

Poket Xinwu App game for promotion of the Stone Tidal Weirs cultural heritage and collaboration with local communities in Taiwan

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ABSTRACT

The topic of this abstract fits best within this Session 12 because the study aims to investigate the potential of digital technologies in promoting the cultural heritage of Stone Tidal Weirs, also known as "Stone Tidal Weirs" in Taiwan. The Stone Tidal Weirs are an integral part of Taiwan's history and culture, yet their significance is often overlooked. This study aims to address this by utilizing digital technologies to raise awareness about Stone Tidal Weirs and their cultural significance, as well as the ecological significance of the Stone Tidal Weirs in near-shore ecosystems.

A mobile application, Poket Xinwu, was developed in collaboration with local communities and university groups to ensure the authenticity and accuracy of the information provided. The app features interactive content that allows users to learn about the Stone Tidal Weirs and their surroundings in an engaging and intuitive way. Additionally, the app aims to raise awareness about the environmental issues surrounding Stone Tidal Weirs and the importance of preserving the local ecosystems. The app also serves as a tourism promotion tool, encouraging visitors to explore the Stone Tidal Weirs and learn more about marine culture.

The study found that the app game was successful in promoting the cultural heritage of Stone Tidal Weirs and raising awareness about their significance. The app's interactive content and the collaboration with local communities were identified as key factors in its success. The study concludes that digital technologies can be effectively utilized to promote and preserve cultural heritage and can foster collaboration and understanding between local communities and visitors.

List of Figures

Figure 1 Distribution of Stone Tidal Weirs in the World (Tawa, 2007)

Figure 2 Schematic map of the location of the No. 1 Stone Weir in Shenzhen

Figure 3 Poket Xinwu app

Figure (4): Collection of fish ecology around stone weirs.

INTRODUCTION

The topic of this abstract fits best within this Session 12 because the study aims to investigate the potential of digital technologies in promoting the cultural heritage of Stone Tidal Weirs, also known as "Stone Tidal Weirs" in Taiwan.

Dr. Asahitaro Nishimura, a maritime anthropologist and a leading authority on the study of Stone Tidal Weirs, referred to this traditional fishing equipment as a "living fossil of the oldest fishing gear," believed to be the world's oldest. (Nishimura 1969; Nishimura 1979). Fish traps are one of the most widespread and enduring features of the maritime landscape. And research also in Ireland has identified a great number of traps, most of which date from the early to late medieval periods (Montgomery, Forsythe & Breen 2015).

Stone Tidal Weirs were once widely distributed in coastal areas with remarkable tidal action and coral reef areas with developed lagoons throughout the world. Figure 1 shows the areas in which Stone Tidal Weirs were distributed (Tawa 2007).

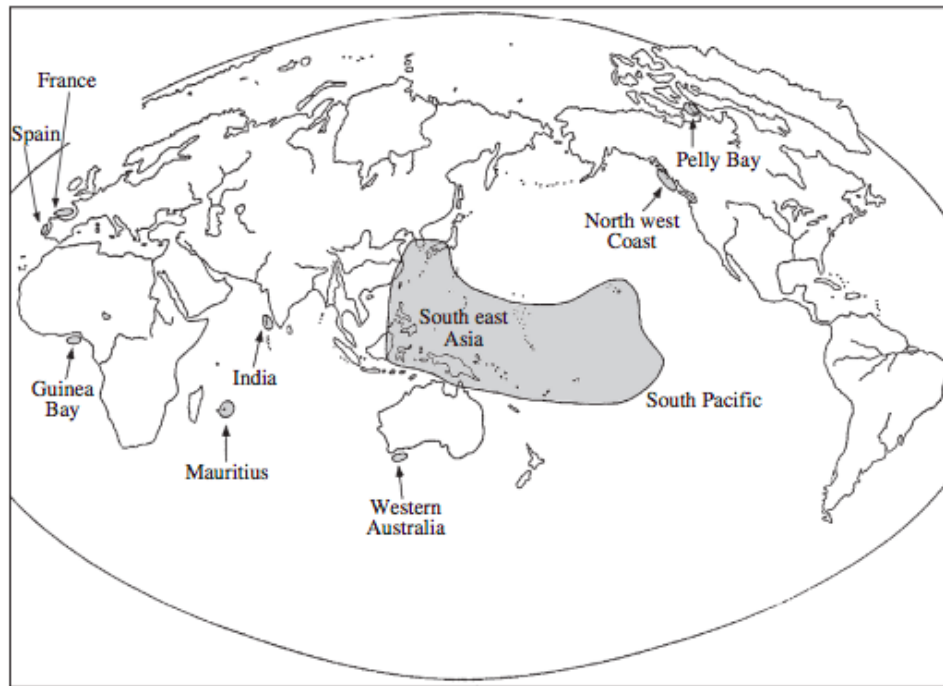


Figure 1 Distribution of Stone Tidal Weirs in the World (Tawa 2007)

In the latter part of the 1980s, geographers in Taiwan conducted a survey of Stone Tidal Weirs, including the author's study of those located along the northwestern coast of the main island. In the 1990s, extensive research was undertaken on Stone Tidal Weir fishing in the Penghu Archipelago, with active involvement from researchers, local school teachers, and their students (Chen 1992;1996). More recently, research has focused on a complete census of Stone Tidal Weirs, providing valuable insights into the cultural heritage of Taiwan and clarifying the use of fishing villages and grounds in the Penghu Archipelago (Hong 1999).

The Stone Tidal Weir is constructed on seaward slopes or fringing reefs, and comprises a semi-circular or horseshoe-shaped wall built from stones or coral lime stones. Its design is closely linked to tidal changes, with fish swimming or being swept into the weir during high tide but unable to escape during low tide. The fish are then caught in the shallow water within the weir using small push nets or dip nets. The Penghu Archipelago in the Strait of Taiwan is home to over 500 Stone Tidal Weirs, the highest concentration in the world, while the western coastal region of the main island also has a significant number of weirs, with some still in use today. In Taiwan, the Penghu Archipelago in the Strait of Taiwan is the region with the world's largest concentration of Stone Tidal Weirs, with over 500 weirs in total. The western coastal region of the main island is another area where a large number of weirs were once distributed, with some remaining today (Tawa 2010).

The Stone Tidal Weirs are an integral part of Taiwan's history and culture, yet their significance is often overlooked. This study aims to address this by utilizing digital technologies to raise awareness about Stone Tidal Weirs and their cultural significance, as well as the ecological significance of the Stone Tidal Weirs in near-shore ecosystems. The Stone Tidal Weirs form art and game exploration narratives which virtually experienced many of these traditions in indigenous community of the region.

CASE STUDIES

The case studies under consideration are the following. The research background of this study originates from the team's discovery of the Xinwu's Stone Tidal Weirs in 2017. The structure of the Stone Tidal Weirs and its significant role in the lives of coastal residents fascinated the team, and led to the conception of a 'coastal library'.

After conducting multiple visits and interviews with local residents, the team learned that the local community has made several attempts to preserve and promote the culture of Stone Tidal Weirs. These efforts include developing environmental tours, organizing community events, and promoting extended local specialties. However, the irregular frequency of events, the need to consider tidal conditions for activities, and the natural seasonal limitations along the coast have proven to be major obstacles. Therefore, this study aims to address these limitations by focusing on Xinwu's Stone Tidal Weirs, the largest and most well-preserved area on Taiwan's mainland, with 9 Stone Tidal Weirs completely according to the Taoyuan City Government Marine Engineering Bureau (Office of Coast Administration Construction, Taoyuan 2023). The study's objective is to promote the culture of the Stone Tidal Weirs through a digital app platform, eliminating human, environmental, and seasonal factors. Moreover, by collaborating with the local community during the production process, this study seeks to develop a more comprehensive understanding of the Stone Tidal Weir's culture.

1. Project planning and team recruitment: Xinwu People's Association collaborated with the local enterprise Tempest Digital Co., Ltd. to plan the development of the Poket Xinwu app. A student development team was formed by recruiting interested members from National Central University's Game Creator Club.

2. Research and data collection: The main interactive teaching tool used in the Poket Xinwu app was the No. 1 stone weir (**Figure 2**). To better present the actual characteristics of the stone weir in the app, multiple visits and data collections were conducted with the community. The community also took the team to repair the stone weir and explained the architectural structure of the heart-shaped six-stone weir. The stone weir was built in the 13th year of the Qing Dynasty and was an arc-shaped weir with many oysters and shells attached to the stones that form a fish-dragon shape. It was not listed as a national cultural heritage site until 2013 (Taoyuan City Government Cultural Affairs Bureau, 2019). Currently, the stone weir is continuously repaired and patrolled, and the local area is mainly engaged in agricultural production with fishing as a supplementary activity.

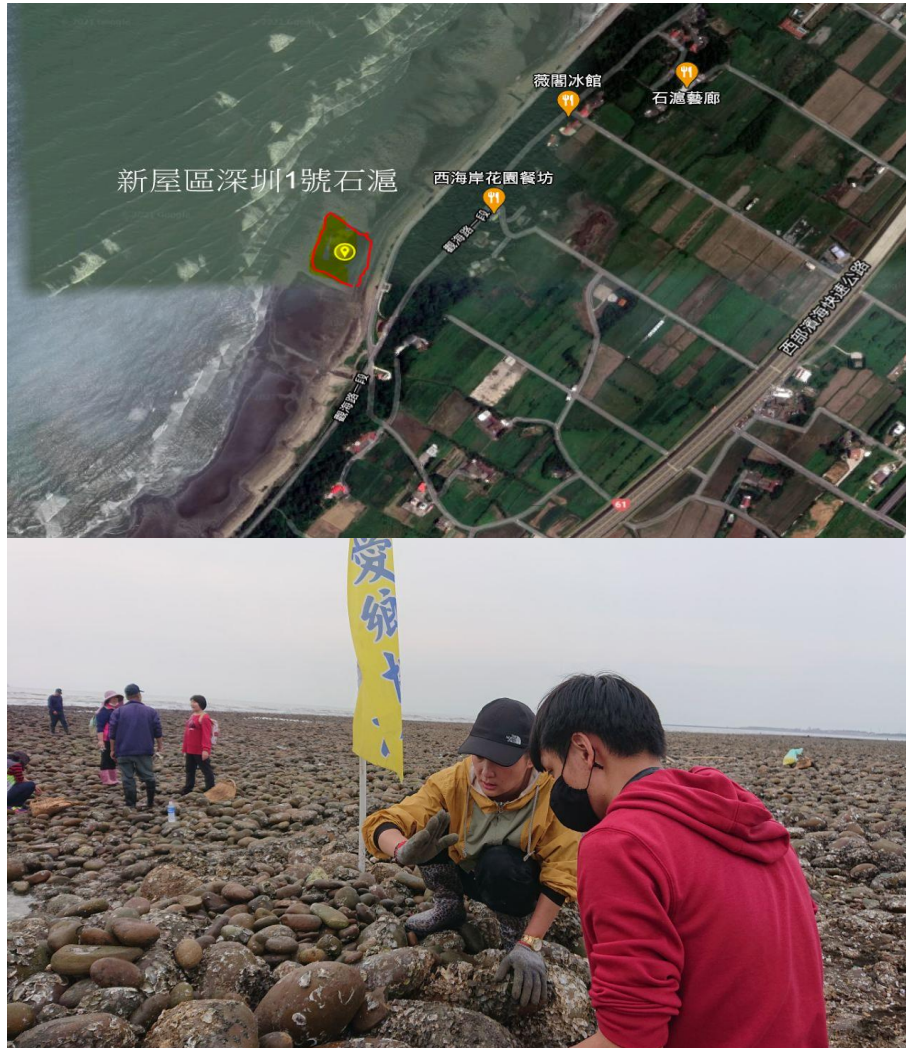


Figure (2). Schematic map of the location of the No. 1 Stone Weir in Shenzhen, with a total length of 250 meters (top).

(Source: 2011 Shenzhen Stone Weir Landscape Maintenance Plan). Repair work is in progress on the No. 1 Stone Weir, with association members providing guidance to a game maker on the repair process (bottom).

3. Feature extraction: To develop the Poket Xinwu app (Figure 3), the cultural features of the stone weir were extracted. After understanding the basic architecture and history, the app mainly focused on two directions as the main features: ecological features and surrounding attractions. The unique fish and ecological environment of the New House Stone Weir were locked as the ecological feature. Common fish names and photos found in the stone weir were collected through several visits to the local community and on-site inspections (Figure 4). The fishing scenes of the stone weir were restored as much as possible. Surrounding attractions were identified as another key feature. As the New House Stone Weir is a connecting point for the whole community, surrounding attractions were identified along the coastal and inland areas. Members of the New House Love Township Association were interviewed, and field visits were conducted to identify unique local attractions.

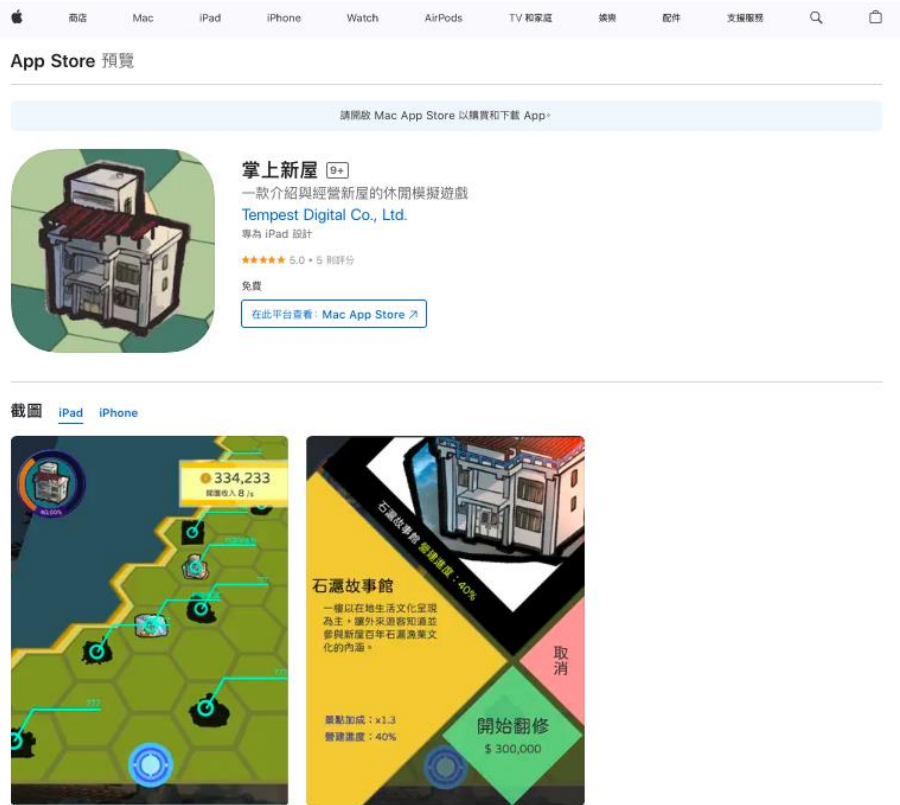


Figure 3. Poket Xinwu app (Source: <https://apps.apple.com/tw/app/%E6%8E%8C%E4%B8%8A%E6%96%B0%E5%B1%8B/id1555679247>)

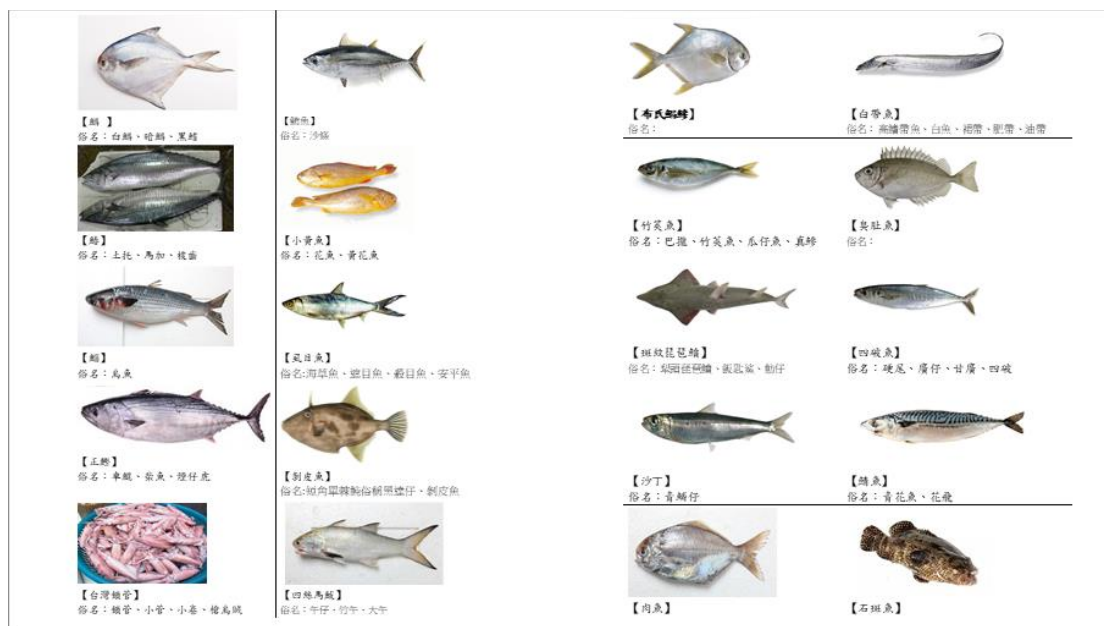


Figure 4. Collection of fish ecology around stone weirs.
(Source: Marine species identification manual for horizontal longline fishermen 2006.
<https://www.facebook.com/photo.php?fbid=2304667786405092&set=a.1116075205264362&type=3>)

4. Game mechanics: The Poket Xinwu app's gameplay is based on the story of sister Jiang Mina returning to New House to assist her father's business. By managing attractions, new surrounding attractions are unlocked. Each attraction unlocks various rewards, and players progress through the game by collecting rewards and managing the business successfully.

In this study, we developed an app to promote the ecology and history of stone water. Before the app's development, we did not have a complete compilation of information on the fish

ecology in Stone Tidal Weirs. However, after the app's development, we successfully created a fish map of Stone Tidal Weirs. We put it into the Stone Tidal Weirs Storytelling Museum to introduce the ecology, which is an important function of the app that allows users to understand more about the ecology and history of Stone Tidal Weirs.

Before the app was created, the local association used tours and excursions to protect and promote Stone Tidal Weirs. However, in the course of the app, we found that more and more people joined the app and began to describe their impressions of Stone Shanghai and their memories of the past, such as the aunt who collected sea melon seeds and vegetables and the uncle who collected driftwood for carving, which reflected the important role of the Poket Xinwu app in promoting the culture of Stone Tidal Weirs. In addition, we found that the eco-circle¹ of the Stone Tidal Weirs-community is known and promoted after the production of the Poket Xinwu app. This shows that the app we developed has successfully contributed to transmitting and promoting Stone Tidal Weirs culture.

The number of visitors to the experience of high school students in using the app show that the app has good experience and promotion benefits. For example, a student pointed out that the app cooperated with local merchants to launch coupons to promote tourism. In addition, the UI of the app is quite simple and easy to use, and there is no problem with cards or unpleasant operations. In addition, we noticed that some students, generally rated the app highly, saying that it was good and had an important role in promoting Stone Tidal Weirs culture. On the other hand, some students suggested that the game would be more enjoyable if it could be presented in a non-idle format to increase interactivity.

In conclusion, the Stone Tidal Weirs app developed in this study has achieved positive results in promoting Stone Tidal Weirs culture and promoting Stone Tidal Weirs ecological protection and has promotional benefits and good usage experience.

RESOURCES

The resources available to conduct this research project include the participation of the community in the development of an interactive mobile application, the process of collaboration between the research team and the local community, Xinwu People's Association, the marine ecology, field surveys of nearby attractions, and a wealth of community data and relevant documentary sources.

The development of the interactive mobile application involved the use of Unity software, the collection of artistic materials, and the creation of a script for the storyline. In addition, a large number of interviews were conducted to align the storyline of the mobile application with the cultural significance of Xinwu People's Association. The application called Poket Xinwu app was published on Google Play, which allowed for analysis of downloads and market feedback, giving us insights into user backgrounds and qualitative evaluations. Since its release on March 27, 2021, the Poket Xinwu app has received a total rating of 4.4 stars on Google Play as of April 5, 2023. The app has had an average distribution of downloads over time, with a total of 207 installations and 151 uninstalls. The current user retention rate is 27%. The app also features a mechanism for providing discount coupons to local shops, which some users have already redeemed. These insights into user behavior and feedback from the Google Play platform can help inform future updates and improvements to the app.

The collaboration between the research team and the local community proved to be an indispensable resource in achieving a co-creation of knowledge and a deep understanding of the cultural significance of Xinwu People's Association. Through this fruitful partnership, we

¹ eco-circle: eco-circle promotes and protects traditional fish weirs through an app-based marketing approach, community engagement, and environmental conservation efforts. This creates a cycle of promotion and protection for fish weirs, resulting in positive impacts on local ecosystems and communities while achieving both environmental and economic benefits.

were able to identify and prioritize research questions, and to develop a comprehensive research plan that effectively met the needs and aspirations of the local community.

Direct access to the local marine management agency through government-sponsored activities provided us with crucial information on the Stone Tidal Weir's culture and surrounding scenic spots. Additionally, we gained valuable insights into the government and local community's perspectives, goals, and plans regarding Stone Tidal Weir culture and the site's management. The local association has adopted a cautious approach that prioritizes the preservation of the local ecology, which allows for limited tourism to avoid coastal waste and damage to the stone weir. In contrast, the government supports sustainable commercial applications that aim to efficiently manage and promote the site while catering to the needs of a large number of tourists interested in understanding Stone Tidal Weir's cultural ecology.

During our research process, we observed that developing an application that promotes and protects the culture of Stone Tidal Weir is in line with the positions and needs of both parties. The consensus framework² for this proposal proved to be highly conducive to the successful promotion and preservation of Stone Tidal Weir. Our findings highlight the importance of effective collaboration between research teams and local communities, especially in preserving culture and promoting sustainable development.

Xinwu People's Association and the nearby marine ecology were important resources that provided us with a unique research opportunity. Xinwu People's Association is a local organization in Xinwu that is dedicated to the protection and promotion of Stone Tidal Weir culture, and the marine ecology in the area is diverse and complex. These resources allowed us to study the historical and ecological significance of the area and gain a deeper understanding of the cultural and natural heritage of the community.

Field surveys of nearby attractions provided us with additional resources for our research. We conducted surveys of nearby tourist sites to understand their impact on Xinwu People's Association and local communities. This allowed us to identify potential threats to the site and the community and develop recommendations for sustainable tourism practices.

Finally, a wealth of community data and relevant documentary sources allowed us to stay up-to-date with the latest research developments and incorporate this knowledge into our work. We collected and analyzed global articles related to Stone Tidal Weirs and integrated this information into our research, providing a broader perspective and deeper understanding of the significance of Stone Tidal Weirs.

FRAMEWORK

The research problem is the marketing and promotion of the stone tidal weirs is insufficient. In the past, the promotion of stone weirs was mainly through academic research and event organization. As a result, the general public's understanding of stone weirs is insufficient, and with the changing times, the number of users of stone weirs has also decreased. Therefore, to address the problem of insufficient promotion of stone weirs, this study employs game base marketing to develop an APP game to help the public learn about and virtually experience the culture of stone tidal weirs.

RESULTS (expected)

In the past, the promotion of stone fish weirs was mainly through academic research and physical activities. By creating an app game-based marketing, the cultural significance of stone

² Consensus framework: A structured approach to establish agreement among individuals with different opinions, promoting collaboration and guiding decision-making.

fish weirs can be easily promoted. In the future, this can be combined with LINE application for digital marketing and the establishment of a virtual world Stone Fish Weir Museum.

The United Nations Environment Programme released a report titled "War and Environment: Destruction, Pollution and Recovery" in November 2021. The report states that the destruction and damage caused by war and armed conflict to the environment and ecosystems has reached unprecedented levels, and that these damages will have long-term effects on local and global environments and human health. The report proposes solutions such as strengthening international legal frameworks, protecting cultural heritage, and supporting sustainable development. By promoting and preserving the data of stone fish weirs through an app game, we can prevent the loss of cultural information caused by destruction during war and armed conflict.

CONCLUSION

To conclude, the study found that the app game was successful in promoting the cultural heritage of Stone Tidal Weirs and raising awareness about their significance. The app's interactive content and the collaboration with local communities were identified as key factors in its success. The study also reveals that digital technologies can be effectively utilized to promote and preserve cultural heritage and can foster collaboration and understanding between local communities and visitors.

Therefore, In the future research and development phase, further data accumulation and in-depth analysis of its effectiveness can be conducted. Subsequently, it can be extended to more mature regions or countries for research and organization, such as Penghu County in Taiwan and Japan. In the future educational promotion phase, it can continue to serve as a teaching tool for communities, schools, and tourism, educating people about stone weirs and their significance to the local area.

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