Preserving Cultural Product Knowledge: The Design Characteristics and Intangible Qualities of Malay Traditional Hand-combat Artifact

SITI MASTURA Md Ishak, RAHMAH Bujang, and NOR AZLIN Hamidon

Expanding the richness of explicit and tacit knowledge of early invented artifacts has great potential as a new approach in the commercial creative industry. In Malaysia, this knowledge context has spurred a growing interest in the cultural design intelligence of traditional Malay inventors. This has led scholars towards preserving and establishing product knowledge in a new cultural environment. This paper provides an understanding of the philosophy behind the design characteristics and functional application of a Malay hand combat artifact called Lawi Ayam, as it promotes both aesthetics of use and physical appearance. Information collected from artifacts and the perceived views of artifact experts through analytical and cognitive assessment of product classification is useful to understand the user experience. The paper also highlights the practical and functional identification of the explicit and tacit properties of this artifact as an assertion of traditional Malay-world analogical thinking. It seeks to promote the hidden traditional creative knowledge in the global cultural tourism industry. The offers a holistic understanding based on value analysis and explores the tradition of early concepts.

Keywords: Design philosophy, Malay, Lawi Ayam, Hand combat artifact, User experience
1. INTRODUCTION

The existence of weapons system in the Malay world was driven by diverse knowledge in artifact creation. Steel product making was brought by Middle Eastern people to the Malay Archipelago in the 15th century (Gardner (1936, cited in Shahrum, 1967); Hill, 1956; Wan Abdul Kadir, 2000). The Malays have since equipped themselves with technological skills and played a major role in the development of steel blacksmithing through their inventiveness and responses to local needs. Experts in blacksmithing are called ‘pandai besi’ or craftsmen (Farish & Khoo, 2003; Gardner (1936, cited in Shahrum, 1967); Hill, 1956; Ismail, 2009; Mubin, 2011; Zakaria, 2007;). They are capable of making any metal craftwork and inventing tools which reflect their own system of measurement, symbols, and identity inspired from the earth (Farish & Khoo, 2003). Their involvement in making a practical tool such as a weapon plays an important role in cultural product design realization that is distinctively important to the Malays (Siti Mastura, Rahmah, & Hazreena, 2013).

This research analyzed the traditional Malay hand combat artifact, Lawi Ayam from the vantage point of the user. This analysis is based on terminology issues, focusing on both physical and non-physical features, as well as product function. This research complements previous research by adding a new approach in processing the product identification and by revising product particulars.

According to Zakaria (2007), Lawi Ayam is used by village people as a survival technology. The transformation of its use happened in wars between the 15th and 19th century in certain states of the Malaysian peninsula such as Kelantan, Pahang, Johor, Selangor, and Perak.

In Hikayat Pahang (MS937), there is a brief historical explanation of the role of Lawi Ayam in the art of Malay war (Wan Mohd Dasuki, 2004). According to the writer, Muhammad Noor (1857-1895) the involvement of the Malay people in the Pahang War in the 19th century revealed that the usage of Lawi Ayam is categorized as a third type of weapon, or as a last resort weapon to protect against an attack. The Lawi Ayam is hidden or concealed in the warrior’s cloth fold, head gear, or tanjak (another small axe weapon). The Lawi Ayam artifact is also described as a personal protection tool for women. The weapon ideally may be placed in a hidden area of a woman’s body parts such as in hair bun or under her cloth, and it can be used to protect from the woman from being raped (Gardner, 2009; Hill, 1956; Ku Ahmad & Wong, 1978; Mohd Zainuddin & Mohd Syahrim, 2007; Mubin, 2011; Shahrum, 1967) (Figure 1).

However, most documented information lacks specific categorizations that are physically justi-
fied by the artifact. Research on similar contexts in design categorization is often based on referral extensions, whereas, the lack of user and usage information has impaired detailed analytical elucidation. Similarly, confusion caused from improper artifact classification has led to ambiguous information and a negative attitude towards preserving traditional knowledge.

Furthermore, the artifact anthropologist and design researcher often face situations in which the design character and usage context are improperly classified during the artifact identification (Che Husna, 2000; Khamis, Nik Hassan, Abdul Latif, & Zuliskandar, 2013; Siti Mastura, Rahmah, & Hazreena, 2013). For instance, the current younger generation of blacksmiths (pandoi besi) has difficulty in justifying terminology for Lawi Ayam by its analytical detail (size, form, ornamentation and the intangible qualities such as philosophy, psychological context and product behavior). However, most agree on the material usage. This study gives detailed insight into the design characteristics and intangible qualities of Lawi Ayam and constructs an artifact classification of this traditional weapon.

Though previous historic documentation has been performed, little is known about design cognition involving both form and abstract meaning. Previous research suggests using the same Lawi Ayam terminology for all kinds of similar artifacts (Draeger, 1973; Hill, 1956; Mubin, 2011; Shahrum, 1967; Zakaria, 2007). However, the researchers believe further discussion is vital in order to segregate the information into structured data as a way to verify the terminology.

The purpose of the current study is to contribute to a better understanding of the cultural knowledge and design awareness in the younger generation, as well as their attitude and behavioral intentions for culture-tourism. The findings of this study also anticipate its use in the design industry. This study also provides insight into the role of tacit knowledge in exploring the indigenous technology.

This study builds on the seminal work by aesthetic interaction scholars who explore the aesthetic experience and human-product interaction (Hekkert & Schifferstein, 2008; Locher, Overbeeke, & Wensveene, 2010; Petersen, Iversen, Krogh, & Ludvigsen, 2004). Furthermore, this research extends previous findings (Gardner, 2009; Hill, 1956; Siti Mastura, Rahmah, & Hazreena, 2013) to compile and analyze both extrinsic and intrinsic data from ethnographic approaches. In short, the researchers expect that the findings of this study would establish pioneering cultural artifact classifications by both comprehension of design characteristics and capacities and intangible qualities, which should be structured as the defining terms and design criteria. This would reveal the ambiguity of the culture design concept to boost interest in artifact labeling for the culture-tourism industry.

2. BACKGROUND OF STUDY

In current culture setting in Malaysia, Lawi Ayam normally can be found in several states. However, the exact local name of this tool differs significantly from place to place. In fact, there is a slight difference in physical characteristics based on the user preference in different locations. There are two types of Lawi Ayam, a smaller version intended for women and a longer version for men. Lawi Ayam has been widely known as a small dagger used for close combat in the Malay art of war (Hikayat Pahang (MS937), 1857-1895; Gardner, 2009; Mokhtar, 1985; Shahrum, 1967; Zakaria, 2007).

Lawi Ayam is justified as a heritage artifact of the Malays along with the other weapons such as keris, lembing (javelin), tombak (lance), golok (cleaver), tumruk lada (a type of dagger), be-ladau (dirk) and the like (Mokhtar, 1985). Most
information on Lawi Ayam may be found in the current Malay martial art (Silat) world. Martial art anthropology is a form of psychophysical progress (Cynarski & Obodynski, 2011). Social philosophical concepts are the idea on creation of a new science about man (Cynarski, 2000). Human artifact usage can be understood through the anthropological study of Malay martial art as a comprehensive entity, with its higher-order needs, goals, and inspiration, as well as its spiritual development. This is anticipated to be in a new systematic paradigm between man, culture, and society (Hekkert and Schifferstein, 2008; Hekkert and Leder, 2008; Cynarski & Obodynski, 2011), especially when the psychophysical progress associated with a functional artifact fits in with the whole idea of preserving the knowledge.

The researchers found that existing recorded information lacks in depth explanations about different aspects of the weapons other than their historical and geographical background. The lack of vital explanation has lead to variants for which it is better to justify the artifact definition in previous cultural settings. Lawi Ayam artifacts are largely defined from the idea of a cock’s tail feather (Gardner, 2009; Hill, 1956; Mubin, 2011; Shahrum, 1967; Winstedt, 1925). Scholars have produced conflicting definitions. The term varies from Kerambit, Karambit to Kuku Ayam (cock’s claw) (Gardner, 2009; Ismail, 2009; Shahrum, 1967; Zakaria, 2007). Likewise, some documents use other terms that are rarely used such as Rambai Ayam, Lambai Ayam, and Kurambi Ayam (Gardner, 2009; Shahrum, 1967). Most of these terms are derived from features of the rooster. However, the specific justification varies.

The term Kuku Macan or Tiger Claw (Draeger, 1973; Mubin, 2011) is also used for Lawi Ayam. However, kuku rimau or tiger’s claw may not be accurately used to define Lawi Ayam. Since the term derives from the tiger’s physical shape, it

<table>
<thead>
<tr>
<th>Scholars</th>
<th>Year</th>
<th>Term Given</th>
</tr>
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<tbody>
<tr>
<td>Hikayat Pahang (MS937)</td>
<td>1857-1895</td>
<td>Lawi Ayam</td>
</tr>
<tr>
<td>Winstedt</td>
<td>1925</td>
<td>Lawi Ayam</td>
</tr>
<tr>
<td>Hill</td>
<td>1956</td>
<td>Lawi Ayam, kuku ayam, Rambai Ayam, kerambit, Kurambi</td>
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<tr>
<td>Syahrum Yub</td>
<td>1967</td>
<td>Lawi Ayam, kuku ayam, Rambai Ayam, kerambit, Kurambi</td>
</tr>
<tr>
<td>Draeger</td>
<td>1972</td>
<td>Karambit, Tiger’s Claw</td>
</tr>
<tr>
<td>Ku Ahmad &amp; Wong</td>
<td>1978</td>
<td>Lawi Ayam, kerambit</td>
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<tr>
<td>Mohd Zainuddin &amp; Mohd Syahrim</td>
<td>2007</td>
<td>Lawi Ayam, kerambit</td>
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<tr>
<td>Zakaria</td>
<td>2007</td>
<td>Lawi Ayam, kerambit, Kuku Harimau</td>
</tr>
<tr>
<td>Gardner</td>
<td>2009</td>
<td>Lawi Ayam, kerambit, kuku ayam</td>
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<tr>
<td>Ismail</td>
<td>2009</td>
<td>kuku ayam, Lambai Ayam, kerambit</td>
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<tr>
<td>Mubin</td>
<td>2011</td>
<td>kerambit, Tiger Claw Dagger</td>
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may be erroneous, due to the size differential. For instance, the usage of tiger claw terminology is perhaps more closely related with what the Royal Asiatic Society (1829) described as a weapon called ‘Wagnak’ that was used in India.

There is also a lack of detailed discussion about the syntactic quality such as specific dimensions, gender-based design, decorations, definite types of users, pragmatic information, and psychological or behavioral responses. Hence, these inconsistencies of terminology and different descriptions of Lawi Ayam by previous researchers has stimulated this research to elucidate every criterion that could define this artifact correctly.

2.2 Design Inspiration

The terminology context plays a significant role in justifying any cultural artifact by signifying its unique attributes via a social identity. This represents the conscious desire of the designer of the artifact to create great impact by its name alone (Bloch, 1995). In the Lawi Ayam context, it is believed that the idea of the Lawi Ayam artifact origin was from a metal spur used in Malay cock fighting (sabung ayam) (Newbold, 1839). This finding indicates how a ‘curved spur’ for a fighting cock is inventively recreated as an effective weapon (Razak, 2000; Wan Yusmar (personal communication, January 12, 2013). However, this theory is limited to the functional evolution of this particular cock’s spur. Furthermore, there is a lack of indication of the development of physical form. However, the concept of ‘effective weapon’ cannot be ignored as it is being practically used.

Several scholars state that Lawi Ayam resemble and are modelled after jembiah¹ design (the Arab dagger) (Draeger, 1973; Hill, 1956; Ku Ahmad & Wong, 1978; Mubin, 2011; Winstedt, 1925). These statements present an alternative terminology of Lawi Ayam that is debatable since there is no historical and physical evidence to support this origin. Further, Lawi Ayam and jembiah are significantly different artifacts. Nevertheless, it is believed that the jembiah design also influences the design evolution of Lawi Ayam; possibly invented under the Arab influence in the Malay Archipelago around the 15th century (Wan Yusmar (personal communication, January 12, 2013); Zainal (personal communication, October 23, 2014).

Incorporation of creative thinking and foreign influence on the socio-cultural background of the Malay craftsmen has developed their design knowledge, eliciting design inspiration and aesthetic interaction in creating this artifact. This contention is supported by Hekkert and Schifferstein (2008) who stated that the development of skills, expertise, and concerns defined in relation to an outside world materialized through the interaction with their surrounding environment. The usage of design is internally assimilated when people accepted things such as utensils that enter their domestic setting (Dewey, 1934).

2.3 Artifact Function Led to Cultural Knowledge Understanding

Lawi Ayam has an effective design. According to Siti Mastura, Rahmah and Hazreena (2013), the effectiveness of Lawi Ayam usage succeeds when the user understands the knowledge of aesthetic experience gained from their behavior through the technical philosophy. In Malay martial arts, movement of weapon user complements the weapon’s design. According to Ong (2009), Lawi Ayam handling and movement is similar to kerambit technique, which is the most vicious strike among all silat moves.

...Swings low and rapidly behind the enemy knee. The key target is tendon and hamstring muscle that hold the enemy upright...then, the upward strike towards the neck. Deep enough cut will slice through the jugular vein. Next, a knee to the chest drop the enemy head to perfect position for the final strike, the rapid

¹ The jembiah is of Arabic origin. It has double-edged blade that thicker and heavier than Lawi Ayam (Hill, 1956; Ku Ahmad & Kit, 1978; Gardner, 2009). It is also known as jambiah.
strike to left eye-socket In four lightning fast moves the enemy blinded, unable to stand and bleeding up... (Ong, 2009: 24:46ff)

Ku Ahmad & Wong (1978) highlighted the importance of understanding the handling technique for Lawi Ayam: (1) a suitable hole size for the index finger to ensure the firm grip for the user; (2) the product handling of Lawi Ayam is designed for effective use; and (3) it is important to keep in mind that Lawi Ayam are mere tools of man and should be used with discretion. The Lawi Ayam design is an effective design that causes death through an upward stab (radak) and swing-slash (rambit) tactical movement (Siti Mastura, Rahmah, & Hazreena, 2013). The Lawi Ayam movement could rip open the abdomen, slash the limbs, and inflict fatal wounds (Draeger, 1973; Gardner, 2009; Hill, 1956; Ismail, 2009; Ku Ahmad & Wong, 1978; Mohd Zainuddin & Mohd Syahrim, 2007; Mubin, 2011; Shahrum, 1967; Zakaria, 2007), as demonstrated in Figure 2.

In other research, Ismail (2009) stated that Lawi Ayam is for emergency action and as a protective weapon among female users. Lawi Ayam is the most popular after the other small weapons (e.g. cucuk sanggul/hair pin, badik2, lading terus3). For instance, the smaller version of Lawi Ayam is used by women to stop rape attempts, hidden in their hair bun (Gardner, 2009; Hill, 1956; Ismail, 2009; Ku Ahmad & Kit, 1978; Mohd Zainuddin & Mohd Syahrim, 2007; Shahrum, 1967; Zakaria, 2007). In order to use Lawi Ayam effectively, the woman should allow the attacker to approach close enough to her body. Then, when the opportunity arises, she draws out the Lawi Ayam to rip the stomach or genitals of the attacker. However, this type of artifact is actually known as kerambit among some people. The technique used is simi-
lar to the Lawi Ayam technique, but the kerambit movement is smaller than the movement of a man’s Lawi Ayam. This shows that there is a different technique for different genders.

With respect to the artifact context, Locher, Overbeeke, & Wensveene (2010, p. 72) stated that features of an artifact provide a user with different types of information. An artifact’s appearance can convey its aesthetic and symbolic values and provide a quality impression. It can also communicate functional characteristics and ease of use or draw attention by visual novelty and communicate ease of product categorization. Locher, Overbeeke, & Wensveen (2010) also highlighted the physical properties as important factors in the human-product interaction. The finding of structured physical characteristic of artifact should support the propositions of an analysis (Locher, Overbeeke, & Wensveen, 2010; Petersen, Iversen, Krogh, & Ludvigsen, 2004) focusing on a particular artifact that contains tangible properties. It is crucial to elucidate these for an in-depth view of the applied design idea. The results presented herein provide an interface for examining the way the designer and the craftsman communicate across cultures as well as the interwoven experience of their design process.

3. THEORETICAL PROPOSITIONS

3.1 Physical Characteristics of Lawi Ayam: Size, Form, and Material

Physical features of Lawi Ayam are listed according to syntactic qualities such as the design features of the blade, hilt, and sheath; size, parts and components, and finishing, material and decoration. Previous scholars have briefly described the physical characteristics of Lawi Ayam and discussed the design outlook and basic handling techniques (Che Husna, 2000; Draeger, 1973; Gardner, 2009; Hill, 1956; Ku Ahmad & Wong, 1978; Mubin, 2011; Shahrum, 1967). However, the data on specific criteria still remain incomplete.

The artifact design characteristics are described as follows (see Figure 3). Generally, Lawi Ayam are defined as a curved weapon (but not a sickle), sharp along both the inner and outer edges of the blade (sometimes only single edge is sharpened due to personal preference), equipped with hole to insert finger at the hilt, and used with specific movements to wound, immobilize and even kill the opponent (Draeger, 1973; Gardner, 2009; Hill, 1956; Ku Ahmad & Wong, 1978; Ismail, 2009; Mohd Zainuddin & Mohd Syahrim, 2007; Mubin, 2011; Shahrum, 1967; Winstedt, 1925; Zakaria,

Figure 3. The ring hole can be inserted on the forefinger, middle finger or ring finger for better grip (depending on individual ergonomic holding). The ring finger has better grip.
The hilt normally has a hole or ring on it so that the forefinger, middle finger or ring finger (depending on the individual ergonomic holding) can be inserted for better grip. A smaller version kerambit (female user version), kuku ayam, or kuku rimau is sometimes designed without the ring hole.

Previous scholars state that Lawi Ayam is a small weapon that can be hidden in specific places on the user's body. It is 4¾ inches to 12 inches in size (Mubin, 2011; Zakaria, 2007). The width of the blade varies from 15/16 inches to 1 1/16 inches (Shahrum, 1967). However, there is no further information on size other than the general illustrations of Lawi Ayam artifacts. According to Mohd Zainuddin & Mohd Syahrim (2007) and Lailee (personal communication, March 25, 2014), each Lawi Ayam is traditionally created based on the owner’s eye size and the width of blade is based on the forefinger. Using the owner’s body measurements was believed to be the best way to make the weapon. Every Lawi Ayam was thus specially designed for a specific user, thus highlighting the knowledge and local intelligence of the inventor/blacksmith.

In the context of materials, the hilt of Lawi Ayam was made of wood or horn. In some cases, Lawi Ayam is illustrated complete with the sheath. There are also samples of Lawi Ayam produced with a silver cap on the end of the curved wooden sheath (Mubin, 2011; Zakaria, 2007). Some of the designs are finished with rattan string and metal ring either on the sheath or on the hilt (Mohd Zainuddin & Mohd Syahrim, 2007; Shahrum, 1967). Another simple design normally uses a plain leather sheath (without any decoration). On the other hand, the materials used for blade are from strongly forged iron to enhance its sharpness. However, both functional purposes and the beauty of the blade are emphasized. Even though most Lawi Ayam blades were made of forged iron to emphasize the edge sharpness, there is a technique that produces unique weapons by capturing the beauty of pamur (natural pattern formed during forging process and soaking in acidic liquid) that is normally featured on Malay keris.

Understanding the relationship between technique, design, and cultural significance is a vital step towards the classification of the product. Margolin (1995) suggested that any design with powerful theme related to history as well as the contemporary situation must be considered in organizing a product classification. Our review of the literature shows that the material selection in Lawi Ayam production has not been critically discussed in previous research.

### 3.2 Intangible Qualities of Artifact

#### 3.2.1 Artifact Philosophy

Intangible knowledge such as symbolism and philosophy are incorporated into the design concept. Mohd Zainuddin & Mohd Syahrim (2007) observed that the shape of Lawi Ayam was inspired from the letter wau in Arabic (wau is the 27th character of Arabic letter). Farish & Khoo (2003) argued that the idea of Lawi Ayam as wau was inspired by the arrival of Islam in the Malay world by the Arabs. According to an inscription (Terengganu batu bersurat) found at Terengganu in Malaysia dated 1303, the Malays started using Arabic calligraphy after Islam reached the Malay Peninsula between 1326 and 1386. Newbold (1839) saw the concept of the Malay curved tool as coming from the spur used by cocks in sabung ayam (cock fighting). Another opinion relates its origin to the number '9' (Zakaria, 2007).

These statements show the symbolic statement associated with the physical form of Lawi Ayam. Fachruddin, Endjat, & Rumtiyati (1992) posited four symbolic aspects of the weapon in the Malay community: (1) weapon as a symbol of pacification; (2) weapon as a symbol of manliness; (3) weapon as a symbol of a man; and (4) weapon as a...
symbol of strength. The above scholar’s theories show how the symbolism is an important part of the concept of the Lawi Ayam.

These symbolisms resonate with the Malays as they relate their human lives and activities closely to the natural environment. Wan Mohd Dasuki (2013) observed that the conception of symbolism gives abstract interpretation to the physical. He added that empirical thinking should be understood deeply as forms of metaphor being elevated. However, the researchers believe these contrasting statements may be redefined in this study to include awareness of Malay analogic reasoning that can be obtained from ethnographic findings. Thus, in the analysis section of this research, we will define the involvement of symbolic meanings to support the tacit knowledge and intangible qualities of the artifact.

### 3.2.2 Usage Philosophy

The general philosophy of Lawi Ayam use is less discussed in previous work. The techniques of Lawi Ayam use are largely inherited from the Malay martial art, guru tua (old guru) (Razak, 2000). Previous scholars stated that the varieties of techniques include the grip variations and tactical movement during of the Lawi Ayam (Gardner, 2009; Hill, 1956; Neilson, 2006; Ong, 2009). A standard grip, third, and second-finger hold, flipping (retracted and extended) and transitions that secure a control hold to allow maximum articulation of hand and fingers are used (Tarani, 2003). The Lawi Ayam user cannot be easily disarmed, meaning that the weapon literally becomes an extension of the user’s hand (Neilsen, 2006; Razak, personal communication, March 30, 2013; Wan Yusmar, personal communication, February 16, 2013; Zainal, personal communication, March 5, 2014). Scholars agree that Lawi Ayam is an ergonomic and effective weapon within the small dagger range. The use of Lawi Ayam in Malay hand combat art emphasizes the usage philosophy in order to provide great impact and effectiveness. The researchers sees both philosophies as bringing a rich definition that enables understanding of the philosophical knowledge of the artifact and the usage comprising extrinsic and intrinsic value in cultural context.
increase the reliability, external validity, and internal validity (DeWalt & DeWalt, 2002; Fetterman, 2010). This was performed to achieve data pattern matching and to link the findings to the theoretical propositions. The ethnographic case study approaches for cultural product were adapted from Lin (2007) and Siti Mastura (2011), the process of understanding the artifact was adapted from Ross & Wensveen (2010) and Chang & Wu (2007), and the artifact experience information gained from participants was adapted from Locher, Overbeeke, & Wensveen (2010).

The suggested design features derived from the independent variables such as material, color, form, texture, surface pattern, decoration, and detail, which displayed symbolic meaning, could be used as design elements and transferred to modern product design (Lin, 2007). According to the indicated variables, the first level of segregation uses material, size, component and shape as vital factors to define the relevant artifacts for preliminary classification (Figure 4). Then, the second level of segregation is to refine the information based on further physical characteristics such as decoration, finishing, and syntactic design of relevant artifacts. The emotional impact on user is taken into account to justify the intangible qualities of the artifact. In order to identify the actual terminology of Lawi Ayam, all samples were categorized according to the structured physical description and intangible qualities information. Analogical thinking is presumed in this process with terminology clarification.

5. ANALYSIS AND RESULTS

The result from artifact analysis and in-depth interview conducted during the ethnographic observation demonstrates that physical characteristics and intangible qualities were the main factors in the object identification process.

5.1 Analysis of Physical Characteristic Identification

There are 6 out of 17 samples that strongly fit with the previous findings indicating the similar components, sizes, materials, and shapes (Table 2). Technically, Lawi Ayam can be recognized with a blade dimension of between 4 inches and 12 inches. The samples must have major components such as the blade, the handle (hilt) and the ring on handle. The ring hole is a prominent identification marker for Lawi Ayam. However, some Lawi Ayam lack a ring. This exception applies as long as the blade size and the curve angle are in the same category. The most common angle of Lawi Ayam blades is around 45 degrees. Participants said that the transformation of the design occurred through time.

Participants also stated that the physical characteristics of Lawi Ayam indicate the user gender. Aesthetically, Lawi Ayam decorated with certain material, ornamentation, and design signify a
higher status user such as a commander or a royal warrior (panglima). Otherwise, simpler designs for Lawi Ayam are normally used by commoners and soldiers. On the ring part of handle some of it incorporates a metal ring into the hole. Sometimes, makers use horn for the whole handle because that material is more durable than wood. There is also ‘horn’ shape (balung) on the ring which can function to hit targeted parts such head, eye, or neck. Even in some cases where it is ringless, this is believed to be for getting a better grip on Lawi Ayam. However, this particular design depends on individual preferences and the way the weapon is employed.

The remaining artifacts come in smaller sizes. Even where they have the same shape and material, they are classified into different groups such as kerambit, kuku ayam (cock claw), kuku rimau (tiger claw), lawi itik (duck’s feather), kuku helang (eagle claw) and kuku beruang (bear claw). Basically, these types are used by female users. The results, however, failed to support the previous findings because Lawi Ayam is seen as a bigger curved weapon by 89% of the users and blacksmiths and is more applicable to male users than female users. Therefore, these findings have added analytical information to enrich the previous statements.

In addition, an important notion of Lawi Ayam as a cock’s tail feather shows how the inventor specifically imitates the physical features of the cock’s prominent part, beautifully exposed while it is in action (fighting). Creatively, they transformed this ‘Lawi’ which signifies beauty and pride (N= 20 participants) into the design. Thus, the participants strongly supported the contention that the derived name of ‘Lawi Ayam’ itself justifies the terminology of Lawi Ayam.

5.2 Analysis of Intangible Qualities on Artifact

The ethnographic case study approach revealed several intangible connotations that are closely related to the context of the Lawi Ayam tacit knowledge. The philosophy in the artifact design and the usage were seen as having a major role in understanding of the Lawi Ayam concept.
5.2.1 Philosophical movement

Philosophy in usable artifacts is crucial to relating the human dimension and logical thinking in artifact user movement. Even though the existence of the philosophy is based on analogic reasoning, the informants agreed on the practicality of the movement considering their understanding of human science, anatomy, and neural systems (personal communication with Wan Yusmar, February 12, 2013; Razak, March 28, 2013; Zainuddin, December 30, 2014; Roslan, June 18, 2014). Through the observation of the application of the weapon by participants, a series of efficient movements attacking opponents were demonstrated. This supports previous scholars opinion that generally stated the swing, slash, and upward strike in kerambit was also practiced by Lawi Ayam users (personal communication with Abdul Hakim, April 6, 2014; Roslan, June 18, 2014; Wan Yusmar, February 12, 2013; Zainal, April 5, 2014). The participants confirmed that the agile movement contributed to usage effectiveness. Thus, previous arguments for the importance of the concept of movement philosophy during Lawi Ayam use are correct. Knowing the effectiveness of analogical movement shows that the tangible qualities associated with artifact usage and efficient movement provide relevant identification processes for Lawi Ayam classification. Table 3 shows the participants (blacksmiths and users) feedback on philosophical movement that supports the above statement. For instance, the analogy in assuming the self as a tiger is how the user shows the tacit knowledge evaluation and to gain the understanding of how the Lawi Ayam should be used.

5.2.2 Philosophy of artifact usage

In the manufacturing processes and usages of Lawi Ayam, the users and informants said that the Lawi Ayam philosophy has a unique analogical explanation based on human anatomy. Mohd Zainuddin & Mohd Syahrim, (2007) posited the usage philosophy of Lawi Ayam as a hidden weapon and full of secrets that intrinsically, defined the blade as the eye that sees and observes, while the finger that holds signifies fast reactions and precise responses (personal communication with Lailee, March 10, 2014; Hassan, March 8, 2014; Zakaria, January 12, 2014;). The curved length of the Lawi Ayam blade is based on the eye size of the user (owner). The blade width is

<table>
<thead>
<tr>
<th>Table 3. Participants’ feedbacks on the intangible qualities of Lawi Ayam</th>
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<tbody>
<tr>
<td><strong>Philosophical movement</strong></td>
</tr>
<tr>
<td>‘Harimau Main’ (Tiger play)</td>
</tr>
<tr>
<td>‘Mata Harimau’ (Tiger eye)</td>
</tr>
<tr>
<td>‘Gerakan Harimau’ (Tiger movement)</td>
</tr>
<tr>
<td>‘Cabut bisa ular cencang lumat’ (Take out the snake venom, chop off till dead)</td>
</tr>
<tr>
<td>‘Potong akar’ (Cut off the root)</td>
</tr>
<tr>
<td>‘Padam Lampu’ (Light off)</td>
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based on the width of the owner’s forefinger. It is believed that if these traditions are disobeyed, the Lawi Ayam will cause damage to the owners themselves. Thus, the concept of human anatomy used by the local blacksmiths and Lawi Ayam expert demonstrates how they interconnect the factor of safety and ergonomic design. Table 4 indicates the definitions that bring meaning to the philosophy of Lawi Ayam usage. It defines the world-view of particular community and how its members see comparison and similarity. In turn, this highlights the uses of symbolism in Malay creative thinking.

This study highlighted the meaningful results of data visualization that show the ignorance of previous documentation about the important notions of potential knowledge of cultural artifacts. Specifically, the triangulated findings are consistent across participants. The artifact analysis and the observations of artifact application elucidate the philosophical thinking behind the artifact.

6. DISCUSSIONS

6.1 Analogic Thinking in Lawi Ayam Weapon Philosophy

Analogical thinking is related to human cognition. Experts in particular communities have been using analogical abstraction to justify the process and tools they use in domestic life (Siti Mastura & Wan Mohd Dasuki, 2011). Evidence that has the degree of adaptability predicts which inferences are made from the analogy (Gentner, 1983). It is important in creativity and scientific discovery. For example, the analogy of decapitating the snake and ensuring it is harmless is how the user understands the representations of movement and usage. Such persuasive analogies are meant to explain new inferences of behavioral ergonomic and cognitive response knowledge. This supports the theory of how the culture in human activity develops mentally (Wan Mohd Dasuki, 2013) to capture the psychological processes that carry out the analogical mapping (Gentner, 1983).

The same approach was used by the Malays to infer the idea of projection in specific design identification. The uses of terminology based on nature shows how they appreciated their role on earth (Farish & Khoo, 2003; Zakaria, 2007). The tangible and intangible information provides ideas for the designer in the process of designing a concept, prototyping the idea, and lastly producing the final outcome (Siti Mastura & Noraisyah, 2011). Once stated, an analogic description in material usage could give understanding of the whole concept of adaptive process visualization. Therefore, we posit that analogic thinking and usage effectiveness enhances understanding of Lawi Ayam artifact philosophy through the design

<table>
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<th>Philosophical usage</th>
<th>Definition</th>
<th>Representation</th>
<th>Usage of artifact</th>
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| 'Cabut bisa ular cencang lumat' (Take out the snake venom, chop off till dead) | Decapitate the snake head and chop off the body with several attacks to end the intimidation | • ‘Snake head’ - Human hand that holds the Lawi Ayam weapon  
• ‘Snake venom’ - The weapon | • Disarm the attacker  
• Alert towards the attacker’s movement  
• Demobilize the attacker  
• Several attacks to vital body points. |
| ‘Potong akar’ (Cut off the root)      | ‘Paralyzing’ the tree by cutting off the roots  | • ‘Tree’ - Human body.  
• ‘Root’ - Human leg. | • Demobilize the attacker  
• Counter attack the attacker in standing position  
• Targeting at main nerves and tendon.  
• Blocking the view of the attacker  
• To ‘blind off’ the attacker by covering the eye by Lawi Ayam user’s hand. |
| ‘Padam Lampu’ (Light off)             | Switch off the light                            | • ‘Light’ - The attacker’s eye.                    | |

Table 4. Philosophy of artifact usage from the users’ perspective
characteristic capacities and intangible qualities in the Lawi Ayam design evolution.

6.2 Artifact Classification

Result shows that an emerging trend among knowledge of cultural artifact research is the use of physical evaluation to simulate product identification. The findings support the extant literature regarding the analytical and ethnographical approaches to further understand the factors of symbolism and provide better understanding of the non-physical context of an artifact. The researchers also suggest an analytical evaluation as crucial in constructing product classification without positing Malay analogic reasoning as an external feature. Thus, the researcher sees the inference of ethnography and case study as valid in obtaining the findings undertaken for the artifact itself to be analyzed, following Petersen, Iversen, Krogh, & Ludvigsen (2004), Lin (2007), Chang & Wu (2007), Hekkert & Schifferstein (2008) and Locher, Overbeeke, & Wensveen (2010). The method is more applicable to local knowledge.

This study expects that knowledge gained from the inferences of cultural knowledge understanding in the physical characteristics of Lawi Ayam and its usage could provide a transferable process for artifact behavioral evidence. Therefore, the researcher finds that criteria in artifact design, methodical usage, and user information play an important role in creating philosophical meaning that underlies the design-user interrelationship guideline system on the basis of cultural ideas.

In this study the researchers use the inference of the artifact knowledge comprehension and the improvisation of design evolution understanding through design characteristic capacities and intangible qualities into appropriate term and design criteria in artifact classification of the Malay Lawi Ayam hand combat artifact. This establishment of theory could lead the identification process and fill the knowledge gap in Malay design setting. The benefits in structuring this guideline would allow answering several inquiries that concern the Malay cultural design innovation, artifact effectiveness in pragmatically design evaluation, usage characteristic and cultural knowledge understanding for pioneering product classification for cultural design stakeholders.

7. CONCLUSION

The review first discussed the information of the traditional Malay combat artifact that is Lawi Ayam. Information about the Lawi Ayam artifact design and its typology is identified to fill the research gap. Two approaches are suggested, analytical dimensioning and pragmatic assessment in Petersen, Iversen, Krogh, & Ludvigsen (2004) and Locher, Overbeeke, & Wensveen (2010). These two approaches support the artifact knowledge comprehension and the design evolution understanding to establish artifact classification of the Malay Lawi Ayam hand weapon. We reveal the ambiguity of functional artifact knowledge and fill the knowledge gap in Malay design setting. As a result, a new theoretical framework is established based on Malay knowledge that has the potential to be used in a more global cultural design discussion.

Second, the researchers find that several approaches could help to elucidate the needed user knowledge. An overview of pragmatism that normally sees aesthetic as a specific kind of explicit evidence that interrelates between context, culture, history and the user, however expands in more wide art context. Locher, Overbeeke, & Wensveen (2010) provide clear direction for understanding information processing between the personal context and the artifact context. Even though this framework can be generalized to different populations in the design field, this research believes it has the potential to be merged with different cultural influences to further enrich it. Nevertheless, both aesthetic theories are employed and consecutively used to compliment the knowledge establishment. The same concern
is applied to increase the appreciation of Malay indigenous design and technology for better understanding of Malay accomplishments.

In conclusion, the authors recommend this research for excavating other cultural artifacts in order to better understand the artifact function, behavioral ergonomics, and user cognition for upgrading its marketability.

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