

A Study of Applying Sakizaya Tribe's Palamal (the Fire God Ritual) into Cultural Creative Products Design

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Abstract. The Palamal is a memorial ceremony during which the Sakiazaya people to worship their ancestors. This study is based on searching for possibilities in applying the Sakiazaya Palamal to the creative culture industry as the main research issue, emphasizing the integration of interdisciplinary fields. Besides conferring the dance gestures, ritual clothing and decorations for the Sakiazaya Palamal, research for product design development will also be held in coordination with the Sakiazaya performance promotion.

As for the research methodology, collecting literature data and onsite interview will be used for this project; through the investigation of the Sakiazaya cultural tradition and the understanding of ceremony rituals and worship utensils, this study intends to present the rich and vivid culture with a new look, the combination of traditional elements with modern creative ideas will transform our cultural essence into commercial culture products and artistic performance. The transformation process must be treated with respect, thus, we must understand the taboo and the deeper meaning of the culture to prevent conflicts due to cultural differences.

Keyword: Sakizaya, Palamal (the Fire God Ritual), culture creative industry

1 Introduction

The Sakizaya tribe was the subject of this study. The Sakizaya were officially recognized as the 13th Taiwanese aboriginal tribe in 2007. In 1878, the government of the Qing Dynasty advanced into Eastern Taiwan in the name of developing Taiwan. This advance resulted in a famous conflict between the Qing government and the Sakizaya people, who are native to the Daguhuan Lake, Hualien County. This conflict, historically known as the Kaliawan Incident, caused an extreme sacrifice among the Sakizaya people. Fearing reprisals following the event, the survivors fled their homes, concealed their identities, and hid themselves among the Amis tribe. During the colonial period, the Japanese classified the aboriginals and categorized the Sakizayas as Amis. Subsequently, the name, Sakizaya, became nonexistence in the official literature [5, 12].

Through the present, the Sakizaya have suffered substantial losses in their identity, bloodline, and language. Cultural reconstruction is extremely difficult. The Sakizaya tribe has wandered for more than a hundred years, during which its culture has integrated with and been affected by the Amis tribe. However, after the Sakizaya people have gained official recognition following the name rectification campaign, what faces them now is series of difficult challenges.

2 Research Purpose

In *The Invention of Tradition*, Hobsbawm indicated that “traditions which appear or claim to be old are often quite recent in origin and sometimes invented” [3]. In this study, the remnants of the culture of the Sakizaya tribe were used as elements for cultural and creative design, to develop products featuring Sakizaya tribal characteristics. Through a literature review, interviews with Sakizaya elders and tribal members, and participation in the Sakizaya tribe’s festival activities (i.e. the Palamal Ceremony [the Fire God Ritual] and the Sakur Tribal Harvest Festival), characteristic cultural elements were extracted and applied to derive creative cultural product designs. Subsequently, this study endeavored to understand the evaluations and response of the tribal people and consumers toward these designs, thereby promoting Sakizaya cultural characteristics.

3 Literature Review

3.1 Culture and Society of the Sakizaya Tribe

Chun-Nan Chen is a member of the Sakizaya tribe. In his PhD thesis, *Study of Sakizaya Culture and Official Recognition*, the social culture, name rectification process, and current predicaments that the tribe is encountering were extensively described [1].

3.1.1 Ceremonies and Rituals

The Sakizaya referred to God as Dito; this figure corresponded to the Amis’ figure of Kawas. Like the Amis and other aboriginals, the Sakizaya believe that all things possess spiritual essence and that supernatural powers exist everywhere. Additionally, they believe that Dito includes ancestral spirits. The Sakur believe that when people die, their spirits pass through the valleys of Malon Mountain, drifting toward the east, into the ocean. During the Sakur tribe’s harvest festival, sacrificial offerings are placed in the direction of Malon Mountain; the chief priest reads prayers toward Malon Mountain, facing the ocean. The houses of the Sakizaya all face the direction in which sunrise occurs; the Sakizaya view the east as sacred and irreplaceable. To enhance tribal sentiments and cohere tribal identity, since 2006, the Sakizaya have held Palamal ceremonies annually to commemorate the people who sacrificed themselves in 1878 during the Kaliawan Incident. During the occurrence of the name recti-

fication process, the Palamal ceremony became the representative ritual of the Sakizaya tribe.

3.1.2. Social Structure

Originally, the Sakizaya followed a system by which heredity was matrilineal, and men were married into their wives' families. However, after 1930, with the increasing trend of typical matrimony, the matrilineal system began to collapse. Similar to the Amis, the Sakizaya tribe was also divided according to age. Young age-based hierarchy groups provide labor and military protection for the tribe, and engaged in major organizations of public affairs. Between settlements, the Sakizaya used common age-based hierarchy names, whereas the Amis used different age group names in different settlements.

3.1.3. The Palamal Ceremony (the Fire God Ritual)

Since 2006, the Sakizaya tribe has held the Palamal ceremony annually. The Palamal ceremony is viewed as the most major and representative traditional ceremony, and is held in memoriam of the Sakizaya tribal hero Komod Pazik and his wife Icep' Kanasaw [1].



Figure 1 The Palamal Ceremony

(Retrieved from Taiwan's Aboriginal Culture History and Language Dictionary)

In 1878, the Sakizaya tribe experienced a conflict with the Qing army, and eventually resisted the Qing army in conjunction with the Kavalan tribe, resulting in the Kaleawan Incident. After the conflict, the chief couple was executed by the Qing army through the process of "slow slicing (*Lingchi*)". The remaining members of the tribe fled their homes and hid themselves among the Amis, to avoid being massacred by the Qing army. One hundred years later, these ancestors who had sacrificed themselves to defend the homes and lives of their fellow tribe members had yet to be enshrined. During the process of regaining recognition, the Sakizaya decided to enshrine Komod Pazik and Icep' Kanasaw as the god and goddess of fire, and through the Palamal ceremony, commemorate all tribal people who had sacrificed their lives [2].

3.2 Theory and Practice of Cultural Creative Design

Norman presents in his book "Emotional Design" three levels of emotional design—visceral, behavioral and reflective. The visceral level involves direct feelings when in touch with a product, including shape, style, tactile impression, material and

weight. The behavioral level is non-conscious, including the pleasure after exercise, or the delight after a shower. The reflective level presents conscious behaviors such as the pop culture or style and tastes [11].

Leong and Clark suggest a brief framework for investigating cultural product design, dividing it into three space structures as the external concrete tactile level, middle behavioral level and the inner invisible spiritual level [7]. Hsu, Lin and Chu expand the three levels, offer more detailed explication, and provide a cultural creative design model which could further facilitate comparison, application and thinking for design (Figure 2) [4, 8]. This theoretical framework could serve as the focal points when investigating individual stages for cultural product design.

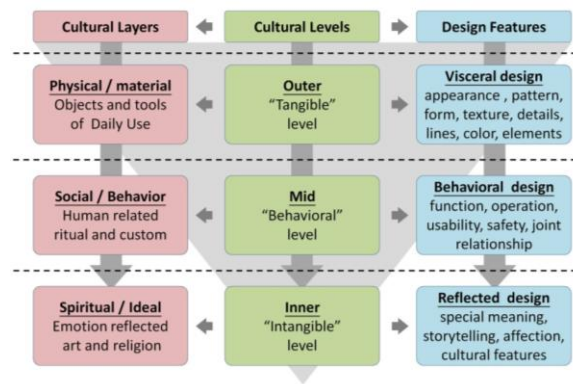


Figure 2 Three Layers of Cultural Creative Design Model (Hsu, Lin, & Chu, 2004)

Starting the 80s, design scholars has been devoted in research of product semantics. Krippendorff and Butter claimed that conventional semantics stress the interrelationship among sign, referent and thought, emphasizing linguistic expression; product semantics, on the other hand, looks at a product as a symbol system, investigates the symbolic qualities of a product from the perspectives of its operation and application and employs the knowledge for product design [10]. They suggested that, from product semantics, the success of product design relies not only on the physical and biological functions of the product but also its psychological functions and its links with the social and cultural context.

4 Analysis of Design Cases

4.1 Design Case A: Eraser

- Design concept:

In the Kuofu neighborhood of Hualien, festivals are held at the Sakizaya ceremonial square, where eight boulders representative of admonitions for Sakizaya people were erected. The first four boulders represent God's duties: making the wind blow,

the rain drizzle, the earth grow, and the fire roast; the last four represents the principles of living: work hard, love God, love oneself, and love others. Erasers were designed to mimic the appearance of the boulders, representing the ability to correct small mistakes.



Figure 3 Array of boulders describing God's duties

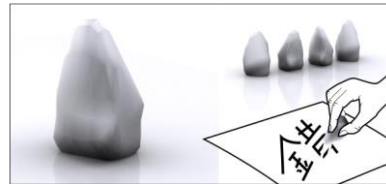


Figure 4 3D schematic of admonition eraser

Based on Figure 2, the external appearance of the white boulder represents the outer, tangible cultural level, and the symbol of the boulder represents the admonitions of the tribe and belongs to the inner ideal cultural level.

4.2 Design Case B: Pulong Fruit Platter

During major Sakizaya ceremonies, sacrificial offerings are surrounded by miscanthus posts, called pulongs in the Sakizaya language. The pulongs prevent evil spirits from entering the space where sacrificial offerings are presented to the ancestral spirits. Other spirits and ghosts are prohibited from entering. The fruit platter is designed to create the image of the pulongs. Fruit forks are designed according to the appearance of the miscanthus posts, and can be erected around the fruit platter. When the fruits are placed at the center of the plate, a certain sacrificial offering image is created, representing the pulongs protecting the fruits, preventing evil spirits from consuming them.



Figure 5 Miscanthus posts

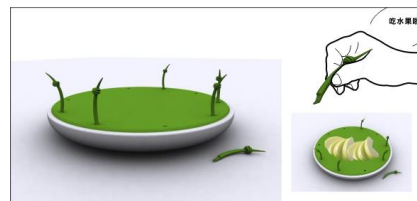


Figure 6 Schematic 3D diagram of the pulong fruit platter

According to Figure 2, the appearance of the green miscanthus posts is associated with the tangible cultural level; insertion of the miscanthus posts by users represents the behavioral level; and the imagery of protecting the offerings from outer evil spirits represents the inner ideal level.

4.3 Design Case C: Bamboo (Bitonay) Fence Keychain

The building of bitonay fences was the most essential and special custom involved in the age hierarchy ritual of the Sakizaya tribe; interviews with tribal elders confirmed that the building of bitonay fences was a well-established tradition. During the

Kaleawan Incident, the Qings were reportedly in an inferior position to the Sakizaya, and could not break through the more than 50 bitonay fences despite repeated attacks during their invasion. The age advancement ritual (Langat) was held every 8 years in the past, and thus the bitony fences may have had a history of more than 400 years. Regrettably, the Qing army burnt the fences, forcing the Sakizaya out of their homes [14]. The fence building was not only critical in the age advancement ritual, but also implicated the protection of Sakizaya homes. In the present day, keys are essential tools for entering one's home. Thus, the bitonay fence can be designed to form a keychain that can be used to store keys and symbolize a device that protects one's home.

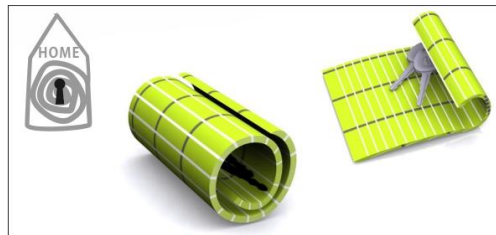


Figure 7 Guarding Pass (Source: Chan, 2007) Figure 8 3D schematic of the Bitonay Fence Keychain

The fence represents the tangible cultural level; the Langat ritual is a custom for celebrating the advancement of age, which represents the behavioral level; and the bitonay fences represent protecting the homes and aging of tribal people, which is associated with the inner ideal cultural level.

4.4 Design Case D: The Triangle Stone Double Bolster Pillow

Sakizaya apparel is often decorated with triangles, the concept of which originated from the legend of the triangle stone mark. According to legend, God carved a wall of chastity for Damo and Namoh on the side of the mountain; this carving appears as a triangular mark when viewed from the Kuofu neighborhood. The green pillow represents the mountain, and the white triangle represents God's mark described in the legend. In the design of the double bolster pillow, the undying affection between man and woman is represented. The triangular totem embroidered on the pillow protrudes slightly. After waking, the sleeper's cheek is imprinted with the triangular mark.



Figure 9 The triangle stone mark on the Shapotang mountain

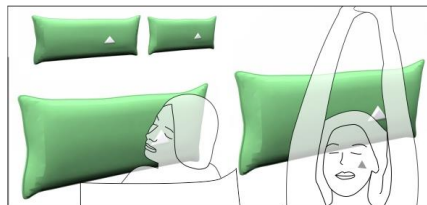


Figure 10 3D schematic of the triangle stone double bolster pillow

According to Figure 2, the white triangular stone mark represents the tangible cultural level, and a couple's sacrificial and dedicated spirit represents the inner ideal cultural level.

4.5 Design Case A: Eraser

Each of the boulders located in the Sakizaya ceremonial square features a totem. As shown in Fig. 11, the curves on each of the four corners represent God's duties: the blowing of the wind (upper left), the roasting of fire (lower left), the drizzling of the rain (upper right), and the growing of the earth (lower right), which create the cycle of universe and denotes God's duties. God fulfills his duty to allow the people to be fed. Dishware engraved with totems representing God's operation was designed, to thank God for providing the people with food today.



Figure 11 Totem on the boulder



Figure 12 A 3D schematic of the totem dishware

The Sakizaya tribal totem represents the tangible cultural level, and the implication of the totem represents the inner ideal cultural level.

4.6 Design Case A: Eraser

This design also applied the boulder totems to the design of a table set. The transparent material in the center symbolized the water, wind, fire, and earth, which were each represented by blue, transparent, red, and brown, respectively. The tabletops were paired with a white surface, incorporating the natural landscape into the furniture design.

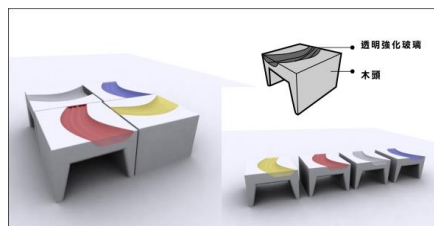


Figure 13 3D schematic of the tables of earth, wind, water, and fire

The Sakizaya tribal totem is associated with the tangible cultural level, and the implication of the totem is the inner ideal cultural level.

4.7 Design Case A: Eraser

According to literature, the Sakizaya were often harassed by the Taroko in the past. To protect their tribe, Sakizaya warriors shot tree nuts with slingshots, stopping the enemy beyond 100 yards. A chair designed based on the concept of the slingshot can increase interaction between people. A person pulls the slingshot while another sits on the chair, simultaneously receiving a massage and feeling euphoric. The slingshot is no longer used as a weapon of human onslaught, but is adopted in the chair design to symbolize the relegation of past rivalries.



Figure 14 Aboriginal slingshot

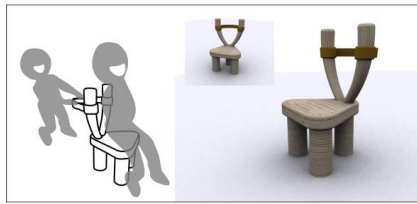


Figure 15 3D schematic of the slingshot chair

The appearance of the slingshot chair is the tangible cultural level; the action of pulling the slingshot is the behavioral cultural level; and attacking the enemy and protecting fellow tribal members is the inner ideal cultural level, which was transformed into a symbol of reconciliation with other tribes in this study.

5 Research Methodology

5.1 Research Process

In this study, the history and culture of the Sakizaya tribe were used as a foundation to apply extracted cultural elements to the design of innovative cultural products. Through a literature review, interviews with Sakizaya members (i.e., elders, a clothing designer, and the chief), and participation in the Sakizaya harvest festival and the Palamal ceremony, an in-depth understanding of tribal culture and stories was obtained. Subsequently, innovative cultural products were designed incorporating Sakizaya cultural elements. Finally, a design case evaluation survey was conducted.

5.2 Research Instrument

The survey was divided into four sections. The first section involved collecting demographic information. The second section comprised an evaluation survey of design cognitions. The third section involved requesting participants to rank their three favorite design cases. The fourth section involved assessing the properties of the design cases by using adjectival vocabularies. The second and fourth sections of the survey are described in detail as follows.

Lee proposed a cross-cultural design research framework, to investigate cultural variables, design characteristics, and the relationship between function, aesthetics, and

symbols [6]. The survey content of the second part of this study was divided into four dimensions—design sense, functionality, the application of cultural elements, and overall preference. Using a 5-point Likert scale, the participants were asked to assess the design cases.

In assessing the properties of the design cases by using adjectives, the data obtained were analyzed using the multidimensional scaling (MDS). MDS is used to classify observational values, and is a data analysis method for determining whether a potential structure exists in the data [13]. In this study, eight sets of semantic vocabularies that describe the design styles were selected by experts to construct a 5-point scale semantic analytic survey. The results were analyzed by using MDS.

The eight sets of semantic vocabularies were as follows: “austere-cool,” “elegant-gorgeous,” “ornamental-practical,” “abstract-figurative,” “serious-humorous,” “fashionable-traditional,” “complex-simple,” and “refined-rough.”

6 Research Results and Data Analysis

6.1 Design Evaluation and Discussion

A total of 166 surveys were completed in this study. The study participants were Taiwanese and their academic backgrounds were divided into three categories: product-design-related, design-related, and nondesign-related. Finally, seven design cases were sent to the tribal members through the mail, and the relationship between the responses of the participants and tribal member was determined. The key results and findings were classified and sorted as follows.

6.1.1 Cognitive Difference between Study Participants and Tribal Members

The 166 participants were asked to rank the three designs they preferred, where the most preferred design was assigned a score of 3, followed by 2 and 1, and no scores were given for the remaining items. After tabulating the scores, the slingshot chair, totem dishware, and totem table set were ranked respectively from first to third.

Table 1 The rankings of study participants’ and tribal members’ favorite products

Ranking	1	2	3
Tribal Members			
Study Participants			

The seven design works were presented to the tribal members (Chief De-Yung Huang and Tribal Elder Huang, Chin-Wen), and Chief Huang was satisfied with and intrigued by the design products; his three personal favorites, in descending order,

were the bitonay keychain, the triangle stone double bolster pillow, and the boulder eraser. Clearly, product rankings were substantially different between tribal members and the study participants.

6.1.2 ANOVA Analysis of the Preference of the Design Works

The analysis of variance (ANOVA) results indicated that academic background significantly affected how people evaluated each design case dimension (Table 1). Participants with design-related and nondesign-related academic backgrounds appreciated the products more than did participants with product-design-related knowledge. We speculated that participants with product-design-related academic backgrounds used stricter product design evaluation standards compared with those possessing design-related and non-design-related backgrounds.

Table 2 ANOVA for overall assessment by the influence of academic background

Product	Factor	Source of Variance	SS	DF	MS	F	Scheffe
A. Eraser	application of cultural elements	Between groups	13.493	2	6.747	9.763***	2>1
		Within group	112.642	163	0.691		
		Total	126.136	165			
B. Pulong Fruit Platter	design sense	Between groups	5.781	2	2.891	3.901*	2>1
		Within group	120.766	163	0.741		
		Total	126.547	165			
C. Bamboo (Bitonay) Fence Keychain	design sense	Between groups	6.678	2	3.339	4.573*	2>1
		Within group	118.998	163	0.73		
		Total	125.675	165			
D. The Triangle Stone Double Bolster Pillow	application of cultural elements	Between groups	6.863	2	3.431	4.052*	2>1
		Within group	138.024	163	0.847		
		Total	144.887	165			
E. Totem Dishware	application of cultural elements	Between groups	5.546	2	2.773	4.841**	2>1
		Within group	93.36	163	0.573		2>3
		Total	98.906	165			
F. Tables of Earth, Wind, Water, and Fire	design sense	Between groups	5.981	2	2.991	5.002**	3>1
		Within group	97.456	163	0.598		
		Total	103.437	165			
G. Slingshot Chair	design sense	Between groups	8.623	2	4.311	7.013***	3>1
		Within group	100.205	163	0.615		2>1
		Total	108.828	165			
G. Slingshot Chair	functionality	Between groups	10.768	2	5.384	10.918***	3>1
		Within group	80.385	163	0.493		2>1
		Total	91.154	165			
G. Slingshot Chair	overall preference	Between groups	6.915	2	3.458	4.065*	3>1
		Within group	138.628	163	0.85		
		Total	145.543	165			

* $P < 0.05$ ** $p < 0.01$ *** $P < 0.001$

1: product-design related 2: other design fields 3: non-design fields

6.2. MDS Analysis of the Design Cases

The seven design works and eight sets of adjectival vocabularies were analyzed by using MDS. SPSS software was used to compute the two crucial correspondence indices of the two-dimensional (2D) spatial plot; the Kruskal's stress and the determination coefficient (RSQ) were 0.08497 and 0.98545, respectively. The former was less than 0.01, whereas the latter approached 1, indicating that the spatial relationships

between the seven products and eight sets of attributes could be appropriately represented in 2D. The stress index indicated that the 2D plot and the original data exhibited satisfactory fit; the RSQ indicated that the 2D plot was capable of explaining 98.55% of the variance in the seven products and eight-set attributes [9].

A 2D plot was formulated following MDS analysis, and factor analysis was conducted on the eight sets of adjectival vocabularies selected by the participants. The preliminary 2D distribution plot of the seven design works was divisible into three major groups, which also happened to include the high and low scoring groups. The first group (high score) comprised the totem dishware, totem table set, and pulong fruit platter; the second group (high score) consisted of the slingshot chair; and the third group (low score) comprised the triangle stone double bolster pillow, bitonay keychain, and the boulder eraser.

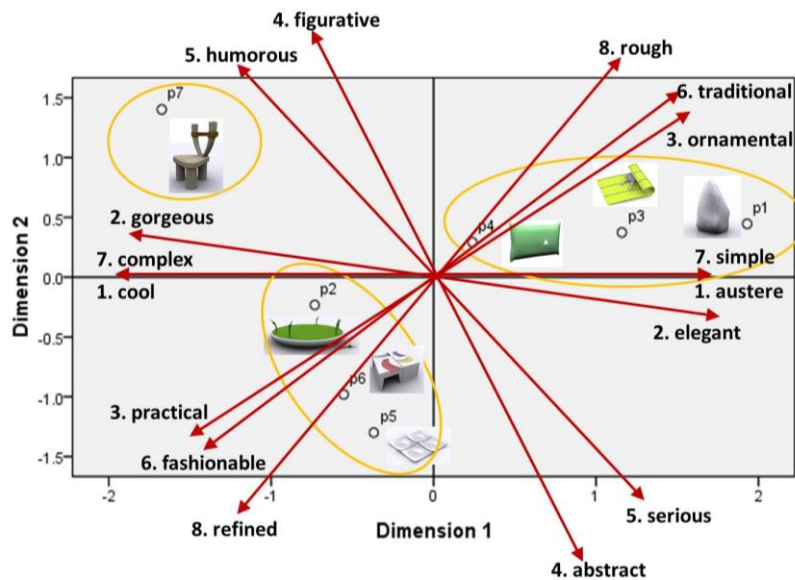


Figure 16 Cognitive space distribution of the seven design works and 16 attributes

A multiple regression equation was used to further compute the included angles on the plot between each property, to plot the cognitive spatial distribution diagram of the seven design works and 16 attributes. The totem dishware, totem table set, and the pulong fruit platter of the first group (high score) were determined by the participants to be “cool,” “practical,” “fashionable,” and “refined”; the slingshot chair of the second group (high score) achieved the highest score and was determined to be “humorous” and “gorgeous”; the triangle stone double bolster pillow, bitonay fence keychain, and the boulder eraser of the third group were determined to be “rough,” “traditional,” and “ornamental.”

7 Conclusion and Recommendations

7.1 Conclusion

7.1.1 Cognitive Difference of Participants with Different Backgrounds

The ANOVA results revealed that participants with design-related and non-design-related academic backgrounds had a greater appreciation of the design cases in all of the dimensions. We speculated that participants with product-design-related academic backgrounds used a stricter product design evaluation standard. However, participants with design-related and non-design-related academic backgrounds both had a greater appreciation of the design cases compared with those with product-design-related backgrounds.

The cognitive differences between tribal members and the study participants were clearly distinct. This distinction necessitates further investigation. We speculate that because of differences in identity, the general public may not understand the cultural characteristics associated with the Sakizaya tribe. By contrast, Chief Huang and Elder Huang, being tribal members themselves, truly understood the importance of their culture, and thus selected designs that symbolized the legends of the fence and triangle stone mark.

Moreover, aboriginals live in nature and favor design styles that are strongly associated with their culture; thus, they have a preference for rough and simple designs. By contrast, the general public is deeply infused with the culture of high refinement, showed a preference for more refined products. Various social groups inevitably exhibit differences in social cultural cognition, leading to cognitive discrepancies; therefore, developing a method by which these discrepancies can be mitigated is worthy of further investigation.

7.1.2 Comparison of Design Attributes and Participant Opinions

By using MDS semantic differential analysis, the seven product designs in this study were divided into three major groups, which were also classified into high and low scoring groups. The totem dishware, totem table set, and pulong fruit platter of the first group (high score) were determined by participants to be “cool,” “practical,” “fashionable,” and “refined”; the slingshot chair of the second group (high score) was determined to be “humorous” and “gorgeous.” These two groups were the high scoring groups, indicating that the public preferred the imagery of these products.

The triangle stone double bolster pillow, bitonay fence keychain, and boulder eraser of the third group were determined by participants to be “rough,” “traditional,” and “ornamental.” This group was the low scoring group, which suggested that the public least preferred these products.

7.2 Further Research and Recommendations

7.2.1 Expansion and Extension of Basic Participant Data

Considering the scarce population and scattered settlements of Sakizaya tribes in Hualien, studying the Sakizaya was relatively difficult. Thus, the participants in this

study were the general public, and design cases were shared with participants through telephone interviews and other means of communication. The results showed that product preferences between the Sakizaya tribe and the study participants differed. Future surveys of the Sakizaya (or other aboriginals) are warranted.

7.2.2 Derivation of Interdisciplinary Research

This study typically adopted the appearance of the cultural elements to develop and design products; however, we assert that the historical events of the Sakizaya are the source to dramatically representing the Sakizaya tribe. Future researchers are recommended to apply stories with emotional connotations to drama performances or, despite the challenges entailed, to developing innovative cultural products.

References

1. Chen, J. N. (2009). *Study of Sakizaya culture and official recognition*. (Unpublished doctoral dissertation). National Chengchi University, Department of Ethnology, Taipei.
2. Cultural Dictionary of Taiwan Aboriginal History and Language (2007). Retrieved from http://210.240.134.48/citing_content.asp?id=3367&keyword=%A4%F5%AF%AB%B2%BD
3. Hobsbawm, E. (1992). Inventing tradition. In E. Hobsbawm & T. Ranger (Eds.), *The invention of tradition* (pp. 1-14). UK: Cambridge University Press.
4. Hsu, C. H, Lin, R.T., & Chiu W. K. (2004). Taiwanese aboriginal product design. *International Innovation Design Symposium Thesis*, 157-164.
5. Information Gateway of Taiwan Aboriginal Culture (2013). Retrieved from <http://www.sight-native.taipei.gov.tw/mp.asp?mp=cb01>
6. Lee, K. P. (2004). Design methods for a cross-cultural collaborative design project. In J. Redmond, D. Durling, & A. de Bono (Eds.), *Proceedings of Design Research Society International Conference –Futureground* (Paper No.135). Melbourne: Monash University.
7. Leong, B. D., & Clark, H. (2003). Culture-based knowledge towards new design thinking and practice—A dialogue. *Design Issues*, 19(3), 48-58.
8. Lin, R. T. (2007). Transforming Taiwan aboriginal cultural features into modern product design: A case study of cross-cultural product design model. *International Journal of Design*, 1(2), 45-53.
9. Lin, Z. Y. (2007). *Multivariate analysis*. Taipei: Best-Wise Publishing Co., Ltd.
10. Krippendorff, K., & Butter, R. (1984). Product semantics: Exploring the symbolic qualities of form. *Innovation*, Spring, 4-9.
11. Norman, D. A. (2002). *The design of everyday things*. New York: Basic Books
12. Pan, C. C., & Shi, Z. F. (2010). *The battle of Kaliawan*. Hualien County, Taiwan: College of Indigenous Studies at National Dong Hwa University Press.
13. Wang, B. J. (2004). *Multivariate analysis*. Taipei: Cultural Enterprises of Higher Education Ltd.
14. Zhan, S.J. (2007). *Old literatures, new findings: Interpreting historical documents of Taiwanese aborigines*. Taipei: Cultural Enterprises of Ri Chuang Ltd.