A Digital Library for Preservation of Folklore Crafts, Skills, and Rituals and Its Role in Folklore Education

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Abstract. The importance of folklore can be manifested by Alan Jabbour's speech in the 100th anniversary of American Folklore Society-"folklore reflects on the ancestral missions that have shapes us, the inherited values that we reflect and must radiate into the future". Currently, most of the digital preservation projects focus mainly on digitizing artifacts, in which the crafts of how to make them and skills of how to use them are neglected. Besides, folklore and religious rituals embed spiritual meanings. Step-by-step procedure of a ritual is not trivial for a people or a religion. The motivation of this project are manifested in three aspects: (1) folklore crafts, skills, and rituals play the same important roles in preserving our ancestor's wisdom in addition to folklore artifacts; (2) media richness facilitates learning of courses with high uncertainty and equivocality; and (3) e-learning with interactive videos gains more learner satisfaction than non-interactive and traditional classroom learning according to recent studies. In this paper, video clips are used for recording step-by-step crafts, skills, and rituals. The metadata used here are modified from our previous work regarding digital preservation of Taiwanese folklore artifacts by emphasizing the "Relation" element in linking individual steps together. A website served as an extension to digital library of folklore artifacts has been constructed to be used as an e-learning platform for folklore education in obligatory and higher education. The system not only constructs a digital library for folklore preservation but provides instructional interactive materials with media richness to support a more effective method for folklore education than non-interactive or traditional classroom learning.

1 Introduction

In recent years, digital content development with applications to the preservation of artifacts relating to the arts, languages, ecology, living styles, etc. has been studied and implemented worldwide [1,2]. Most of the digital contents emphasized artifacts rather than the craft in making or the skill in using these artifacts. Besides, folklore and religious rituals have their spiritual meaning that step-by-step procedure embeds

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significant meaning for a people or a religion. In this paper, as a preliminary study of digital content development for crafts, skills, and rituals, we applied the techniques of digital preservation, metadata, and E-learning to digitize folklore crafts, skills, and rituals for both preservation and online education. The same concept has been applied to digitize childcare standard operation procedures (SOPs) [3]. The SOPs mentioned here can also be referred to hospital operating procedures, experimental procedures for implementing scientific researches, or the processes of natural phenomena, such as photosynthesis in biology, reactions in biochemistry, hurricane generation in meteorology, etc. In contrast to general non-interactive e-learning and traditional classroom learning style, we proposed a metadata-based method for recording each step as a metadata record in which the title, description, associated digital media, and other related information are all included. Metadata format compatible with the Dublin core [1] was adopted, in which the "Relation" element contains two quantifiers, i.e. "Has Part" and "Is Part Of", is used to interlink between the main (parent) metadata record and its children metadata of individual steps.

The motivation and significance of this project are manifested in three aspects. First, in addition to folklore artifacts [2], folklore crafts, skills, and rituals play the same important roles in preserving our ancestor's wisdom. Second, media richness facilitates learning of courses with high uncertainty and equivocality [4]. Third, e-learning with interactive videos gains more learner satisfaction than non-interactive and traditional classroom learning according to recent studies [5].

1.1 Merits of Folklore and Folklore Education

The importance of folklore can be manifested by Alan Jabbour's speech in the 100th anniversary of American Folklore Society, which stated that "folklore reflects on the ancestral missions that have shapes us, the inherited values that we reflect and must radiate into the future" [6]. The word "folklore" may refer to unsubstantiated beliefs, legends, and customs, currently existing among the common people [7] or substantiated artifacts, crafts, skills, and rituals, widely governing the living style of the common people [2]. It can be stated that folklore customs take shape within a definite area, among a group of people in a collective environment. After a long period of settling and accumulation, during which the people can make their own choices and spur each other on a certain way of life, and then a certain mindset gradually emerge, which in turn lead to folk customs, religious beliefs, and value systems. People growing up in the same circle of folklore and customs will mutually understand each other, and will have the similar beliefs and share a worldview and a tacit understanding about many practices.

1.2 Folklore Artifacts and Their Relations to Folklore Crafts, Skills and Rituals

In general, folklore refers to the society and culture tradition of the common people and the customs practiced and beliefs held by the vast majority of people in the cultural mainstream that they have inherited from their ancestors, including legends, stories, religious beliefs, festivals, ancestor worship, taboos, ceremonies, leisure activities,

music, singing, dance and so forth [2]. As a result, the value of folk artifacts, crafts, skills, and rituals lies in their demonstration of popular conceptions, life wisdom and the ancestral legacy hidden within the culture. Their basic value lies in their tight intermeshing of spirituality, psychology, and social mores; and their social functions and symbolic cultural meanings lie largely in their artistic and historical worth. In a previous investigation, we had finished content development and digital preservation of the Taiwanese folklore artifacts [2]. In this paper, we focus on the folklore craft in making and the skill and ritual in using these artifacts. For example, the craft in making puppets concerning wood sculpture, painting, clothing, and decoration, while the skill of using or playing the puppet in religious rituals regarding delicate finger operation, hand control, and arm and body movements.

Folklore objects and activities can be classified into four different types which include artifact, craft, skill, and ritual. One of our previous investigations focused only on digitization of folklore artifacts which are divided into ten categories [2]. In this paper, three types of folklore activities were added to make the folklore content and preservation more complete so that the spirits of folklore can be demonstrated more exhaustively. Table 1 shows the classifications and categories of the folklore artifacts and activities. An example of step-by-step demonstration of making puppet head is demonstrated in Table 2.

2   Materials and Methods

An artifact is related to static presentation of the folklore, which is usually an artwork produced by a craftsman, and eventually used as a tool in daily life or a utensil in a ritual. The skill refers to the use of artifacts skillfully in a ritual, daily life, or ceremony. Therefore, in this study, we classified the folklore objects and activities into four types, i.e. artifact, craft, skill, and ritual. The latter three types are referred to folklore activities embedding dynamic characteristics that can be delineated and recorded by step-by-step video clips.

Step-by-step folklore activities were demonstrated practically by the folklore specialists invited to participate in this study and the actions were taken by a professional photographer using a digital camcorder. The text and oral description of a folklore activity were done by a folklorist who majors in this specific activity. Video clips of individual steps were obtained by using the video editing software to edit a video sequence and saved as the Microsoft wmv and Apple Quicktime formats. These video clips were then combined with other related information and recorded using metadata format compatible with the Dublin core standard. Metadata designed based on the Taiwanese folklore artifacts [2] were extended to include folklore crafts, skills, and rituals.

2.1   Media Richness and Interactive Videos to Facilitate Learning

People generally acquire knowledge using different modalities and that individuals possess varying degrees of strength in each of them. In recent years, a great deal of research has been done on learning styles. Extensive research has been done concerning

different learning styles or modalities [8,9]. Some students are visual learners, and others are auditory or kinesthetic learners. Some students learn globally, some analytically, some in a random fashion, while others learn sequentially. In a meta-analysis of learning and modalities study, Reiff [9] found that approximately 25% to 30% of students in a classroom are auditory learners, 25% to 30% are visual learners, and 15% are kinesthetic learners. Flaherty [8] reported that about 40% of students in K-12 consider themselves visual learners, 20% believe they are auditory, and 40% say they are kinesthetic learners. It is clear from these examples and many more found in numerous research articles, that although some students have strengths and weaknesses in certain modalities, most students learn with all their modalities [9].

Although different people have their individual strength for learning with various senses, the auditory and visual senses, manifested by video learning, seem to be more efficient for most people. More recent investigations showed that interactive videos are more effective than non-interactive videos [5]. It was also found that high media richness facilitates learning for courses with high uncertainty and equivocality, while it might cause distraction or loss of focus for courses with simple tasks [4]. Folklore artifacts, crafts, skills, and rituals embed abstract social, psychological, and spiritual concepts and sometimes unsubstantiated believes [7], they will definitely need high richness media to facilitate learning for learners with various age groups. In this paper, we apply metadata for constructing individual steps of the folklore crafts, skills, and rituals to support interactive multimedia environment emphasizing on interactive video for online folklore education.

2.2 Metadata Design and Webpage Implementation

In Table 2, an example of metadata showing individual steps of the procedure for delineating puppet head making is given. Each step in this table has a corresponding video segment. Additionally, a main (parent) metadata record is used to interlink with its related activity steps (children) by the "Relation" element proposed by the Dublin core, in which, as shown in Fig. 1, the element contains two Quantifiers; i.e., "Has Part" and "Is Part Of" for describing the sequential relation between the parent and
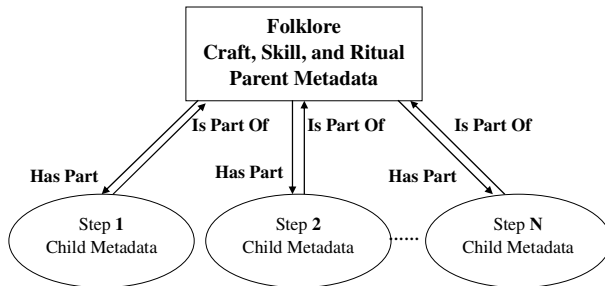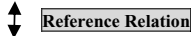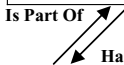

Fig. 1. Relationships between a parent metadata record and its children steps

Type	Collection Type	Folklore Artifact
	Sub Collection Type	Arts and Recreation
Title	**Budai Opera Puppet**	
Subject	Classified Number	AARPU_00
	Content	Hand Puppet Theater
	Situation and Function	Traditional Hand Puppet Theater has a very classical and refined flavor about it. It has seven major characters, including students, females, clowns, monks/nuns, children, miscellaneous and beasts
Relation	Has Part	
	Is Part Of	
	Reference Source	CACPU_00

↕ Reference Relation

Type	Collection Type	Folklore Craft
	Sub Collection Type	Artistic Carving
Title	**Taiwanese Hand Puppet Theater-The craft of making the puppet head**	
Subject	Classified Number	CACPU 00
	Content	Hand Puppet Theater
	Situation and Function	The head of the puppet is important as it gives it life and personality. The types of heads can be divided overall into "san gu" (lit. three bones) and "wu hsing" (lit. five forms). San gu refers to the brow, cheeks, and jaw bone, while wu hsing refers to the two eyes, two nostrils, and mouth. San gu and wu hsing endow the puppet it's own aesthetic beauty, personality, and emotions and feelings.
Relation	**Has Part**	CACPU_01, CACPU_02, CACPU_03, CACPU_04, CACPU_05, CACPU_06, CACPU_07, CACPU_08, CACPU_09, CACPU_10
	Is Part Of	
	Reference Source	**AARPU_00**

Is Part Of ↗   Is Part Of ↑   Is Part Of ↘

Has Part   Sequential Relation   … …   Has Part

Type	Collection Type	Folklore Craft
	Sub Collection Type	Artistic Carving
Title	**Selecting wooden blanks**	
Subject	Classified Number	CACPU_01
Relation	Has Part	
	Is Part Of	**CACPU_00**

Type	Collection Type	Folklore Craft
	Sub Collection Type	Artistic Carving
Title	**Applying varnish and hair application**	
Subject	Classified Number	CACPU 10
Relation	Has Part	
	Is Part Of	**CACPU_00**

↓ Has Part

Type	Collection Type	Folklore Craft
	Sub Collection Type	Artistic Carving
Title	**Sculpting work**	
Subject	Classified Number	CACPU 02
Relation	Has Part	
	Is Part Of	**CACPU_00**

Fig. 2. A metadata example for implementation of sequential and reference relations

children metadata records. Additionally, the Quantifier "Reference source" is applied for expressing its relationship with other artifacts or folklore activities. The "Has Part" Qualifier is used for the parent metadata record to relate to its children steps, while the "Is Part Of" for the child steps to trace back to their parent.

A practical example describing the sequential relation and reference relation for the craft of making puppet head is shown in Fig. 2. With this mechanism, all the child steps can be tightly connected to their parent so that the ASP webpage design program can support flexible interaction between the users and the browsers for easy navigation. Also as shown in Fig. 2, the Quantifier "Sub-Collection Type" was added to the Element "Type" in the metadata proposed in [2]. A Microsoft SQL2000 server is built for handling database management and query. The web pages were designed using ASP.net.

3   Results

Figure 3 shows the homepage of the website supporting the digital preservation and online education for folklore crafts, skills, and rituals, where (a) shows the main metadata record in English and (b) in Chinese interfaces and descriptions. As depicted in the figure, the frame at the left allows the user to select the topics that he/she wants to browse. For each craft, skill, or ritual, a step-by-step video demonstration accompanied with either Chinese or English description can be selected by the 中 文 (Chinese) or English button. The user can click Play button or click an icon related to its individual step to enter into step-by-step demonstration, as shown in Fig. 4. As demonstrated in this figure, the user can choose continuous play by clicking on the Continuous button or step-by-step play by selecting the desired step from the icons displayed at the bottom of the right frame, or using Previous or Next button to navigate sequentially. A user who intends to go back to the main metadata page (Fig. 3) can just click the Main button. For interoperation, web pages with XML format compatible to the Dublin core can be initiated by clicking the XML button.

4   Discussion and Conclusion

Jensen [10] noted that when more senses are involved in the learning process, a greater impression is made and the longer the information stays with the learners. An enriched environment creates a thicker cortex within the brain, more dendrite branching, more growth of spinal nervous, and larger cell bodies that lead to cells that communicate better. An enriched environment is multi-sensory so that people are able to see, hear, say and do as they learn. Fauth [11] and Jensen [10] indicated that people retain 10% of what they read, 20% of what they hear, 30% of what they see, 50% of what they see and hear at the same time, 70% of what they hear, see, and say, and 90% of what they hear, see, say, and do. Jensen [10] also noted that most people learn many things at the same time due to the abilities of their brains to process concurrently vast amounts of information, emotion, and awareness.

Einstein stated that he felt an idea first, and then experienced it through visual and kinesthetic images, before he was able to put the idea into words [12]. Diamond [13] demonstrated that enriching the learning environment changes the structure and ability of the brain's cerebral cortex.

Table 1. Categories and examples of Taiwanese folklore artifacts and activities. Refer to [2] for examples of folklore artifacts.

Collection Type	Sub-Collection Type	Example
Craft	Carving	Wooden utensil carving, bamboo utensil carving, leather carving, idol carving, puppet head carving, jade carving, etc.
	Weaving	Bamboo leave conical hat weaving, lantern weaving, tradition coir raincoat weaving, straw sandal weaving, Chinese macramé, "dark flower" weaving, xiangbao weaving, embroidery.
	Molding	Pottery, leather, dough figurines, candy blowing, glass, jiaozhi pottery, cutting and pasting, etc.
	Painting/ Dying	New Year's paintings, block print paintings, Taoist written incantations, Chinese opera face makeup, idol painting, painting of objects, cloth dying, plant dying, etc.
	Folk Culture Items	Calligraphy brush making, Chinese ink preparation, drum making, fan making, oil umbrella making, lacquerware making, papier mache making, kite making, top making, etc.
	Metal Objects Manufacturing	Gold objects, silver objects, tin objects, iron objects, bronze objects, etc.
	Special Crafts	Lion head making, miniature carving, micro carving, rice carving, brick carving, egg carving, hair carving, shell painting, etc.
Skill	Traditional Opera	Nanguan performances, beiguan performances, nanhu performances, bayin performances, erhu performances, dulcimer performances, pipa performances, bamboo flute performances, sheng (a reed pipe instrument) performances, etc.
	Musical Instrument Performances	Bajiajiang performances, Songjiang Battle Array performances, Cheguzhen performances, dance drumming array performances, bull fight dance performances, cloth horse dance performances, Taiwanese aboriginal dance performances, lion dance performances, etc.
	Dance Performances	Boxing performances, knife performances, spearplay performances, swordplay performances, staff performances, taichiquan performances, qigong performances, etc.
	Martial Art Performances	Top spinning performances, stilt performances, diablo performances, shuttlecock kicking performances, jump rope performances, Zhongkui dance performances, war drum performances, puppet performances, etc.
	Special Performances	Nanguan performances, beiguan performances, nanhu performances, bayin performances, erhu performances, dulcimer performances, pipa performances, bamboo flute performances, sheng (a reed pipe instrument) performances, etc.
Ritual	Religious Ceremonies	Buddhist, Taoist, Protestant, Catholic, Islam, and Yi Guan Dao ceremonies, etc.
	Belief Rituals	Venerating the Ruler of Heaven, the Earth God, Matzu, Buddha and ancestors, Avalokiteshvara, and Guan Gong, etc.
	Pray Ceremonies	Sending of the royal barge, the Jianjiao Ritual, the Raojing Ritual, the Incense Offering Ritual, the Gehuo Ritual, the Water Lantern Ritual, the Sky Lantern Festival, and the Qianggu Ceremony, etc.
	Celebrations and Festivals	New Years, Lantern Festival, Tomb Sweeping Day, Dragon Boat Festival, Ghost Month, Autumn Moon Festival, Winter Solstice, and Weiya (end of the year party), etc.
	Aboriginal Ceremonies	The Pas-taai Festival, the Harvest Festival, the Ear-Shooting Festival, the Flying Fish, the Eel Worshipping Festival, and the Qiandian Ceremony, etc.
	Special Ceremonies	Tossing Boabwei, divining by the Eight Diagrams, the soul leading ceremony, the Guanluoyin Ceremony, exorcising ceremonies, Antaisui Ceremony, etc.
Artifact		Clothing and Jewelry, Kitchenware and Dinnerware, Furnishings, Transportation, Arts and Recreation, Machinery and Tools, Religion and Religious Ceremonies, Aborigines, Study, Documents and Deeds.

Table 2. Step-by-step descriptions of the folklore craft for puppet head making

Step	Name	Description
CACPU_01	Selecting wooden blanks	The wood from Chinese Phoenix, red-bark oak, long-an, camphor trees are generally used in the making of blanks as they are hard but light, easy to carve, don't warp easily, and easy to manipulate because of their lightness. Wood blanks are soaked in water for three to four years before the carving work begins to make them durable and prevent them from rotting
CACPU_02	Sculpting work	The head of the puppet is first roughly etched into the wooden blank using an appropriately sized axe. A V-shape blade is first etched onto the wood carving tools such as slanted, round, and flat-edged knifes are used to define more clearly the san-gu (three bones) and wu-hsing (five shapes). Extra care must be paid to the shaping of the ears. The work of each craftsman is different.
CACPU_03	Refining work	After the rough carving is finished, the craftsman brings out the facial features, including the corners of the eyes and mouth, nostrils, philtrum, nasolabial furrows, and ear holes and lobes.
CACPU_04	Sanding	Coarse sandpaper is used several times to smooth the uneven inner and exterior surfaces of the doll.
CACPU_05	Paper covering	Ultra-fine, permeable tissue paper (also used in traditional Chinese painting) is affixed to the head with paste to cover the pores of the wood and to give it a "fleshed out" feeling when it is completed. Over time as the paint peels and reworking is needed, the paper is much easier to peel off.
CACPU_06	Applying sand-based plaster	The wood is painted with a mixture of finely filtered yellow sand and glue (3:1 ratio). They are boiled until they melt and combine). From five to eight layers are applied. After the paint is dry, the wood is carefully and repeatedly sanded down until it is smooth and free of coarse wood pores. From five to eight coats of plaster are needed.
CACPU_07	Smoothing the plaster surface	After the plaster is applied, the wood is dried naturally in the sun. Coarse and fine sand paper is then used to smooth out paintbrush and carving marks, leaving the wood smooth. The work is finished when there are no visible coarse wood pores.
CACPU_08	Lacquering	A mixture of colored powder and glue in 3:2 ratio is cooked together. From five to eight coats are applied to the now sanded and coated wooden blank.
CACPU_09	Applying face make-up	After the lacquer is applied, traditional paints are used to create the face pattern. It is used to make eyebrows, eye sockets, lips, wrinkles, commode (a traditional kind of head piece), and black hair.
CACPU_10	Applying varnish and hair application	Hair may be put into a bun or alternatively facial hair such a beard, moustache, or whiskers can be added depending on the age of the character. Either real hair or silk threads are dyed then affixed into prepared holes and affixed firmly into place using hot glue. The hair is styled based on the role it will play.

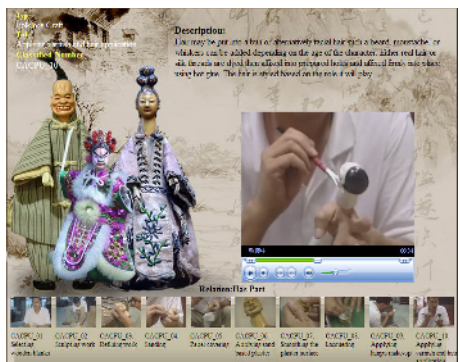(a)   (b)

Fig. 3. Web pages for showing main (parent) metadata record of making puppet head with (a) English and (b) Chinese interfaces and descriptions

(a)

(b)   (c)

Fig. 4. Web pages for showing child metadata of making puppet head for (a) Step 1, (b) Step 2, and (c) Step 10, respectively

All the above psychological and educational theory and studies support interactive learning to be a more effective method for training of practical skills. In conclusion, in this preliminary study, digital preservation of folklore crafts, skill, and rituals using metadata has been proposed. The potential of using these materials with media richness and high interactivity for providing step-by-step demonstration of the task has been addressed. Metadata used for digital preservation of the Taiwanese folklore artefacts have been extended to accommodate folklore activities including crafts, skills, and rituals. The "Has Part" and "Is Part Of" identifiers in the "Relation" element are used to link the parent metadata record with its related children records for delineating sequential relation, while the "Reference" identifier used for linking among resources in the 4 categories. The system providing interactive learning and is expected to attain more effectiveness than the non-interactive learning [3,4,5]. Further large-scale investigation and evaluation will be done in our institutions. The proposed method will be also applied to preservation and education of folklore crafts, skills, and rituals in the near future.

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