The Sustainable Development of Sports Culture via Digital Archives

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Abstract

This study engages in the process of digitizing information concerning interviews of veteran athletes and collections of historical relics, and then establishes metadata pertaining to the archival process. The fruits of this labor are to be demonstrated on the Historical Sport Relics Digital Museum website for public interests. The purpose of this work is to use digital archiving as a method to preserve the culture, heritage, and values of Taiwan's sport history, as well as to develop value-added applications.

Keywords: sport and athletics, Taiwan, digital archiving, value-added application, sport tourism and recreation.

I. Background and Motivation

Digital archiving is a procedure that has consistently been gaining popularity in recent years. This consists of using digital technology to record the history of humanity writ large, as well as preserve its treasured, invaluable historical relics, be they physical or not, in a digitized form. The possibilities for what can be preserved in this way are limited only by the breadth of human history itself: it could span from cultural to scientific import; from artistic to musical expression. The digital form in which it will persist after digitizing could consist of words, sounds, images, or even 2D/3D objects. In order for the quality of a digital archive to be sustained - which is particularly important as the data contained within a digital archive serves as the basic foundation for follow-up research and valued-added applications produced in conjunction with said research - each of the relics and documents to be preserved must be meticulously and painstakingly inventoried, tabulated, authorized by the relevant parties, as well as given to experts in order to comprehensively and accurately record the digital information.

According to the "Challenge 2008" six-year national development plan, which was initiated by the Executive Yuan of Taiwan in 2002, Taiwan's National Science Council regards the "National Digital Archives Program" as a significant, important enterprise. The underlying purpose for creating digital archives is to allow essential aspects of Taiwanese history, culture, and art to be handed down and utilized more easily. This is achieved by enriching the informational content of related websites, creating databases, and sharing vital national resources with citizens through the use of internet media. The Ministry of Science and Technology has continuously promoted various projects – the "Digital Museum Project," the "National Digital Archives Program," and the "National e-learning Program" among them - since 1988, all of which were combined into "National digital archives and e-learning program" in 2008. This demonstrates clearly that the Ministry of Science and Technology is dedicated to the enormous undertaking of digitizing national archived historical relics and documents. [1]

Based on the 2003 "Sport and Athletic Policy White Paper," the Sports Administration within the Ministry of Education in Taiwan created a website in 2009: the sports historical relics digital museum. The purpose of this website is to preserve the historical value of Taiwan's sporting and athletic culture and uphold the heritage of sports culture via digital technology, as well as create value-added applications with digital materials in order to incorporate the resources of creative cultural industries with sports leisure industries. [2] Then, in 2017, The Sports Administration also executed the "Sport and Athletic Culture Digital Archives Plan," the main purpose of which is to collect, organize, and digitize both historical sports relics and information on famed sports veterans in order to ensure that the relevant digital data meets the following criteria: availability, persistence, and smart conformability. Furthermore, this plan aims to promote sport and athletic culture by means of research and education, in addition to industrial and value-added applications. [3]

Since the first phase of the plan commenced in 2017, both the first and second phases have already been completed. These encompass the digital archiving of 45 esteemed professionals and 346 historical relics, along with broad assortment of publications on related topics (for example: postcards, books, audiovisual resources, memorial caps and clothing, etc.), old photos, videos, interviews of sports veterans detailing their memories. Furthermore, the soliciting and collecting of historical relics, on which digitalizing techniques were also used, coupled with the promotional method of using interactive learning, afforded those involved to demonstrate, educate, archive, and research the databases generated by this archiving in order to build up a larger network of information step-by-step. The fruits of this labor then ultimately served as the bedrock for the content constituting the following website: the sports historical relics digital museum.

Therefore, building upon this bustling trend in Taiwan, the target of this study is to sustain the push to digitally archive Taiwan's valuable sports culture, and to utilize digital technology to safeguard the heritage underlying this culture (See Figure 1). Moreover, researchers aim to augment the availability of value-added applications of the archives to various service and leisure industries by combining the digital results with the resources of these industries. After integrating the contents from these different facets of our project and coding them, there is a worthy of reference path provided for educational research, as well as for the promotion of sporting cultural heritage.

Figure 1. The core target of the Sport and Athletic Culture Digital Archives Plan

II. Research Purpose

The stated purpose of this research is the collecting, organizing, recording, and digitalizing historical relics and information obtained through Taiwan's sporting royalty with the intent of developing applications of these digital archives meant to continue the extend and advance this heritage far into the future. Moreover, allow this culture to propel the creation of further digital archiving content, and employing it in order to create a new cultural IP, which can then activate, contribute to, and drive the development of local sports-related industries. In light of the increased interest in digital archives in recent years, in 2019 the aforementioned "Sport and athletic Culture Digital Archives Plan" has already begun extended the success of the first two phases into a third new phase. The prospective goal for the fourth phase is to have completed digital archives for 20 additional sporting dignitaries, 300 new historical relics, and one more value-added application that includes visual identity, packaging design, leisure maps, and campaign videos, amongst others. These are then used to combine sports and athletics with local cultural IP in order to revitalize the traditional sporting spirit, and promote the sports tourism industry.

Therefore, a sensible foundation for this study: the interviews of elites; interpreting, composing, and recording the content of these interviews in order to build up digital metadata; and using this metadata to understand how important digital archives are to the promotion of collecting and organizing sports-related historical relics and cultural heritage in the future.

III. Research Methods

To understand the current situation Taiwanese traditional sports find themselves in, as well as their role in its athletic and sports culture, this study uses content analysis from qualitative research first in order to analyze the interviews of the sports veterans in Taiwan, as well as the resources arising from historical relics; thereby understanding the historical significance of these memories for Taiwan's modern day sports culture. Secondly, employing the semi-structured personal interview qualitative method to convert them into entertaining and informative, allows the audience to focus on the interviewee's personal feelings and in-depth descriptions about their experiences in sports. By delving inside these veterans' minds via these dialogues, the audience is then able to discern the expectations of the interviewees regarding sport and athletic culture in the past, as well as moving forward. Furthermore, by digitizing completely the words, photos, and audiovisual data that illuminates the canvas these legends are painting on, in addition to the rich history contained in related historical relics, life is breathed life into the meaning behind the preservation of, and education about, Taiwan's vibrant sports culture. Ultimately, the integration of these two intertwined parts should shed light on their differences, and provide a meaningful reference path for both educational and industrial use of digital archives in the future. The research methods employed in this study are represented in Figure 2.

Content Analysis

The notion of content analysis was originally initiated in the world of journalism and communication studies. The essence of content analysis is the conversion of obtained literatures into quantifiable data, and to furthermore make use of numerous statistical methods of comparison to highlight the results of this content analysis with the use of systematic and qualitative characteristics.
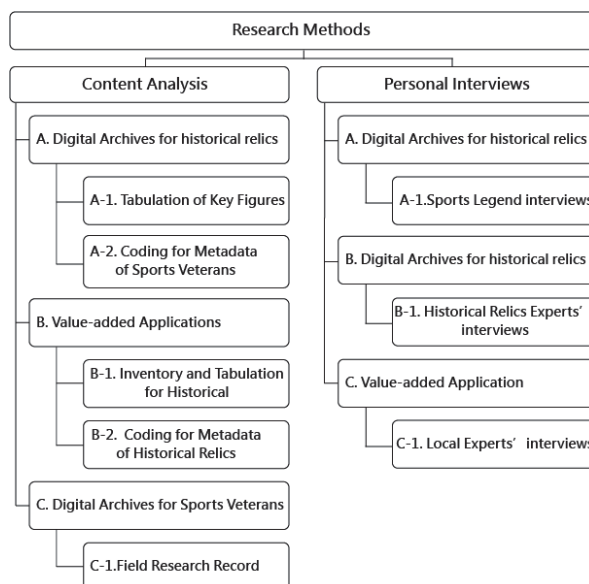

Figure 2. *A framework of the research methods employed in this study*

To construct a digital database for sports and athletic archiving, the study collected and organized resources related to sports royalty, in addition to the relevant historical background, by observing, interviewing, and conceptualizing these veterans, reducing data, and describing them in accordance with their essential attributes and perspectives. In the end, this study aim to make these characteristics manifest through the digital database after using meta-analysis.

(1) Digital archives for sports elite

Inventory of and authorization from the elites themselves (inventory and authorization sources: organization, group, association, individual, etc.): Investigate the information for each veteran- name, sports category, important achievements, birthday and age, state of health, language status, contact information, etc., which are on the veteran recruitment questionnaire. Then schedule an interview with the veterans deemed valuable enough to warrant an interview. This kind of digital archiving can have further applications via a wide variety of information technology or value-added innovation methods in the future, on one hand, and this kind of digital archiving can also preserve sports and athletic culture in Taiwan, on the other hand. This may also apply for promotional purposes: for example, the creation of teaching discs, to create widely available and diversified benefits.

(2) Digital archives for historical relics

(a) Inventory and authorization of the historical relics (inventory and authorization sources: organization, group, association, individual, etc.): Inventorying of these historical relics in each affiliation, detailed organization and collection of the related historical information, and at the same time clarifying the ownership of copyrights, the authorized purview etc. Questions of this nature are in favor of digitizing historical relics. The relevant affiliations who provide the contact information of legendary sports figures related to the collected references for this plan are: the National Sports Training Center, the Chinese Taipei Olympic Committee, the Chinese Taipei Olympian Association, the National Taiwan Sport University, the National Taiwan University of Sports, the Taiwan Baseball Hall of Fame Association, the Xiao Ba Wang Table Tennis Association, the

Wen-Da Wu Foundation, the Golf Association, the Gold History Museum, the Sunrise Golf Club, the Modern Pentathlon Association, the Chinese Taipei Baseball Association, and finally the interviewees from the digital archives. The five sport items form the primary goal in executing this plan, and at the same time cooperate with other related affiliations, allowing extensions to other sport items year-by-year.

(b) Write and organize the metadata for historical relics: Digitize historical relics, and then follow this up by working on coding for each relic, and ultimately, hire experts to write and build up the metadata. The accuracy and pertinence of the data is key for the historical relic digital archives, which reveals why this plan involves the invitation of experts and scholars who deeply understand Taiwan's sport and athletic history and to examine and revise the metadata. The process of reviewing the metadata is displayed in Table 1. Not only can this be used to revise or expend the content of the Sports Historical Relics Digital Museum website, but can also be utilizing as professional, digital, cultural teaching material by merely displaying the information openly on the aforementioned website. Table 2 is the description for the index and codename of digital historical relics and the explanation for inventory filled in.

Table 1. The rundown of the metadata review process

Step 1	Digital archives team processes the digitization of historical relics
Step 2	Name and code the files
Step 3	Experts write content for the metadata
Step 4	The experts examine and revise the content
Step 5	Revise and proofread metadata
Step 6	Metadata has been established

Table 2. Descriptions of historical relic codenames and inventory

Sports Item	Traditional Sports (TR) School Sports (SC) Social Sports (SO) Sports Tournament (SP) Olympic (OL)
Historical Relic Category	Old photos (hp) Brochure (bc) Books (bk) Medal (md) Artifact (af) Ball (bl) Video (vi) Others (ot)
Main Content	01 Photographic paper 02 Paper 03 Metal 04 Plastic 05 Wood 06 Fabric 00 Others
Quality of Preservation	5: Excellent 4: Good 3: Neutral 2: Poor 1: Very poor
Authorization Status	Unauthorized Authorized

(3) Value-added application

Field work: In order to convey the results of this plan in a meaningful way, this study investigated local sports culture by collecting background information, surveying field work, and interviewing experts, all in service of the accurate execution of value-added applications. The demonstration areas in this plan constructed a mind map of three places in southern Taiwan (Neimen, Kaohsiung, Wanluan, Pingtung, and Hengchun, Pingtung) by using textual analysis, and further employed this mind map as the basis for further design developments.

Personal Interviews

This study used interviews and literature review in order to explore our research topic. 20 interviews were used to explore interviewees' experience in sports and athletic areas, transferred each of them into videos, and then coded each according to the above scheme. Ultimately, this constituted the results of our analysis. Personal interview is the most widely used method in qualitative research, as the researchers and the people who are begin researched need to build trust between each other for this study to be successful. However, because of the restriction of funding, time, and manpower, researchers simply could not perform ample interviews themselves. Proceeding without the ability to supply our own interviews presents us the challenge of quantifying the interview information, but there are also a few advantages: 1. According to the interview guide, researchers can delve into more questions because of the interviewees' professional knowledge and experience. This can make greatly improve the accuracy of our integrated analysis; 2. In-person discussions allow the interviewees to answer more extensive questions and can also aid in simplifying complex questions; 3. This empowers the interviewees to honestly and fully express their opinions within a controlled environment, which more easily facilitates the quantification of the interview information.

Therefore, researchers interviewed each interviewee one to two times for the sports veterans digital archive portion of this study, and each interviewee had two to three assisted-interviewees, who are the interviewee's relatives, friends, teachers, students, or the relevant scholars. The intimate knowledge people of this type possess about the interviewee provides us with a more genuine understanding of the interviewees themselves. Additionally, in order to help adjust the interview content, based on feedback provided by the interviewee, for the historical relics digital archives portion of the study, sports literature and history experts and scholars constituted the main interviewees, as well as established the metadata after interview. Lastly, when it comes to the value-added application portion of the study, researchers interviewed the related veterans and experts in each local place, did data transcription, and the applications were developed by using the content which the team collected and organized.

(1) Sports legend digital archives

(a) Researchers collected and organized the authorized figures and digitized any relevant information: after soliciting and collecting the precious icons themselves, and evaluated each interviewee's adaptability and schedule the interview, researchers designed insightful questions for each interviewee, drew up an interview information sheet, and outlined to process of the interview. Following the interview itself, the digital rundown of the interview was further organized by editing the video and interview content.

(b) Edited video of legend interviews: Researchers edited the interview into an informative video, which not only allows one to

maintain and preserve the modern sport and athletic culture, but can also be put on the "Sports Historical Relics Digital Museum" website in order to permit the public to browse the information obtained. It may also be used by the Sports Administration in the Ministry of Education as a means to establish a digital knowledge base for the future.

(2) Historical relic digital archives

(a) Researchers collected and organized the authorized historical relics and digitized them. After classifying the historical relics into various categories (old photos, brochures, books, medals, artifacts, balls, videos, others), they were further grouped according to five important indexes for evaluating the standard of quality: historic import, representativity of the associated sport, scarcity, fragility/endangeredness, and future applicability.

(i) Historic import: The historical relics possess more historical value if they are either from further in the past or if they occupy a significant role in an important period of time.

(ii) Representativity: This measure how well an historical relic serves as a representative symbol for the history a certain sport.

(iii) Scarcity: More unique or very rare historical relics are considered of a higher value.

(iv) Fragility: Researchers also take into account how well preserved the relics are.

(v) Future applicability: The expansibility and functionality of the historical relic digital archives are determined in order to ascertain how easily one can apply to various products in the future.

(b) Researchers implemented a digital evaluation standard for historical relics that used High (3 points), Medium (2 points), and Low (1 point) as the base for evaluation (the details can be seen in Table 3).

Table 3. Indices for the evaluation of digitizing relics

Five items \ Example	Maysang Kalimud - Silver medalist in the Olympics in Rome in 1960
1. Historic Importance	High: 3 points
2. Representativity	High: 3 points
3. Scarcity	High: 3 points
4. Endangeredness	High: 3 points
5. Future Applicability	High: 3 points

(3) Value-added application

Researchers interviewed numerous experts during field research and employed these experts' opinions while designing, finishing proposals, and ultimately sending said proposals to local government and sports administration for review. These proposals were finalized after extensive meetings. Table 4 provides a rundown of value-added application execution.

Table 4. Value-added application execution rundown

Step 1	Document analysis
Step 2	Field research
Step 3	Expert interviews
Step 4	Conceive / creation of designs
Step 5	Design proposals
Step 6	Meetings to review the proposal
Step 7	Modify designs
Step 8	Approve the review
Step 9	Packaging design is authorized by local governments to use

IV. Conclusion and Discussion

The third phase of the "Sport and Athletic Culture Digital Archives Plan" from accomplished three important tasks (the details of which can be found in Figure 3):

1. For the digital archives pertaining to sporting legends, 80 sports veterans were interviewed and the corresponding videos were edited. The resulting videos consist of a long version and a short version for each of the 20 interviews conducted, totaling 40 archive videos.

2. Regarding the historical relic portion of the digital archives, 300 historical relics were digitized. In light of the voluminous supply of potential relics, 10 additional relics were then digitized, bringing the grand total to 310.

3. As to the value-added applications, demonstration sites were built in three separate locations: Neimen in Kaohsiung, Wanluan in Pingtung, and Hengchun in Pingtung. This study completed 3 visual identity designs, 18 packaging designs, 3 leisure maps, and 1 campaign video.
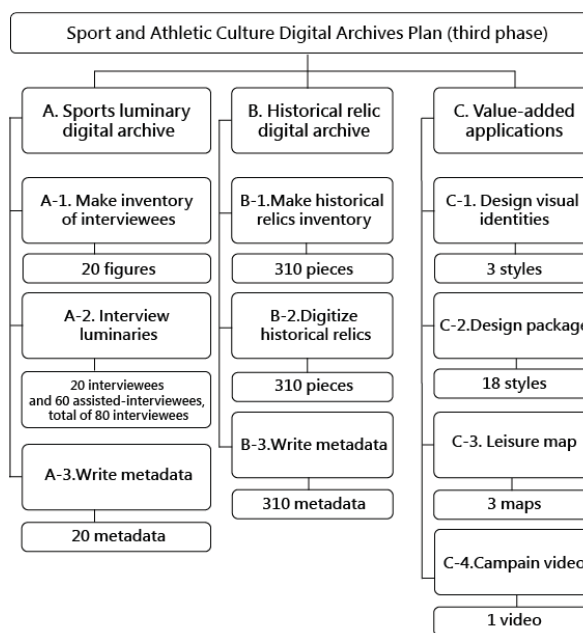

Figure 3. Results of the third phase of the plan

Results obtained regarding the sports luminary digital archives

This research completed 80 sports veteran interviews (comprised of 20 interviewees and 60 assisted-interviewees), as well as all of the associated video editing. The length of each long version of the interview video is roughly 10-14 minutes for archiving, while the short version runs about 3-5 minutes for internet broadcasting. The formatting of these videos is full HD. Both the title card and the post-credits utilized beautiful animation to introduce the interviewee, while dynamic image cards were employed in order to display the interviewee's name, event location, and any relevant historical relic photos, as a supplement for title card. The post-credits prominently displayed the interviewee's sports chronology, which includes memorabilia in addition to important achievements. An example can be found from the link: https://www.youtube.com/watch?v=jBxjrnOPfDU.

Results obtained for the historical relic digital archives

As mentioned above, the underlying goal of the third phase was to digitize 300 historical relics. In the end, this was extended to the digitization of 310 relics. In Tables 5 and table 6 below one can find the various statistics related to the distribution of these digital historical relics amongst the diverse categories available according to categorization scheme. More specifically, these tables present the various amounts digitized according to three distinct classifications: sports items, historical relics, and affiliations.

Table 5. Statistical counts for digital historical relics (Sports items)

Sports Item (code name)	Amount	Proportion
Traditional sports (TR)	4	1%
School sports (SC)	3	1%
Social sports (SO)	39	13%
Sports tournaments (SP)	173	56%
Olympics (OL)	91	29%
Total	310	100%

Table 6. Statistical amounts for digital historical relics (historical relics)

Category (code name)	Amount	Proportion
Old photos (HP)	43	16%
Brochures (BC)	6	1%
Books (BK)	28	12%
Medals (MD)	132	46%
Artifact (AF)	34	10%
Balls (BL)	10	4%
Others (OT)	56	10%
Videos (VI)	1	1%
Total	310	100%

Results pertaining to value-added applications

3 Visual Identity Designs

This study created an anthropomorphic visual identity, as well as a sports item visual identity, design based on three demonstration sites, the details of which can found in Figure 4 and Figure 5 below. The cultural events featured in these are as follows.

Location: **Neimen, Kaohsiung** Sports item: **Song-Jiang Battle Array**

Location: **Hengchun, Pingtung** Sports item: **Ghost Grappling**

Location: **Wanluan, Pingtung** Sports item: **Night Sacrifice**

Figure 4. Visual identity designs

C15% M85% Y68% K0%   C100 % M60% Y41 % K2 %   C90 % M93 % Y46 % K16 %

Figure 5. Three sports item visual identity designs

(a) Kaohsiung Neimen Song-Jiang Battle Array. Cultural features: protection of our homes and defense of our country, strengthen the body, exorcism. Origin of the activity: Neimen is surrounded by grand mountains, within which bandits can cloak themselves from the surrounding areas. The residents in Neimen were immensely bothered by this fact, as the local authorities are far too far away to be available for help. In order to guard their homeland, the residents from each village spontaneously composed a parade formation. The spirit of parade formation was taken from the 108 doughty heroes who gathered together to carry out god's will and protects the citizens from the Outlaws of the Marsh. In order to augment the opera's long-standing traditions to thank their gods within temples, the original parade formation provided a deeper, more dramatic plot surrounding the Outlaws of the Marsh, ultimately adding to the theater of it all. With this infusion of a more artistic character, the renowned Song-Jiang Battle Array has become the spectacle it is today.

(b) Pingtung Hengchun Ghost Grappling. Cultural features: Ghost festival, focus on sharing and giving, desire to unite and move upward, Ku Zhu (bamboo pole), Ku Peng (canopy) Origin of the activity: During the ghost festival, the people of Hengchun worship the single men who came to Taiwan with the intent of cultivation and died. One reason for this worship is so they can attempt to avoid a ghost revolt, since these ghosts people who worship them. After the ghost festival, they give offerings away to any poor and lonely around; thence these offerings are called Ku Pin (in Chinese Ku means "alone," while Pin means "offering"). As a consequence of the ease with which people will snatch and fight each other, when the Ku Pin are given away, a competition called Su Ku Pong was established, which consists of getting these offerings from a Ku Peng (canopy). This activity was aptly named "ghost grapping (Chiang Ku)."

(c) Pintung Wanluan Jiapoalang Night Sacrifice. Cultural features: The legend of the fairy egg; Tio-hi (an activity mainly consisting of songs and dance intending to thank god); praying for sufficient future rains, as well as a good harvest; natural agriculture. Origin of the activity: According to the legend, there once was an elderly woman who picked up a mystic fairy egg. A baby hatched from the egg after the elderly woman carefully looked after it, and she raised the baby until the baby grew up as a maiden. When the girl was 16 years old, she told the elderly woman and the villagers that she is a fairy, and then proceeded to take out a Long Tou Zhen (hairpin) from her hair, and gave to villagers before returning to the sky. In the eyes of the villagers, she had become a god -- Xian Gu Zu -- that they can pray to when rain is needed for their harvest, and they believe she is very effective to this end. Afterward, the Long Tou Zhen (hairpin) became a tool for psychics to use in order to pray for more rain in Jiapoalang, and it is said that if a drought hits the farmland, such a prayer to Xian Gu Zu will yield abundant rains. From then on, the villagers held a night sacrifice every year, with dancing to entertain the god, as well as prayers for a good harvest.

Furthermore, they will travel to the Xian Di temple for worship, and finish off with an enormous banquet and other festivities.

18 Packaging Designs

The packaging designs made use of the historical spirit and essence of local sporting and athletic culture, and combined precious local specialties in order to breathe life into sports and athletic tourism and recreation in the area. The packaging designs overview of which can found in Figures 6 below. The local government worked with relevant experts and decided upon using specialties from particular areas. For each specialty researchers created two different packaging styles. Infused with the spirit of traditional sports and athletic culture, a packaging product was created which possesses a deep, connected meaning.

Figure 6. *18 packaging designs*

Sports Sightseeing Leisure Map

The design size of leisure map is on A5 paper to let tourists more easily carry with them. After completing our field research and interview various experts, this research decided to concentrate on presenting information pertaining to local cultural history, the natural environment, the landscape, and local specialties on the map. With clever use of visual identities on this leisure map, the following content was also made use of: the IP for local traditional sports activities, an explanation of IP design, a funny four-frame comic, and an explanation of local sightseeing and cultural activities, as well as souvenirs and attractions. This was brought to life by gorgeous illustrations with a sports mascot. Our hope is for tourists to be invested in the local sports while relaxing during their trip. There are featured tour spots on the map in Figure 7.

Figure 7. *Actual Leisure maps produced for these events*

Promotional video

The name of this 7 minutes 26 second promotional video is "A memorable hometown," which was filmed using microfilm. It is short dramatic film, the purpose of which is to exhibit the local sports and athletic culture, all while allowing young people to explore the plentiful sightseeing resources in Taiwan. The plot of the video revolves around a young person, Xiao Sung, who left their hometown to work, whose stressful nature has prevented Xiao Sung from returning home for long time. One day, Xiao Sung's mom called to request that he comes home to take care of his injured grandfather. During this time caring for his grandfather, all of his vivid memories of his hometown came flooding back, which birthed within him a strong desire to delve deep into, and gain an understanding of, the traditional sports culture in his hometown. These promotional video (in English) can be found from the link: https://youtu.be/rwhjDYuFX14.

V. Conclusion

Sports and other athletic activities not only provide a healthy source of competition, workout and leisure activities, but also have a historical and cultural meaning. However, it is quite difficult to maintain and preserve sports and athletic culture, not just sustaining the sports items themselves in our collective memory, but additionally because innumerable local, traditional folk sports are gradually forgotten by the world all the time. Furthermore, the elders with their rich, skilled experience with said sporting traditions are not taken the least bit seriously, which ultimately causes that the related relics and history to evaporate in the mists of time -- the clear and distressing dividend of which is an inability for this athletic culture to persist and be inherited by future generations.

There are further difficulties that arise from interviewing the precious sports luminaries who stories brighten the history itself: some of these titans have aged and are in poor health. They may even need family and friends to help to them to simply complete an interview. There are, furthermore, a whole host of sports veterans who have already been lost, and consequently their stories are unlikely to be protected and propagated into the future. Therefore, because of this crisis of disappearing, precious cultural records, sports culture runs the risk of failing to be inherited; thus, the urgency of creating digital archives preserving the memory of these figures and traditions is of vital importance. Only by proactively establishing an extensive digital database, and by finishing the arduous task of establishing these digital archives, can perpetuate the precious equity of sports culture. Moreover, by thoughtfully applying the fruits of this archiving labor towards educational endeavors, thereby promoting further research, sports culture can become rooted within public life and ensure that the development of sports in Taiwan expand.

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