical events, cultural practices, and environmental challenges of Minoan Crete through dramatic activities, role-playing, storytelling, and performances.

One of the program's educational activities, "Last night I dreamt", aimed to foster historical empathy and a deeper understanding of Minoan civilization within its geophysical context. The activities included immersive and kinetic experiences guided by music and a scenario provided by the youth trainer. These activities allowed trainees to vividly envision events in the Minoan court.

Furthermore, various techniques, such as "frozen images" and "hot chair", prompted trainees to imagine the period before and after a significant disaster that befell Crete and the Minoan civilization, possibly seen as a punishment from Mother Nature. This exercise encouraged participants to empathize with their Minoan ancestors' reactions to this catastrophic event.

As the project continued, ongoing data analysis informed the development of a comprehensive plan for promoting sustainable management of the region. The goal was to establish a more sustainable tourism model that respects and conserves Minoan Crete's geocultural heritage.

In the final stages of curriculum development, the program included appropriate assessment and evaluation strategies. These strategies were designed to measure participants' progress, knowledge acquisition, and changes in attitudes toward geocultural heritage and environmental issues. This continuous assessment process allowed for instructional adjustments, ensuring that the program effectively achieved its objectives.

5. Results

The data collected from the participants' responses to a series of questions before and after their participation in the program provide valuable insights into the effectiveness of the program in terms of changing attitudes, knowledge, and values. These responses are analyzed in detail below.

Question A: *"How well do you think you know the Minoan civilization?"*

In the pre-evaluation, the majority (43 participants) answered 3 = moderate, indicating a moderate level of knowledge. In the post-evaluation, after the program presentation, there was a noticeable shift in responses. Ten participants still answered 3 = moderate, while twenty-eight participants upgraded their response to 4 = quite well, and twelve participants chose 5 = very well. This indicates a significant improvement in their perceived knowledge of the Minoan civilization after participating in the program (Figure 6).

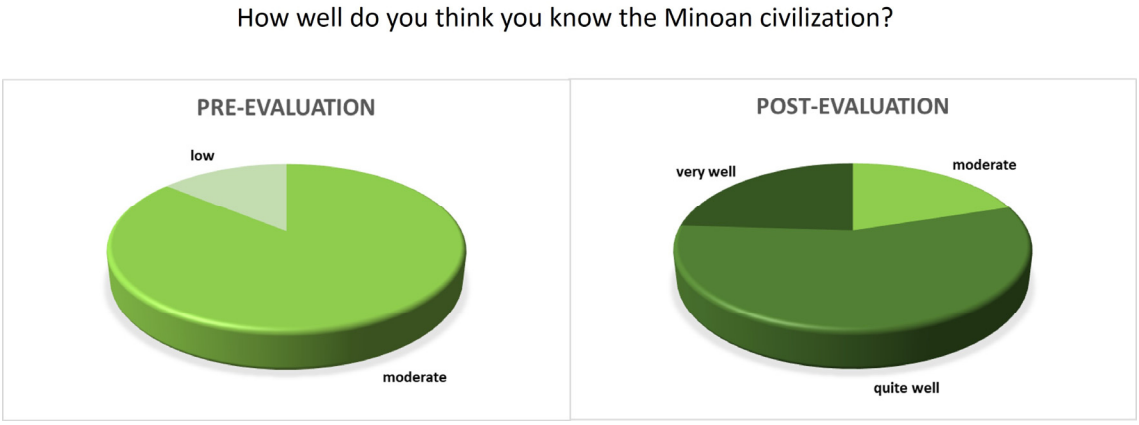

Figure 6. Graphical representation of the results of the pre- and post-evaluation results for question A.

Question B: *"Would you describe Environmental education as an effective tool for training individuals and communities to sustainably manage the rich geocultural heritage of an area?"*

In the pre-evaluation, responses ranged from 3 = moderate and 4 = quite a bit, with twenty-seven participants choosing 3 = moderate and thirteen participants selecting 4 = quite well. Remarkably, in the post-evaluation, there was a substantial shift in responses. Only two participants answered 4 = quite well, while a majority (forty-eight participants) chose 5 = very well. This indicates that after the program, participants had a significantly more positive view of environmental education's effectiveness (Figure 7).

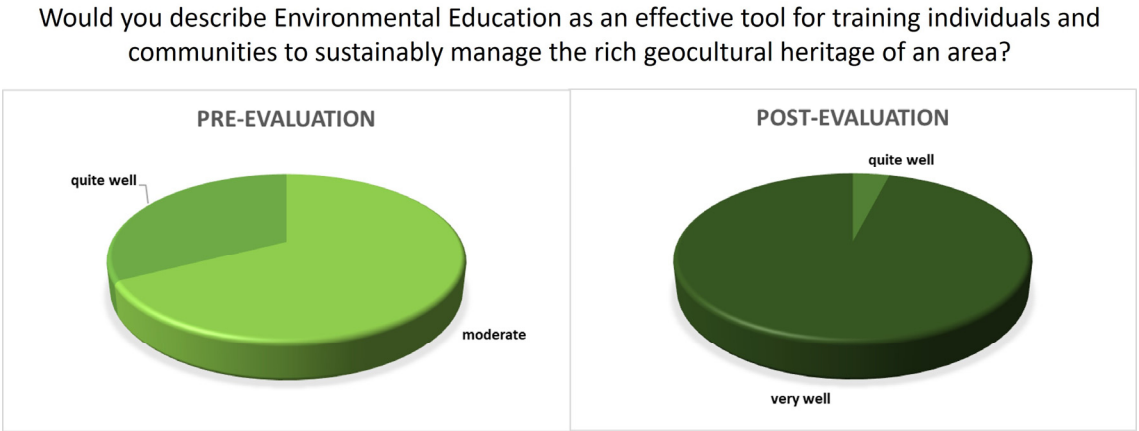

Figure 7. Graphical representation of the results of the pre- and post-evaluation results for question B.

Question C: *"Would you describe Theater as an effective tool for educating individuals and communities in the sustainable management of a region's rich geocultural heritage?"*

In the pre-evaluation, most participants (40 out of 50) answered 3 = moderate, indicating a moderate perception of theater's effectiveness for education. In the post-evaluation, all 50 participants upgraded their response to 5 = very well. This suggests that the program's use of theater as an educational tool was highly effective in changing participants' perceptions (Figure 8).

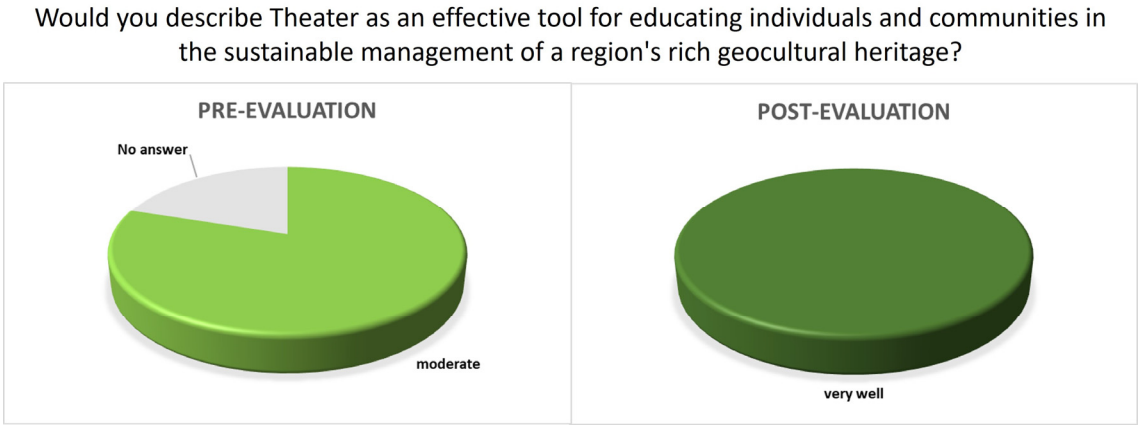

Figure 8. Graphical representation of the results of the pre- and post-evaluation results for question C.

Question D: *"Do you think that through the interdisciplinary approaches of theater and Environmental Education/Sustainability education, there could be an understanding and appreciation of Minoan culture that may promote environmental awareness and sustainable behaviors locally, among both natives and visitors?"*

In the pre-assessment, responses varied, with a notable number (30 participants) choosing 4 = fairly, indicating some belief in the effectiveness of interdisciplinary approaches. However, some participants had more reserved opinions. In the post-evaluation, the majority (34 participants) answered 5 = very much, indicating a significant shift in their belief in the program's potential to promote understanding and appreciation of Minoan culture and local environmental awareness (Figure 9).

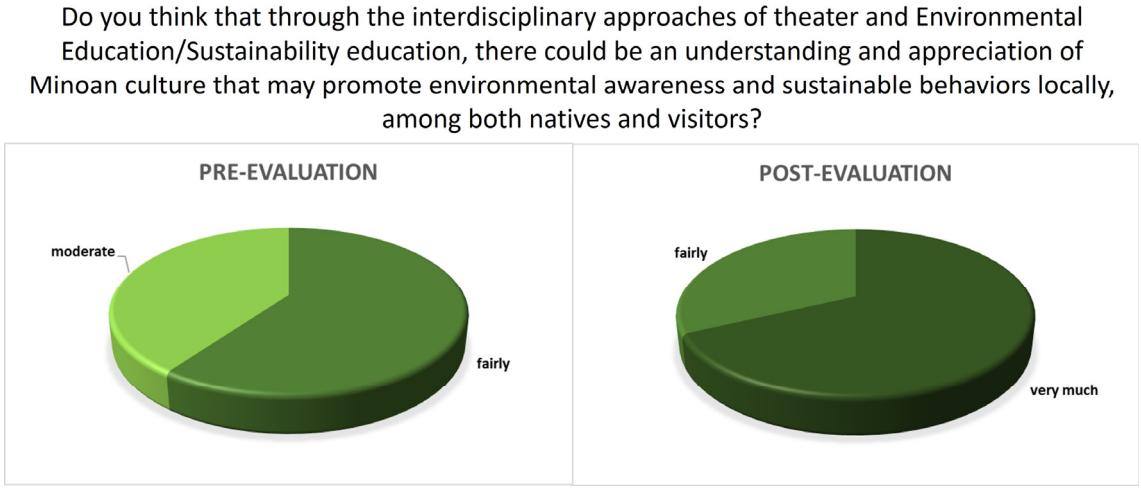

Figure 9. Graphical representation of the results of the pre- and post-evaluation results for question D.

Question E: *"Would you parallel the course of the Minoan civilization with the modern course of human civilization?"*

In the pre-assessment, responses were varied. Twenty-four participants answered 3 = moderate, indicating some parallelism between the Minoan civilization and the modern course of humanity. However, a substantial number of participants (14) answered 1 = not at all, indicating a lack of parallelism. In the post-evaluation, the majority (38 participants) chose 4 = quite, signifying a more positive perception of parallels between the Minoan civilization and the modern course of humanity. Ten participants selected 5 = very well, indicating a strong belief in this parallel. Notably, the opinion of one participant who chose 5 = very well was backed by the idea that both the Minoans and modern humanity

have faced economic crises due to climatic changes, natural disasters, population upheavals, and war (Figure 10).

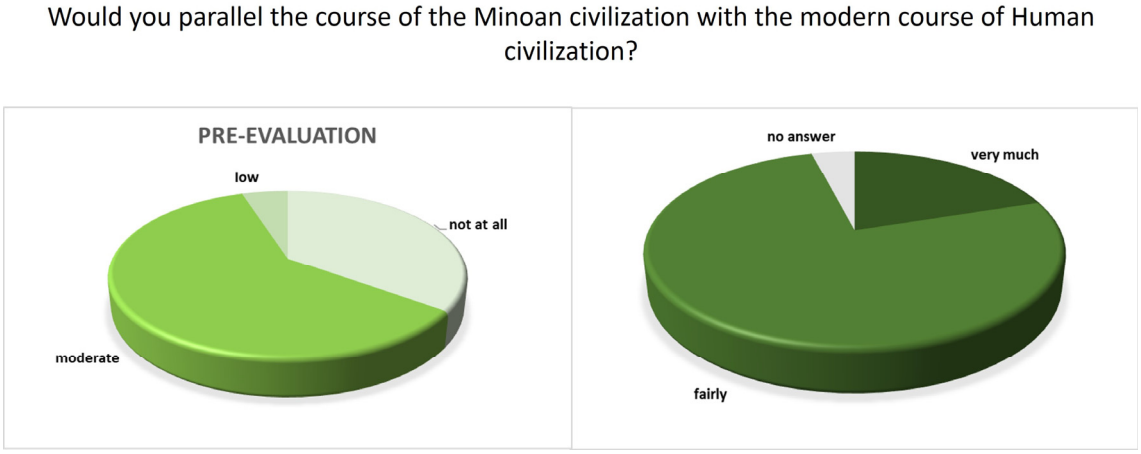

Figure 10. Graphical representation of the results of the pre- and post-evaluation results for question E.

What was seen through the pre-evaluation questionnaire was a moderate level of knowledge of the Minoan civilization and a disbelief in environmental education and theater, alone, as effective tools for training individuals and communities to sustainably manage the rich geocultural heritage of an area; however, some belief in the effectiveness of interdisciplinary approaches of the two was indicated. On the other hand, limited to moderate parallelism was indicated between the course of the Minoan civilization and the modern course of human civilization. Both the first question about the level of knowledge of the Minoan civilization and the feedback activity indicated a significant improvement in the participants perceived knowledge of the Minoan civilization after participating in the program. Also, the post-program questionnaire indicated a significantly more positive view of participants about the effectiveness of theater and environmental education and the growing belief in the program's potential to promote understanding and appreciation of Minoan culture and local environmental awareness. Notably enough, in the post-evaluation questionnaire, the majority acquired a significantly more positive perception of parallels between the Minoan civilization and the modern course of humanity.

These responses collectively highlight the program's success in enhancing participants' knowledge and attitudes regarding the Minoan civilization, environmental education, the use of theater in education, and the potential for interdisciplinary approaches to foster understanding and appreciation of Minoan culture while promoting environmental awareness. The program evidently had a positive impact on the participants' perceptions and beliefs.

6. Discussion

6.1. Interplay between Archaeological Legacy, Sustainable Tourism, and Experiential Engagement

Archaeological sites, which are scattered everywhere in Crete, are the living proof of a history that has been evolving for several thousands of years, with the historical and cultural findings being a source of important information about the past [80,83]. Moreover, as places rich in cultural heritage and natural beauty become popular tourist destinations, it is crucial to recognize the connection between sustainable tourism and the preservation of a place's heritage. Sustainable tourism helps protect these locations, making sure they benefit from tourism while keeping their cultural and environmental treasures intact [84,85]. The experiential involvement offered by the activity described above was great, as is evident from the comments of the participants. Specifically, the visit to the Zakros Palace, which is proposed to be included in the World Heritage Sites of UNESCO (https://whc.unesco.org/en/tentativelists/5860/ (accessed on 15 October

2023), triggered them to delve into the knowledge and acquaintance of this heritage, given the wider positive influences on the economy and development of our country from this inclusion. The participants appreciated that the palace of Zakros is in the list of a serial inscription of UNESCO along with five other palace centers established at key points covering the entire island geographically and the whole range of Minoan civilization from the Early and Middle Bronze Age chronologically, and felt, as we were told, pride for their cultural identity, especially those who were Cretan. Furthermore, they felt the need to preserve this geocultural heritage, as knowing it increases the understanding of the history and diversity of this heritage.

To a significant extent, the activity of deciphering a message that was written with linear B' hieroglyphs (which is also the only one that has been deciphered) contributed to the above. The participants showed particular interest in this activity and their involvement was great as they simulated the graphic and numerical ability of the ancestors to record their daily activities and the conduct of their trade (Figure 11).

Figure 11. Deciphering a message written with linear B' hieroglyphs.

Of course, the emotional connection of those involved in the conduction of the program was magnified with the use of photographs that depicted findings of monuments and works of art of the period, which deepened their perception and image of the specific culture. When they were even asked to form groups and work on the photos and written sources that were also given to them, their involvement was great, as shown by the results of their presentation.

It seemed that the integration of theater training techniques in the program was particularly important. Indicatively, we refer to the first part of the program, where with the techniques and exercises of getting to know each other, relaxation, team cohesion, basic trust and other theater in education techniques, applied through a script specially written to approximate the life in the Minoan palace and the occupations of the inhabitants, as well as other activities, such as bull-fighting, seemed to create a strong empathy from the participants for life in the Minoan Era. In particular, through the techniques of "frozen images", the "corridor of consciousness", and the "hot chair", the participants were able to simulate with and deeply realize to some extent the effect of some natural phenomena, such as the tsunami, on the life of the Minoans. In addition, it worths emphasizing that the experiential involvement achieved through the role-playing that followed, the performances and activities conducted in their groups, combined with the "magic suitcase"

and the "postman facilitator" made it much easier for the participants to explore historical events, cultural practices, and environmental challenges.

As mentioned above, the specific activity entitled "Last night I dreamed..." was implemented in the context of the summer school in the Sitia Geopark, which was co-organized by the Environmental Education Centers/Education for the Environment and Sustainability of the island, attempting to awaken and raise awareness among the participating teachers in the sustainable management of the environment. It is worth mentioning that the specific participants were already aware of environmental issues. Nevertheless, it is worth dwelling on the impact of the program on the participants, as according to the confessions of some of them, they had never thought about nor related the importance of the environment and the personification of Nature to the Minoans. In fact, they observed, through the study of the hypothetical translation of the Phaistos disc (which is based on the version of the scholar Stephen Owens, who suggests that it is a hymn to the pregnant Mother) and their work on it, how fundamental and important the role of Nature has been from antiquity up to the present. In evaluation of the program, the participants emphasized the importance of sustainability and the preservation of the environment, and pledged to be more careful in managing natural resources. As a result, it is characteristically mentioned here, all fifty participants drew up and signed a resolution against the uncontrolled creation of wind turbines on the lands of the Sitia Geopark.

Throughout the program, a very interesting parallel discussion of the historical experiences of the Minoans and contemporary environmental issues emerged, resulting in the resolution mentioned above. There was the observation that the prehistoric Minoan civilization emerged, shaped its geocultural development, and was lost due to the repetition of natural phenomena, such as earthquakes and or tsunamis.

As a natural corollary to the discussion, there was a parallelism between the time of prehistoric humans and the environmental issues humanity is experiencing today. A correlation was made between the effects of the climate change that humanity apparently went through at the time, with the destabilization of the lives of prehistoric people (decrease in production, grain shortage, reduction in production and food stocks, economic decline), and one country dragging another into destruction. There is clear parallelism with the contemporary era, where even today an intense crisis is observed plaguing humanity with similar problems, such as economic and health crises, wars, and population movements. But there is a difference in the role of humanity between the two worlds, a fact that was emphasized, because today we are talking about a human accelerated climate crisis (one that was brought about by humans, because of their actions relative to the environment), in contrast to the naturally induced disaster changes of those ancient times (a change brought about by phenomena that occur naturally).

An important point in the debate was the opinion that the theocratic status in religion and the state organization of the Minoan civilization (with Nature as a deity and King Minos as her offspring) set the limits of human intervention in the environment; it was a typical belief of the Minoans that the earthquake came from the wrath of the great Mother, Nature. Today, despite the knowledge that science offers to humans, they do not respect nature and they also do not fear any "visible punishment", resulting in an anthropocentric intervention in nature, in some cases without ethics, with corresponding effects (wars, population movements, climate crisis, biodiversity loss, lack of raw materials, and others).

6.2. Key Elements Driving the Success of Environmental Education Program

The program's remarkable effectiveness is evident in the profound transformation observed from the pre-evaluation to the post-evaluation stages. This success can be attributed to several pivotal program elements. Participants engaged in experiential learning through hands-on activities and site visits, fostering a deep and personal connection with Minoan culture. The program's interdisciplinary approach provided a holistic understanding, while the incorporation of theater in education techniques added a creative and enjoyable

dimension to the learning experience. Clear learning objectives, skilled moderators, and the seamless integration of environmental awareness further ensured the program's success.

Another significant aspect of the program's impact was the unanimous shift in participants' views, particularly regarding the effectiveness of theater in education. Teaching methods and program content played a central role in this shift, with a thematic focus on sustainable management highlighting practical applications. Clear learning objectives guided participants, reshaping their attitudes toward the effectiveness of environmental education. The transformative power of theater techniques, such as role-playing and storytelling, fostered emotional engagement, stimulated critical thinking, and accommodated diverse learning styles.

The success of the program's interdisciplinary approaches is evident in the seamless integration of various fields, providing participants with a comprehensive understanding of Minoan culture and its environmental context. The thematic focus on sustainable management further emphasized practical applications. Clear learning objectives and pre- and post-evaluations solidified the program's effectiveness.

For program improvement, suggestions include incorporating modern technology for engagement, especially for younger audiences, ensuring long-term sustainability through post-program activities and online communities, and recognizing diverse learning styles for inclusivity. To expand the program globally, emphasis should be placed on local actions' global consequences, and ongoing research is recommended for continuous refinement and enhancement.

The broader implications of the program extend to influencing public engagement, policy development, and community-led initiatives. Participants, now advocates for environmental awareness and geocultural heritage, can stimulate conservation initiatives. The program's impact on cultural and environmental tourism, coupled with potential policy advocacy, can lead to the adoption of local and regional policies prioritizing conservation and sustainability, contributing to a lasting paradigm shift on community and policy levels.

7. Conclusions

The environmental education program focused on Minoan Crete's geocultural heritage has yielded remarkable results, as evident from the transformation in participants' perspectives. Through a multifaceted approach that incorporates experiential learning, interdisciplinary methods, theater techniques, and thematic focus on sustainable management, the program succeeded in fostering environmental awareness and cultural preservation. The unanimous change in participants' views regarding the effectiveness of theater in education highlights the power of these techniques to emotionally engage, stimulate creativity, and provide a unique perspective. The integration of interdisciplinary approaches allowed participants to develop a comprehensive understanding of Minoan culture and its environmental context, with storytelling, role-playing, and creative exercises facilitating a deeper connection to the subject matter. Furthermore, the discussions on historical and environmental factors shaped participants' perspectives on the parallelism between the Minoan civilization and the modern course of humanity.

The potential for scaling up the program and implementing it in different regions or with diverse target groups is promising. By building on its strengths, refining content, and ensuring adaptable delivery, the program can reach a broader audience and extend its positive impacts. Its broader implications are significant, encompassing community engagement and policy development in environmental conservation and cultural heritage preservation. Participants empowered with newfound knowledge and passion can drive local initiatives, advocate for change, and influence the development of sustainable practices, thus contributing to lasting improvements at both community and policy levels. Ultimately, the success of this program serves as a compelling testament to the transformative potential of education in fostering environmental stewardship and cultural preservation.

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