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Harrinni Md Noor · Verly Veto Vermol
Rusmadiyah Anwar
Muhamad Fairus Kamaruzaman *Editors*

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Creative Plan and Decision Choice of Semantic Differential Approach for Chair Design Aesthetic

Musdi Shanat

Abstract The aesthetic designs of the products are capable of portraying a positive usability effect and fostering positive relationships with people, making them more tolerant of problems with a design rather than with less aesthetic design. Hence, this chapter investigates the influence level of aesthetic values and design principle response towards the occasional chair design through the medium of the semantic differential (SD) approach. The implications of differences in preference among respondents, and the relationship between image word(s) and actual design element (s) are discussed. The study also explores the proposed research framework in enhancing the acceptability of the design object in the industry and suggests a design approach to support designers in control of furniture styles for the intended end users. Participants' feedback can provide valuable information to designers on how people perceive furniture and the qualities they require and expectations they wish to have fulfilled. Subsequently, the innovative interpretation of the results will serve as a styling benchmark for designers in a new furniture design and development process. This research is expected to be a kick-start for exploring a real research experience in chair design.

Keywords Semantic differential approach · Consumer perception · Furniture design

1 Introduction

Aesthetic designs are perceived as easier to use, and able to influence human moods by people's looking at and having experience using the furniture. The pleasant appeal of the furniture also can build a positive emotional state or relationship between the consumer and a product, and is able to lead to an appreciation of it [1].

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Reference [2] also suggests that in meeting and satisfying human appreciations, a product should advance its attractiveness and must have the quality to meet consumer desires. Because there was a perceptible object engaged with, many attributes were involved in this experience such as cognitive and affective responses, emotions, and sensory perceptions. Those experiences actually happen due to the aesthetic reactions associated with human senses [3, 4]. However, some people may ask themselves what difference does it make? A chair is still a chair!

Today, people's lifestyles have changed and we spend a lot of time sitting down in the office, at home, and even outdoors. A chair not only supports its occupant at work; it also conveys status in the workplace. A chair is also designed and developed within symbolic contexts, for instance, with the intention of revealing one's economic status, which further serves to bolster egos and demonstrate taste. Studies have shown that the furniture with which individuals surround themselves is an expression of their self-image and is intended to send messages about themselves to others [5]. It may personify meanings and values, which connect with the user at an intellectual, aesthetic, emotional, and spiritual level [6]. Nevertheless, the furniture designs are not objects of coincidence but they are designed, bought, and used with purpose [7].

The general concept of this chapter is to observe the participants' feedback through the medium of outdoor chair designs using the SD approaches. The research study is an interactive phase, bringing the original redesigned chair, a new chair design, and two competing chairs into assessment using an improved version of the semantic differential (SD) questionnaire.

2 Semantic Differential Approach

2.1 Semantic Differential Proposition

For this study, an outdoor chair has been chosen as the subject matter. The research program has been designed to focus on the similarity and differences among participants' emotional responses, particularly the design group and user group. The SD approach has been implemented to measure consumer taste and preferences via the relationship between literal design elements and image words [8]. The image word in this context refers to the furniture image descriptor or attribute. The selection of the image descriptor required establishing a connection between the physical and emotional characteristics of the chair.

Theoretically, the SD is an approach intended to aid understanding how human beings interpret the appearance, use, and content of the product [9]. The SD is also a measuring instrument to obtain the connotative value of an object or an image. It is used to uncover consumers' feelings about the product. The characteristics of the product design are identified from the consumer's image and feelings by experiments in which the relations between words and design elements are observed. The

subject is asked to rate a given concept on a series of seven-point bipolar rating scales. In addition, constructing bipolar scales is based on semantic opposites, for example, the use of words “beautiful–ugly”, “angular–rounded”, “high–low”, “slender–bulky”, “wide–narrow”, and so on.

2.2 Chair Attributes

The researcher managed to identify three major themes that characterized the user’s perceptions as shown in Fig. 1. Before establishing the research theme, it was vital to identify the image words to describe the subject evaluation, which was done

Theme	Sub-theme	Hierarchical organization of semantic descriptors
AESTHETIC	APPEARANCE	[Visual appeal / active character / expensive outlook / Beautiful / Restyling / Good appearance / Pleasant design / Nice appearance / Glamour / Fashionable / Decorative / Appearances / Cliche design]
	IMAGE	[Dynamic / Trendy Image / Modern / Style / Elegant / Pop art / Contemporary / Culture / Trendy / Fun design / Minimalist / Classic / Cozy design / Cheerful design / Active Character / Grand / Lovely / Simplicity / Image / Relaxed / Simple Sophisticated, Inviting design]
	FUNCTIONS	[Personal preference / Outdoor design / Indoor design / Semi outdoor-indoor design / Privacy / Public / Private / Prevalent / Modular system / Multi usage]
	FINISHES	[Workmanship / Good quality / Top quality finishes / Pleasant Outlook / Natural finish / Excellent finishing / Outstanding outlook/ Unique character / High aesthetic value / Top quality outlook / Inviting to sit on / Sleek]
FORM	SAFETY	[Secure design / Safety features / Solid / Safe / Robust / Dynamic / Relaxing]
	SIZE	[Light in weight / Stable / Spacious / Exceptional size / Human percentile]
	MATERIAL	[Material utilization / Fast manufacturing / Mixed material / Mixed media / High grade / Hard wood]
	DURABILITY	[Durable / Creative jointing system / Easy construction / Easy to maintain / Unique seat pattern / Construction / Good jointing system / Simple constructions / Steady]
	PRACTICALITY	[Playful / Easy to clean / Easy to use / Moveable / Portable / Easy to assemble / Easy to dismantle / Compact / pleasant / Simple / Relaxed / Advanced / Functions / Relaxing / Practicality]
UTILITY	BRAND IDENTITY	[Taste / Characteristic / Emotion / Innovative / Identity / Originality / Unique character / Dignified / Trend Setter / Designer signature feeling / Pleasant identity / Brand / Limited Edition / Consumer oriented / Flat pack]
	ERGONOMICS	[Ergonomics design / Comfortable seat design / Back rest / Ergonomics back rest / Smart design / Sustainable design / Comfortable while seated / Human percentile]
	PRICE	[Economical manufacturing / Cheap in price / Cost / Market / Reasonable price / lifo span / Lifelong / Affordable]
	ELEMENTS & PRINCIPLES OF DESIGN	[Line / Form / Shape / Texture / Space / Repetition / Unity / Proportion / Contrast / Balance / Direction / Harmony]
	DESIGN CONCEPT	[Eco-design / Commercial / Easy to match / Design concept / Conceptual design / Representational design / Streamlined Shape / Creative concept / Intelligent design / Concept / Featured Own design / Designer taste / Organic form / Geometric Form / Mass production]

Fig. 1 Three major themes are involved in analyzing the outdoor chair

through journals, conference proceedings, and website articles of difference subject matter. The search process of gathering the image words provided a huge number of significant words related to furniture and product design descriptions in subjective opinions. The selection of descriptors or attributes should be susceptible to quantitative evaluation. The correlation between adjectives and subject evaluation should be representative of perceptions of the chair. The criteria for the selection of words followed the guidelines established by the *Kansei* engineering consumer-oriented technology for new product development.

The samples of image words were selected through a manual process known as a self-checking filtering system that does not employ any technological tools. The selection of correct descriptors implies important roles and notions for the whole questionnaire structure including pairs of opposite adjectives. The hierarchical organization of semantic activities was used to fit attributes or image words to the given theme.

3 Research Design Model

The research framework of this study comprised three phases as illustrated in Fig. 2. Each phase of the research framework has been included with the components of experimentation, evaluation, and feedback. The first phase comprised the

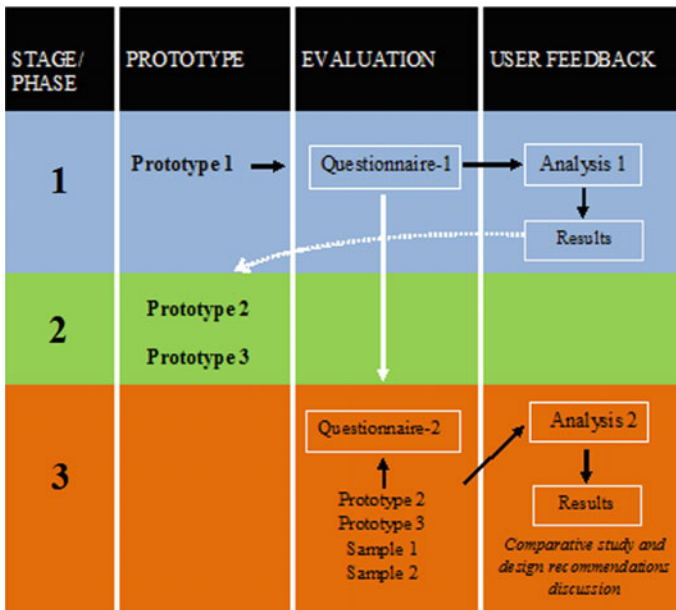


Fig. 2 Research framework



Fig. 3 Four prototypes were utilized in the final assessment: Prototypes 3 and 4, and Samples 1 and 2 (Prototype 1 was used in the earlier assessment)

establishment of the design brief and the design concept of the outdoor chair. Once this step was done, the researcher started constructing a Prototype 1 (Fig. 3) and, simultaneously, the SD questionnaire was formulated. After that, this questionnaire was distributed to participants, and a full-scale prototype concurrently exhibited. The simultaneous actions of circulating the questionnaire and exhibiting the prototype were crucial, because respondents can gain confidence and understanding when reading the questions and observing the prototype before responding. This technique helped to produce precise feedback for the next stage in the design development.

The second phase of the research involved the redesign and rebriefing of the first prototype (Prototype 2). A redesigned chair not only projected and followed some suggestions and preferences from Questionnaire-1 but reflected the respondents' tastes and needs. Improvements to Questionnaire-1 were also carried out in making up the second questionnaire. Questionnaire-2 increased the number of main topic questions after scrutiny of the feedback from responses to the first questionnaire. The original questionnaire was channelled as a benchmark for the researcher to explain and expand new creative topics that had been previously missed from the current body of knowledge.

Finally, the third research phase, or last interactive phase, brought the original redesigned chair (Prototype 3) full circle. Prototype 2, the evaluated model from the original briefing, Prototype 3, are assessed simultaneously by sourcing two chairs on the market (Samples 1 and 2), which considered a great technique for a fair evaluation process between the commercial chair and "owned" chairs. The final four chairs were evaluated for their form, aesthetics, and utility by the design and user groups of participants (Fig. 3).

The prototypes were considered essential to all research phases because of the importance of showcasing to participants the particular tasks and features. The participants were also required to respond to some parts of the questionnaire via observing the prototypes (Prototype 2 and Prototype 3). The tailor-made SD questionnaires were carefully constructed to capture and record the perceptions of participants through the medium of chair design. Finally, descriptive and

comparative analysis was performed after disseminating SD Questionnaire-1 and Questionnaire-2. The flow of this research was dynamic and not linear. The researcher was not only required to work on the survey and analysis, as it was also necessary to design and build prototypes based on the results and recommendations.

4 Data Analysis Results

Generally, two groups of respondents were involved in this study: one group of people who identified themselves as design professionals, the Design Group, and a group of users from among nondesign professionals. A total of 51 individuals answered the questionnaire, in which 84.3 % of the respondents were from the User Group and 15.7 % from the Design Group; 45.1 % were male, 49 % were female, and 3.1 % of participants did not indicate their gender. In terms of higher educational attainment, a total of 25 individuals had completed postgraduate study (49 %), 37.3 % of participants had completed or are still studying for their undergraduate degree, and approximately 7.8 % hold a diploma certificate. For this chapter the researcher only demonstrates one set of sample attributes under the aesthetic theme components, and the descriptive statistical analyses are presented in a graphical format. This allows the data to be organized with classes or groups of “values” which describe characteristics of the chairs. This approach provides not only the presentation of particular data or “value”, but also allows for or shows the disparity of how the chairs were perceived by the two participant groups. To assess the reliability of the questionnaires, Cronbach’s alpha analysis was performed. The questionnaires demonstrated good internal consistency, which was supported through significant results of $\alpha = 0.982$ which is considered to be a good level of reliability for an exploratory study.

The analysis of this section mainly focused on the mean value of particular subjects, which are used to indicate the “central tendency of the subject” evaluation or attributes of the subject. The sum of overall values for each case was divided by the number of participants. If a particular group of participants scored below 4.0 (median value) then it can be considered that they had less preference for the attributes suggested.

Figure 4 demonstrates the participants’ feedback about “physical appearance”, “decorative level”, and “chair functions”. The Design Group of participants perceived that Prototype 2 demonstrates an aesthetically pleasing “physical appearance” (5.25), whereas the User Group considered Prototype 2 (3.81) to be “less impressive”. Both groups of participants indicated that Prototype 3 (Design Group, 5.0 and User Group, 5.12) successfully portrays a good example of a high “decorative level” in its design. The basic function of the chair is mainly for sitting and both groups of participants perceived that Prototype 2 has the most straightforward functions, and, consequently, it scored a high mean value in the Design Group, 4.63, and 4.95 in the User Group.

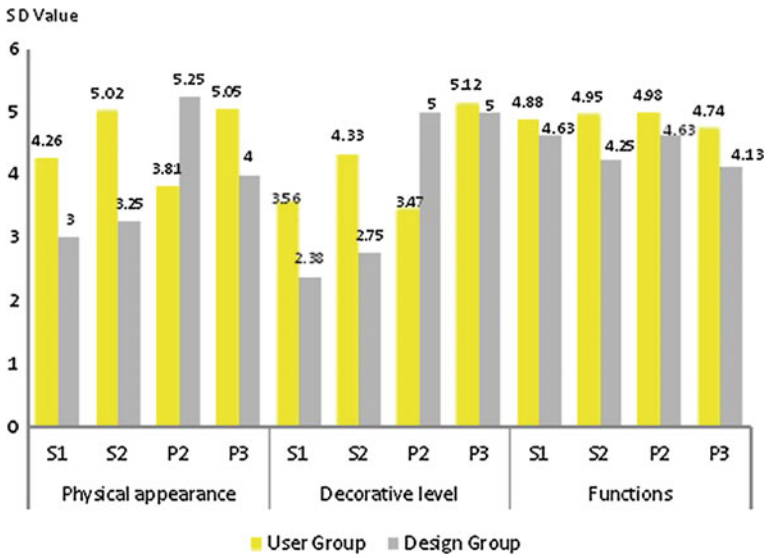


Fig. 4 Feedback on participants’ feelings about the aesthetic values of each

Figure 5 shows the technique of logical analysis of participants’ feelings about the aesthetic values of each chair based on mean value analysis. In answering the question about “exclusive design”, the responses of both the Design and User Groups were in agreement (4.25 and 4.95, respectively) that Prototype 3 reflects the qualities of “exclusive design”. Both groups of participants also rated Prototype 3 to

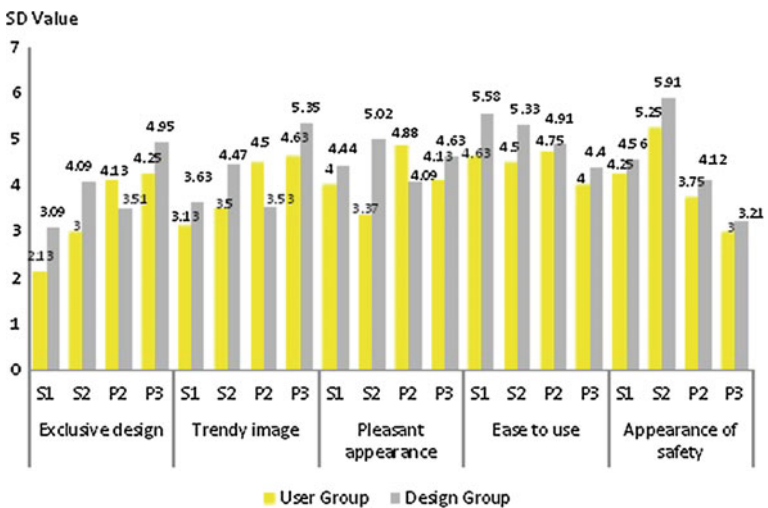


Fig. 5 Feedback on participants’ feelings about the aesthetic values of each

be the most “trendy” in appearance (Design Group, 4.63 and User Group, 5.35). Sample 1 was found to be the least “trendy”, with both groups giving it a lower mean score of 3.13 (Design group) and 3.63 (User group). This may be because Sample 1 has the typical characteristics of an outdoor chair, with all the common design form and without innovation or new features in its design, thus this design looks outdated and less trendy. Further discussion between the two groups of respondents is shown in the outcomes of the question concerning “pleasant appearance” in which the Design Group rated Prototype 2 with a high mean value (4.88) and the User Group rated only 4.09. This chair is a “one-off” or “exclusive” design that has been generated in part through the application of this methodology to the design process. In this category the total score for “pleasant appearance” for Sample 2 is slightly lower than for Prototype 2, with the User Group scoring it as 5.02 and the Design Group rating it at 3.37. The same chair (Sample 2), perhaps unsurprisingly, scored highest in “appearance of safety” (Design Group, 5.25, and User Group, 5.91) because this chair is an “iconic” chair, familiar to all participants in one of its many manifestations, and, as such, may generally be perceived to be more trustworthy. The same trend of “familiarity” with an image gathering a high score applies in the category for “ease of use”, where Sample/Chair No. 1 and No. 2 both score 5.38 and 5.33, respectively, against 4.4 and 4.91 for the User Group evaluation of the two designs of unfamiliar chairs.

5 Discussion and Conclusion

The SD scales have been successful in this study, partly because it is flexible and relatively easy to adapt to research demands, easy to administer, and it appears to be very effective at producing general inference results. From the data collected and analyzed, we can generalize that there are significant semantic attribute preferences among users. The difference and similarities are important and are applied to the next level of the design process (rebriefing design process). The next level of analysis was comprehensive and was expected to gain more precise results. In the comparison and contrasting of data the analysis process generated exciting facts and may provide tips to furniture designers/makers about what is actually sought by end users from any design proposition.

According to the analysis of the results of Questionnaire-2, the findings revealed that two groups of participants were significantly different in their perceptions of the four outdoor chairs. The preferred outdoor chair for the Design Group was Prototype 2, whereas the user group selected Sample 2 as the preferred sample. Figures 6 and 7 illustrate the significant results of the respondents’ perception of the preferred samples.

As shown in Fig. 6 the pattern or ranking of the Design Group in selecting the best chair design that suited their emotional preferences was clearly Prototype 2. However, there was no second, third, or fourth rank because all the other chairs were equally ranked with the same average scores. However, Fig. 7 shows that the

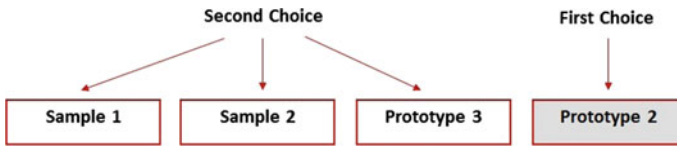


Fig. 6 Design group's preferred samples



Fig. 7 User group's preferred samples

user group selected Sample 2 as the favorite design followed by Prototype 3, Sample 1, and Prototype 2. This unique pattern clearly shows that the responses of both groups of participants reflected individual taste and evidently indicated a difference of opinion in judging the physical appearance of the chairs. The User Group ranking clearly differentiated each chair, whereas the Design Group had one clear preference, which possibly reflected the more highly trained eye of the professional group, which, consequently, may be expected to exert a more rigorous actual appraisal than the User Group. The User Group results reflected a broader set of opinions, likes, and dislikes, and represented the commercial common value for design products.

The participants of the Design and User Groups may understand and interpret the product form from a personal point of view and position it within an existing category of preset attributes that have been given in the questionnaire. However, if the product is different and unusual in shape and form from the existing typical product, they may have difficulty understanding or appreciating the design, and, most probably, they will end up giving a score that is either lower or generally a negative score. In other words, a new chair design, which they are not familiar with will be judged based on spontaneous experience, and, if a particular chair failed to fulfill their preferences or expectations, a lower score would be given and vice versa. This condition or behavior is reflected in the findings of other researchers working in this field. This finding is parallel with the theoretical perspective of dealing with products, brands, and services which have explicitly stated that the consumer who is aware and familiar with certain products, brands, and services will influence the judgment and choice, and provide easily accessible measures of “goal progress” [10]. This finding also supports other literature, which shows that the recognition of the visual appearance of a product is capable of influencing and having an impact on consumer product evaluations [3, [11].

The results of these studies have identified that participants' design preferences do exist and that it is possible to measure them. The Design Group and the User Group have their own differing design preferences and when they are analyzed and

presented, the information does generate or will generate useful and positive information for guidance for the designer in refining and developing the design.

For example, in this study, the SD approach is capable of providing valuable data of a general perception nature, which successfully describes and distinguishes between furniture features and specifications that resonate with consumers' taste and preferences. The "taste" ratings for the Design and User Groups were captured through open-ended questionnaires and were fully supported by four chair samples as a point of reference; thus genuine and sincere feedback was collected. This method may encourage the respondents to react spontaneously to the questions and the set of samples, and yet still follows their cognitive, affirmative, and behavioral responses when expressing their feelings and opinions about design preference. The similarities and dissimilarities of stylistic preference and then overall feeling of satisfaction may be partially due to the personal design awareness among those who have experience and knowledge of the design principles.

In conclusion, the SD approach was sufficient to establish design preference patterns among the participants of the Design and User Groups. Based on the "quick response assessment", both groups of participants ended up selecting Sample 2 and Prototype 3. However, through meticulous assessment and careful reflection with comparing and contrasting of the designs, respondents ended up preferring different chairs. The Design Group was happy with Prototype 2, and the User Group still preferred Sample 2. The participants of the User Group held fast to their opinion but the participants in the professional Design Group changed their preference. The researcher can conclude that this situation is popular because the User Group only observed and reflected on designs for personal use or consumption, whereas those in the Design Group viewed the object from a different perspective through which they considered whether any design they created fulfilled the user demands, was easy to manufacture, and was able to stay on the commercial market for a long period of time. Consumers seek value in a product to suit their needs, and designers can support this by giving them what they desire [12].

Acknowledgment Thank you to UNIMAS for supporting and sponsoring my research activities.

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The Conceptual Framework of Hydroxyapatite Fiber Structure by Slip-Casting Techniques

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Oskar Hasdinor Hassan and Rusmadiyah Anwar

Abstract Hydroxyapatite (HA) has been studied in many fabrication techniques for skull reconstructive material. In previous studies, the study has accomplished fabricating the HA through the conventional slip-casting technique. The study revealed that it is challenging to control the casting due to the fast-drying composition of HA when dispersed in sodium hexametaphosphate. Through another observation on titanium mesh application for skull reconstruction and characteristic of slip-soaked fiber, the study proposed a similar technique by combining these study findings. Fiber mesh material, soaked in HA slip, could have the potential to duplicate the application of titanium mesh. However, the study parameters, especially the selection of the fiber mesh material and the desired thickness, need careful rationalization.

Keywords Slip-soaked fiber · Fiber mesh · Hydroxyapatite · Fiber structure · Slip casting

1 Introduction

Hydroxyapatite (HA) is one of the most often considered substitutes for bone. There were various studies on its method application with attempts to produce porous structures. This includes ceramic foam technique, polymeric sponge

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method, gel casting of foams, starch consolidation, microwave processing, cement paste, slip casting, and spray drying [1]. This fabrication method will play a significant role towards particular application of the synthetic bone. Among the most utilized methods of fabrication is through colloidal processing such as the tape-casting, gel-casting, or slip-casting technique [2–5]. Colloidal processing especially slip casting has been notable to be among the applicable methods to construct complex forms [6].

Manufacturing and fabricating are among the design considerations in most product design [7]. The ease of fabricating factors may be influenced by the method and materials used [8]. This strategy is also applicable in ceramic design studies, where possible method options are constrained by the material's limit as summarized by research [9], based on the compatibility matrix suggested by Boothroyd et al. [10]. These researchers classified the fabricating method into three categories consisting of primary, primary and secondary, and tertiary processes. A process that is capable of producing the main component form is considered the primary processes, and casting falls under this category [11]. The second process category defines the method that can be achieved by producing the main shape of a component with improved features [12]. On the other hand, the finishing processes of a component are considered the tertiary processes [9, 10]. A product that can be fabricated with optimum performance and be cost effective would be the main requirement to compete in the current market scenario. Therefore, design consideration should be evaluated in a systematic way to assist designers in selecting the appropriate materials and fabricating method.

In a previous paper, the author has studied the casting ability of HA material with the conventional slip-casting method. This casting method successfully produced a semi-sphere cast form that has the potential for frontal cranial reconstruction design.

2 Issues of HA Slip Casting

2.1 *Cast HA*

In the previous work, the synthesized HA obtained based on the microwave synthesis technique referred to a study [13] and was castable in semi-sphere form in order to replicate the general frontal skull, although in actuality the radius curve would require some alteration. This form was also applied in a similar study [14]. The cast HA was also successfully sintered at the temperature of 1100 °C.

The HA samples were cast with two different techniques, solid casting and also hollow casting. The dispersion agent used in this HA slip was sodium hexamethaphosphate (NAPO_3)₆. The casting approach was the conventional slip-casting technique that did not involve any compression mechanism. The drawback of this method was it produced uneven casting thickness due to the fast-drying HA slip.

Thus, in this chapter, the author would like to propose incorporating fiber material and form structure in the achieved HA slip. Fiber composite materials are widely used to reinforce strength in bone substitute development [15]. Although it seems that in the case of applications for frontal skull reconstruction, load bearing is almost not required, the fiber structure could aid in achieving the mesh-like structure.

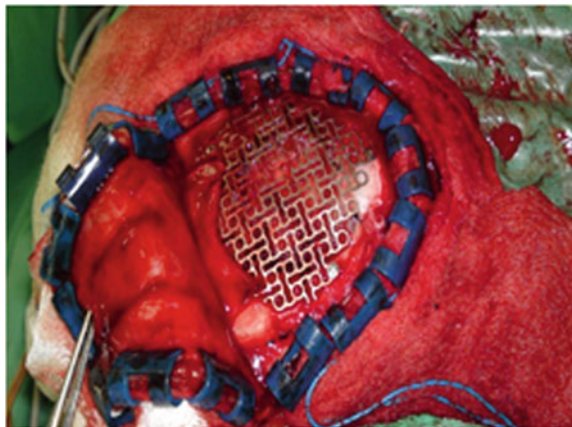
2.2 Conceptual Casting Methods

Mesh structure could achieve precise architecture in a study conducted on patients of cranial reconstruction compared to normal bone grafts. This is due to the certain cranial contour that needs to be accomplished [16]. Mesh structures are normally produced with titanium material. It is commonly used in cranial surgery, as per Fig. 1. However, unlike HA, although titanium is a bioactive material, it is not able to develop as natural bone throughout time. An ideal bioactive material should be able to become natural bone as it tolerates and encourages bioactivities to take place in the body [1].

A technique on fiber material soaked with ceramic slip was shared by Robin Hopper, as applied for his art piece decoration [17, 18] and managed to retain the structure after sintering. Another similar method was also reported as the main body of a ceramic lamp. In this study, the fiber used was treated by scouring and bleaching leaving the fiber up to 90 % cellulose before it was soaked with ceramic suspension. This method concluded that the application may not be appropriate for intricate forms due to its low endurance [19, 20].

Based on this evidence, it may be possible to apply this method to replace the slip-casting technique in the HA that was employed in the previous work. This is due to the uncomplicated form of the frontal skull itself. However, based on several

Fig. 1 Burr hole being covered with titanium mesh in a cranioplasty surgery. Courtesy of Dr. Ahmad Khan bin Ibrahim Khan, Neurosurgeon Consultant, KPJ Johor Specialist Hospital



studies on cranial reconstructive work, it would be a huge advantage if the dimension of the specific area were able to be comprehended before the surgery. This is due to the appearance of aesthetic [21, 22] imperfection that could occur by the nonconforming surface on the application area. Such a consequence may occur if the curvature of the implant does not fit well to the original skull [23].

Arising from this point, it relates back to the importance of design and fabrication of a product. Therefore, in this work a conceptual study of fiber-soaked HA slip technique is proposed as another technique for skull reconstructive design. In the ceramic sintering process, it was acknowledged that organic materials such as carbon, inorganic carbons, or sulphate would burn off at about the temperature of 900 °C, leaving the structure influenced by the organics deposited in the clay [18]. This information is in line with the sintering temperature for the obtained HA in the previous study, where the samples were sintered at the temperature of 1100 °C.

3 Proposed Technique

In this study, fiber mesh is proposed to replace the role of the plaster of Paris mould in the slip-casting process. However, prior to that, the dimensions of the mesh opening need to be determined. This is important in order to predict the allowances for the bioactive when implanted in the human body. The porosity distribution is the main aspect of design consideration in bone graft applications. Each porosity dimension character carries a certain ability, where small surface pores could constrain body fluid movement and reduce bio performance [20]. A study revealed that in order to enable surrounding bone augmentation as well as blood distribution, the minimum requirement is between 100–150 µm for macropores, whereas 50 µm pores are acceptable for osteoconductivity [23].

Similar to the slip-casting absorption mechanism, this technique will manipulate the advantage of the fiber character to absorb the slip to the fiber mesh. In slip casting, the plaster of Paris porosity facilitates the withdrawal of water from the slip leaving the form [24], and this is known as capillary action. The slip-casting technique is an advantage especially in producing intricate forms. However, for a less-complicated radius curve such as the frontal skull, we propose that the soaked fiber mesh be placed on a semi-sphere template to copy and achieve the intended curve. This is referenced from a study that reveals a similar template approach [25], known as “contouring mould shaping” (see Fig. 2).

The common aspects of these techniques are it requires the liquid to be eliminated through dehydration and form a green body. Careful actions need to be taken by ensuring the slip has been fully absorbed into the fiber mesh. Failure in this could lead to “nonsoaked” fiber and break the mesh chain threads once sintering is conducted.

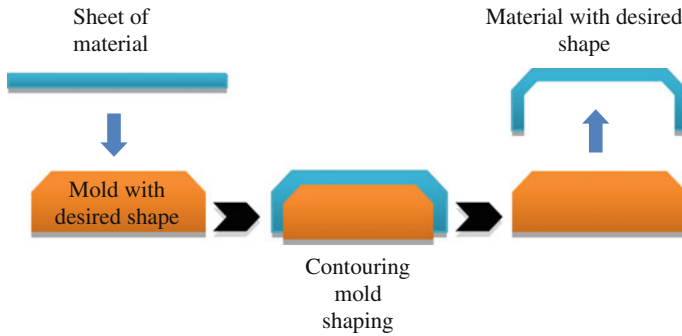


Fig. 2 Contouring mould-shaping technique

The parameters of studies should include the thickness of fiber required to achieve appropriate skull thickness. This would also include the shrinkage percentage of the soaked fiber after the sintering process [26]. Careful consideration needs to be given to rationalization as the mesh opening could be affected by the shrinkage rate. Another factor that needs to be considered is the fiber material selection itself as the material may vary in its absorption ability, the mesh opening as well as the thickness of the thread. Lastly, to achieve the desired specific form or shape using the contouring mould shape approach, the accuracy of the radius curve needs to be addressed [26, 27].

4 Summary

HA slip casting is a promising material for skull reconstructive work. Many aspects have been studied including the design engineering, the fabrication, and the material selection such as the HA composition itself. Based on the findings from previous attempts on HA slip casting, the study proposed another approach to fabrication by replacing the slip-casting technique with slip-soaked fiber to achieve the titanium mesh structure that is commonly used in cranial reconstruction surgery. The technique has potential, based on the findings of previous studies with similar approaches. This new technique was anticipated to counter the challenges of uneven casting thickness faced in previous studies.

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Ceramic Art: An Introduction to MYP Curriculum Design for International Baccalaureate Visual Art

Eilidh Isphahani Mohd Isphahani and Rusmadiyah Anwar

Abstract Ceramic art lessons are part of visual arts where ceramics are recognized as three-dimensional objects. Introducing the lesson in the middle year program (MYP) curriculum design for international baccalaureate (IB) visual arts will bring a different experience and understanding towards ceramic art. Learners will experience and start to sense the criteria needed to structure and develop ideas from two dimensions to three dimensions using observation and hands-on skills. With guidance and reference to the IB learner profile and Bloom's taxonomy method of teaching and learning, we propose to generate a progressively sophisticated learning environment for ceramic art. Specification in the Bloom's taxonomy which is then broken into three main domains of learning—cognitive, psychomotor, and affective—can be applied in ceramic art lessons and adapted in a visual art context including evaluation criteria.

Keywords Ceramic art · International Baccalaureate · Learner profile · Bloom's taxonomy

1 Introduction

Visual arts in the middle year program (MYP) offers students lessons on the history of art, including the methods and techniques used from the Stone Age up to today. They will discover the transformation of art in painting, carvings, fashion, and the art movement from traditional to modernized art, including an artist who has become a reference in art. Thinking creatively is a key concept in MYP where the

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goal is to generate new ideas and consider existing ideas from a different perspective, creating the ability to recognize and value an idea using imagination to solve problems and think independently [1]. Creativity is when an idea can be elaborated and will make viewers think how the idea was created and developed.

References for guidance and conducting MYP are based on the inquiry and the concept of the international baccalaureate (IB) learner profile [2]. This is for the teaching and learning method to have a chance to explore reality and connect it with the required subjects. The outcome of this will be that students will be able to create and develop their ideas according to their own experience and observations.

From required references it is proposed to set up ceramic art education in the MYP. This group of students is introduced to ceramic education because they have matured as critical thinkers and problem solvers. The reason for the education is for the students to understand and learn about ceramic history, where, when, and why ceramic has been used since at least 24,000 BC [3], and added to that, the use of ceramic in their daily lives, such as tableware, decorative ware, bricks, glass, tiles, automobiles (spark plugs), and so on [4].

Learning from history will include understanding ceramic characteristics and properties. Ceramic starts from a piece of clay, which is then fired in a kiln at a certain temperature. Ceramic demonstrates hardness and excellent strength but still can be very brittle when not handled with care [4–6]. After passing through the first dismissal, often ceramics will be covered in decoration, waterproofed, and painted with a substance known as glaze [7].

The ceramic art lesson is introduced in the MYP program because of its connection with visual arts in creating a three-dimensional object. The main material in ceramics, clay, is easily shaped into the required forms. There is a variety of techniques to form clay: one example could be press-moulded where this technique is used to create an equal form or repeated decorations. The MYP is chosen to implement ceramic art lessons because the structure of art courses provided gives opportunities for students to set aims and meet the objectives of the program [2].

To implement ceramic art in the MYP program consists of a measurable method referred to as Bloom's taxonomy to express the level of achievement of student outcome. Bloom's taxonomy is used to assess the learning effect of a student based on three learning domains—cognitive, psychomotor, and affective—which utilize higher-order thinking to form a more constant and manageable classroom and lesson plan.

2 Fundamental Concepts of IB Middle Years Program

The middle years program (MYP) is guided by three principles and has been specially catered for learners between the ages of 11–16 years old [2]. The three principles are holistic learning, intercultural awareness, and communication. These three fundamental concepts are to be implemented in teaching and learning for MYP and also are connected with the IB learner profile. In conjunction with this

profile, focusing on higher-order thinking skills creates the opportunity for learners to explore awareness and connect what they learn with the world around them.

2.1 Holistic Learning

Students develop a global view of situations and issues [2]. They become more aware of their learning and see knowledge as being interrelated and complementary. Learning promotes the development of the whole person, whose attributes are described by the IB learner profile.

2.2 Intercultural Awareness

Emphasis on encouraging and promoting international-mindedness by engaging with and exploring other cultures is a key feature of international education as reflected in the attributes of the IB learner profile [2]. This promotes understanding, tolerance, and respect, which may lead to empathy with others.

2.3 Communication

Students are encouraged to develop open and effective communication [8], important skills that contribute to international understanding as exemplified by the attributes of the IB learner profile.

3 Aim of IB for the Middle Years Program

The aim of all international baccalaureate programs is developing people who recognize the world surrounding them and are able to create a connection between them. As for class management, students are required to apply an inquiry-based learning concept to search for knowledge, questions, present research, and to try new things. As IB learners, there is a list which is referred to as an IB learner profile. In the list is stated:

- Inquiries: Discovering new things
- Knowledgeable: Learning about a subject
- Thinkers: Learning how to improve or find solutions
- Communicators: Sharing ideas and thoughts
- Principled: Responsibility for actions

- Open-minded: Accepting others’ opinions
- Caring: Respecting others
- Risk-takers: Accepting challenges and change
- Balanced: Understanding aspects of lives
- Reflective: Understanding the concept of strength and weaknesses.

As noted above, this study is divided into five academic levels: grade 7 (11–12 years old), 8 (13 years old), 9 (14 years old), 10 (15 years old), and 11 (16 years old).

4 Review of Interrelation Between Bloom’s and Cognitive Level

Figure 1 shows the interrelationships between Bloom’s cognitive levels, which are used as a reference to identify the learning outcome for planning a lesson. Referring to this will create a standard that can be applied and recognized for a student’s

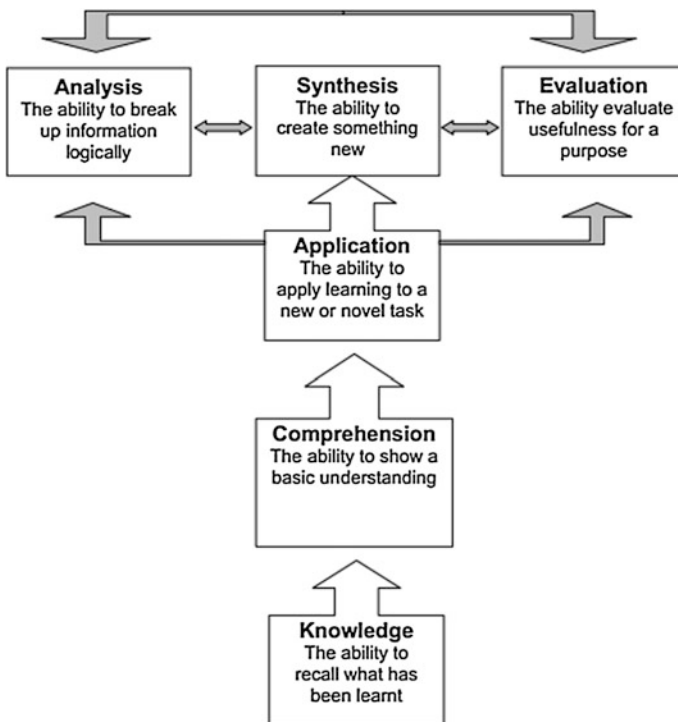


Fig. 1 Examples of interrelation between Bloom’s and cognitive level [9]

ability and credibility in his or her knowledge of understanding, developing skills, creativity in thinking, and the response to a given task.

The ceramic art lesson applies this standard method according to Bloom's taxonomy [10] and three fields of learning that may show equivalent standards with existing visual art examples. The whole structure in learning outcomes derives from domain categories, order thinking skills, and objectives.

4.1 Learning Outcome Related to Knowledge

A student must be capable of remembering or recognizing specific information based on the subject taught according to the level of acceptance. In conjunction with this, the student should be able to explain and describe exactly the character and purpose, communicating it clearly, and showing responsibility and understanding.

In the ceramic art lesson, students move from a beginner's point of view on how they record and digest information to more advanced thinkers and knowledge of the content [11]. Students may receive the chance to determine and adapt the knowledge and should be capable of establishing a link with different visual art examples.

4.2 Learning Outcome Related to Skills

The psychomotor domain is a concept where skills come into place and is interpreted as a sensory activity describing the student outcome through "hands-on" activity or observation of other media such as video, images, or demonstrations. Students should be capable of learning and noting steps of different motor skill applications. The outcome from here should show the student to be able to apply the knowledge of skills responsibly and effectively [11].

This method is applied in the ceramic art lesson because of the information and observation obtained from here, identifying the ability of the students' motor skills in translating physical tasks and ability to recognize standards to achieve in performing a skill. From this understanding they will be able to apply the skill form to remember or memorize a certain topic and task [12, 13].

4.3 Learning Outcome Related to Attitude, Behaviors, and Values

The affective domain is the main topic for describing the attitude, behaviors, and values necessary to understand the growth of emotion and response to affective

learning skills. This domain guides the students in their ability to receive, respond, value, organize, and characterize information, which means the student is capable of building awareness and acting in response to the described content.

It is important to have the ability to respond and explain in a given task. A ceramic art lesson contains hands-on activity where students can feel and explore features of the clay [14]. The learning outcome from there is that students will start to build a sense of awareness in observing and from this will derive explanation.

5 Proposed Taxonomy Guideline for Ceramic Art Education Based on IB Art Guide

We proposed a taxonomy level for the ceramic art module which is stated in Table 1 explaining what a student is required to achieve from grade 7 until grade 11 and reference for evaluation criterion. In the table, it is shown that each grade will have movement and development, according to three domains in learning required for each grade. The reason is the student will gain knowledge in phases. This encourages the students to explore and experience applying knowledge in ceramic art.

Explanation of grade 7, which is the beginner level, focuses more on their understanding, observation, and receiving information. This level is basically new to ceramic lessons and it's required to encourage them to understand and reflect grounded on basic ceramic introductions. Grade 8 starts to show expansion in the cognitive and psychomotor domains, but remains at the same level in the affective domain. This is because the students' knowledge is upgraded to where they will be able to recognize ceramic characteristics and from observation will continue with imitating the shape and size of a ceramic model or basic three-dimensional shapes [15]. As for the affective domain, continuation from the previous grade level gives

Table 1 Cognitive, psychomotor, and affective domain for ceramic art education

Grade VS Taxonomy	Cognitive			Psychomotor				Affective		
	Kw	Cp	Ap	Ob	Md	Rs	Cr	Rc	Rp	Va
7	√			√				√		
8	√	√		√	√			√		
9	√	√		√	√	√		√	√	
10	√	√	√	√	√	√		√	√	√
11	√	√	√	√	√	√	√	√	√	√

Note Cognitive (*Kw* knowledge; *Cp* comprehension; *Ap* application)

Psychomotor (*Ob* observe; *Md* model; *Rs* recognize standard; *Cr* correct)

Affective (*Rc* receiving; *Rp* responding; *Va* valuing)

the students an opportunity to respond on their cognitive and psychomotor domains.

Grade 9 continues with a similar cognitive domain to that used during grade 8. But changes happen when they move on to a next level in the skill and effective domains; as stated in the table they will start to recognize standards in ceramic art. Skills applied are that students experience distinguishing types of clay characteristics and transferring developing ideas from paper to clay [16]. And as for the affective domain, the students should be capable of observing and being aware of shape and design in ceramic.

Grade 10 will experience a step further, based on information in the table; students will apply their knowledge and basic understanding to a more elaborated form of artwork, maintaining the technique in the psychomotor domain and with the ability to detect problems and understand the values through the formation in ceramic art and the ability to evaluate their own or other ceramic arts [17].

Grade 11, which is the level for transition to diploma, applies all three domains of learning because at this level and referring to visual arts for this age they have the ability and potential to respond based on experience and level of thinking. Students are required to demonstrate acquired knowledge to describe a ceramic art applying skills and techniques appropriately and to be able to evaluate their own and other ceramic art projects [18, 19].

The level of achievement for each grade level is explained in detail from the aspect the students will go through to the content of learning outcomes for the academic year. The student's goal for each grade is described based on Bloom's taxonomy. The criterion stated starts from lower-order thinking skills to higher-order thinking skills. Lower thinking skills are the required thinking skills to move to higher thinking skills; it is only a skill to recall and understand [20].

6 Discussion

This chapter discussed making and structuring ceramic art lessons in the MYP referring to the IB learner profile and Bloom's taxonomy. Students should acquire knowledge and experience through characteristics and handling the ceramics including understanding how to transfer two-dimensional ideas into three-dimensional works and vice versa. The evaluation required is based on the criteria in the IB learner profile. Learning outcome as mentioned in Table 2, which is designed based on the taxonomy domain proposed in Table 1, explains the goal and the grade of achievement for grades 7–11 in detail. Setting off from lower-order thinking skills to higher-order thinking skills, which are shown here to be the first level of achievement, will identify and understand the characteristics of clay with the outcome that students will be capable of retrieving the introduction to clay.

In the second step the students will run through the transition from two-dimensional to three-dimensional processes where they will be capable of illustrating and using observation to describe a form. Going to the next point, students

Table 2 Ceramic art guideline design for MYP

Grade	Goal	Taxonomy			Content	Project
		C	P	A		
7	Students able to <i>recall</i> the art form studied concerned with visual and practical practice	Remembering (1) Students able to identify the characteristics of clay	Observing (1) Students able to identify types of clay	Receiving (1) Students able to explain characteristics of clay	Introduction to clay	Green ware
8	Students able to <i>describe</i> how artists, craftspeople, and designers use materials, forms, and techniques to express their observations and experiences	Understanding (2) Students able to illustrate	Model (2) Students attempt to sketch according to observation	Receiving (1) Students able to describe	A translation of 2D to 3D	Green ware
9	Students able to <i>use</i> a wide variety of materials, form, and techniques to express their emotions, observations, and experiences	Understanding (2) Students able to translate 2D drawing to 3D clay work	Recognize standard (3) Students able to differentiate types of clay work and bisque ware	Responding (2) Students show the difference between 2D drawing and 3D claywork	Sketch on clay	Bisque ware
10	Students able to <i>consider</i> artists in terms of meaning, design, materials, and technique	Applying (3) Students prepare decoration according to techniques applied	Recognize standard (3) Students able to detect problems in producing ceramic ware	Valuing (3) Students seek solutions in decoration	Introduction of Surface engrave	Bisque ware with decoration
11	Students able to <i>make judgments</i> about works of ceramics, showing understanding, appreciation, and respect	Applying (3) Students able to establish basic ceramic artwork	Correct (4) Students able to develop ceramic art with surface color technique	Valuing(3) Students recognize the meaning of ceramics with the inclusion of the art elements	Introduction of ceramic surface treatment	Ceramic ware with glaze

Note C (cognitive), P (psychomotor), A (affective)

will be presented with a broad assortment of techniques and forms, translating them from two-dimensional to three-dimensional and they will be able to present and differentiate two-dimensional from three-dimensional clay work.

When the knowledge is applied and identified, students will begin to explore techniques in other approaches, for example, decorations, and at the same time they will be able to resolve problems in ceramic making and decoration. After understanding and the ability of recalling and applying a ceramic art work, they will be required to establish an art work by combining the forming techniques with decorations. With the ability to modify and improve a ceramic art work, students will be exploring glazing techniques.

Referring to Bloom's taxonomy and the three learning domains to evaluate and structure the student's achievement levels, it is easy to track and identify the student's level of knowledge and understanding.

7 Conclusion

In conclusion, ceramic art lessons are encouraged to be introduced in the MYP program to expose the student's knowledge to different approaches in learning visual arts. Therefore, reference guided from the Bloom's taxonomy, the knowledge of introduction to ceramic art can be preserved with the three domains of learning to create a more sophisticated lesson.

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Recognisability of Pictographs on Electrical Consumer Products

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Abstract The growing complexity of technical and electronic products has resulted in the creation of additional pictographs to allow for a visual interaction between the consumer and the product. The emergence of large amounts of different pictographs with the same intended meaning may have resulted in the increase of potentially confusing situations, leading to doubts as to the effectiveness of pictographs on electrical equipment. It thus becomes important to know precisely how recognisable pictographs are in order to gauge their effectiveness. This study aimed to determine the recognisability of pictographs depicted on electrical consumer products in a Malaysian context. Eighteen selected pictographs representing six meanings (referent) were tested on 413 Malaysian respondents selected using purposive sampling. Each referent contained three pictograph variants that had the same meaning. The data obtained from the recognisability test resulted in the researcher suggesting six pictographs to be chosen as a single pictograph, each to represent six different referents. The usage of a single pictograph is expected to increase the probability for it to be seen, used, and studied frequently, which may then help with the avoidance of confusion amongst consumers.

Keywords Pictograph • Product interaction • Recognisability • Visual recognition

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1 Introduction

According to Lang [1], people in a social milieu communicate in different forms such as in speech, writing, and design. Generally, consumers have no access to the designer of products with which they interact. Thus this leads to consumers interacting with a product through its physical attributes or external visual references [2–4]. Based on Warell [5], recognition is based on familiarity, resemblance, or similarity, and requires previous precedents for comparison. The use of singular pictographs representing a single referent may enable it to be seen more often, thus assisting with the formation of pre-established references stored in long-term memory [6]. Physical properties of good products have always helped consumers decipher information and obtain accurate operational instructions. Information on a certain product can be interacted with in three ways, namely behavioural information (BI), assemblage information (AI), and conventional information (CI) [7]. BI refers to the physical properties of the product parts which serve as information that is directly perceived and operated on by users with their body parts, whereas AI is the physical properties that indicate the assembly-ability of two individual parts and help users understand how to operate the object properly. Both deliver their intended meaning through the form and physical attributes of the product. Whilst able to deliver information, not all situations are practical using this form, especially when they involve intricate and complex information within a product that has a simple form. Due to that limitation, CI in the form of using pictographs is still a mainstay on products because it can deliver information faster, cheaper, and in an explicit manner in spite of the involvement of complex information.

Pictographs can exist in a situation whether it is printed, engraved, or moulded on the product surface (IEC 80416:2002), and have their place in product interaction, especially within instrumental interaction such as when using, operating, and managing products [8]. As text usage is limited by factors such as language and space, the use of pictographs is a far better choice and is considered the most efficient amongst designers in delivering concise and effective messages [9]. Over the years, pictographs have become a popular system of communication that is used on product surfaces, especially electrical products, to allow user–product interaction to occur in the absence of text.

To date, manufacturers have been regularly upgrading consumer electrical products (CEP) in order to fulfil the consumers' need to go through increasingly complex daily routines. In Thomson et al.'s [10] view, product features are an important buying criterion for consumers: the more the product can do, the better. Such a demand from consumers necessitates an increase of the electrical product as it corresponds to the increase of product understanding by consumers. The findings from these studies have thus strengthened the need for researchers to undertake further studies on pictographs. Visser [11], in her research titled, 'Analyzing User Perceived Failure Severity in Consumer Electronic Products', claims that the increase of technical functions on some consumer products has caused hesitation on the product information to go up. Based on previous research by Visser [11] and

Han [12], it seems that the incomprehension of product information is a factor connected to product malfunction. Therefore, research on information and communication of products must be upgraded to ensure product usability is well maintained.

Collins [13] is of the opinion that a pictograph's design can be improved and aided with a review of it, and hence help with the reduction of common failure. As more pictographs accompany imported electrical products from countries with a different linguistic landscape than Malaysia [14], it is imperative that we are able to discern if the pictographs appearing on said products are recognisable to Malaysian consumers. Furthermore, it is understood that some manufacturers use pictographs both intentionally and unintentionally with the assumption that all consumers would invariably understand the pictographs used anyway.

1.1 Problem Statement 1

The increasing technical complexity of electrical products has led to the increase in the amount of created pictographs to allow for interactions to take place easily between consumers and the product. It always takes many years for any pictogram to reach maximum effectiveness [15]. However, its effectiveness towards consumers in Malaysia still remains unknown.

1.2 Problem Statement 2

Designers from various countries have created graphical symbols for communicating simple messages. This enthusiasm for graphical symbols has led to a potentially confusing situation where there are different symbols with the same intended meaning [16]. In the context of this study, the meaning to be conveyed by pictographs is known as 'Referent', whereas 'Variants' are pictograph units that vary between each other but attempt to convey a similar referent.

2 Methodology

The main interest of this study lies in the data collected from the recognisability test. This test has been proposed by previous work aimed at measuring the ability of users in identifying the pictograph such as the Wogalter et al. [17] paper titled, 'Research-Based Guidelines For Warning Design And Evaluation', the Handcock et al. [18] paper titled, 'Safety Symbol Comprehension: Effects of Symbol Type,

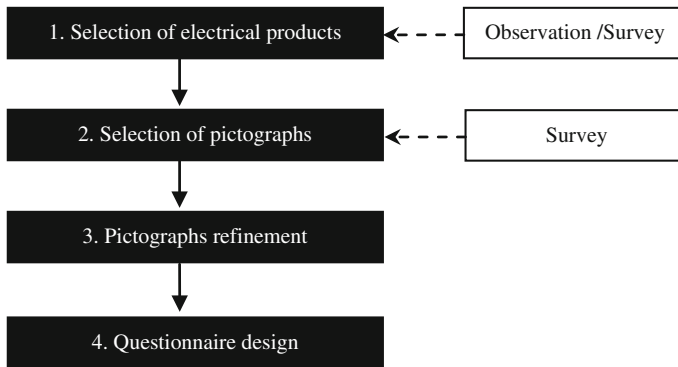


Fig. 1 Flowchart of the instrument design

Familiarity, and Age’, and the Perumal [19] paper titled ‘Effectiveness of Selected Pictographs Among Malaysians’. The data obtained from this test will help to determine the level of identifiability for each variant, thus helping the researcher to suggest six pictographs as a single pictograph each to represent six individual referents (see Fig. 1).

A questionnaire was designed and utilised as an instrument to measure consumer response towards selected pictographs depicted on electrical products. Construction of this instrument began with steps ranging from product selection and pictograph selection right through to questionnaire design. The data obtained from this survey were then analysed using statistical methodology.



















2.1 Selection of Pictographs

There are six groups of referents for the 18 pictographs tested. They are: (1) locking control; (2) cup filler; (3) turbo fan; (4) timer; (5) temperature; and (6) cord rewind. Table 1 shows pictographs with their respective referents.

2.2 Evaluation

The questionnaire was designed to find out if the respondents were able to recognise the depicted pictograph. For that purpose, the questions were styled in an open-ended way, which required word and phrase generation. The respondents would then answer with what they thought the meaning of the depicted pictograph was and write it in the space provided beside the pictograph. Subsequently, the

Table 1 Selected variant by referent group

Referent 1: Locking Control		
		
P1	P10	P14
Referent 2: Cup Filler		
		
P12	P7	P18
Referent 3: Turbo Fan		
		
P17	P2	P11
Referent 4: Timer		
		
P5	P9	P4
Referent 5: Temperature		
		
P16	P6	P13
Referent 6: Cord Rewind		
		
P15	P8	P3

respondents' answers were coded as either correct or incorrect. Based on the coded answers, a frequency analysis in percentage (%) was done to evaluate whether the pictographs could be correctly identified. A 'Test-Booklet' was distributed at random to samples in the area of study. The research party verbally informed each respondent with instructions on how to answer the question.

- (1) *Individual Pictograph Evaluation*: The expected answers from the respondents can be given in the following forms: ‘name of pictograph’, ‘information’, or ‘intended instruction’. If answers given by respondents matched the answer for the pictograph, then the pictograph was classified as ‘correctly identified’. On the other hand, if the answers given by the respondents did not match within the range of correct answers, then the answer was classified as ‘incorrectly identified’.
- (2) *Collective Pictograph Evaluation*: The correct and incorrect answers of every respondent were collected and analysed according to scoring frequency, respectively. Standard pictograph evaluation in ISO9168:2008 specifies that the total collective correct answers must be at or above 67 % for it to be considered effective and able to be recognised correctly [20]. It is a benchmark for evaluating the ability to recognise pictographs in this study. Therefore, only pictographs that score at least 67 % can be considered able to be identified. Overall, there are three categories of results from the respondents’ answers:
 - (a) *Easily recognised*:
‘Correct answer’ Score above 67 % (High scoring)
 - (b) *Average*:
‘Correct answer’ Score between 50 and 67 % (Medium scoring)
 - (c) *Difficult to recognise*:
‘Correct answer’ Score less than 50 % (Low scoring).

3 Result and Discussion

3.1 Recognisability Test

Test results showed significant differences in the ability of Malaysian consumers in recognising pictographs (see Table 2). Generally, the level of identifiability of pictographs by respondents in this study did not show favourable results, with only 9 out of 18 pictographs receiving more than 50 % correct answers. Of these, only 3 pictographs surpassed the standards set by ISO at 67 % and above of correct answers, whereas another 6 received medium scoring of between 50 and 66.9 % correct answers. There were 9 pictographs that scored less than 50 % correct answers, where 3 of them were at a very weak level by getting less than 33 % of correct answers.

The range of variation in the answers provided by the users in the study gave an indication of the need for pictograph designers to run recognisability tests as part of the process of pictograph development, with testing done on users in general without focusing only on selected groups. In addition, we also propose improvements to be made on the eight pictographs that received results of less than 50 % of correct answers.

Table 2 Selected variant by referent group







Category	Pictograph	% correct answer	Referent/description
High scoring 67–100 %	P4	67.6	Timer
	P6	71.7	Temperature
	P16	79.4	Temperature
Medium scoring 50–66.9 %	P1	56.4	Locking control
	P7	63.1	Cup filler
	P5	63.1	Timer
	P9	60.4	Timer
	P13	65.9	Temperature
	P18	51.1	Cup filler
Low scoring 0–49.9 %	P15	8.6	Cord rewind
	P3	11.0	Cord rewind
	P11	19.9	Turbo fan
	P14	30.7	Locking control
	P10	41.2	Locking control
	P12	46.0	Cup filler
	P17	33.0	Turbo fan
	P2	40.1	Turbo fan
P8	42.0	Cord rewind	

3.2 Selection of Singular Pictographs Representing the Referent Group

Limited guidelines on the usage and design of pictographs on electrical appliances may have contributed to the emergence of various pictograph designs intended to convey a similar meaning. Thus, this may cause users to misunderstand due to multiple possible meanings, resulting in confusion. Pictographs on electrical products should be universal and for a singular purpose such as with the ‘warning sign’ symbol. The use of a single universal pictograph to represent one meaning may hence enable it to be seen and recognised more easily and often, as opposed to the use of multiple designs representing one meaning. Therefore, we suggest the use of the six pictographs which have scored the highest in the recognisability test of each referent to be used as a singular pictograph representing each referent. The pictographs are shown in Table 3.

Although these pictographs have scored the best for each referent group, P2 and P8 are still categorised under ‘difficult to recognise’ because they received a score of less than 50 % of correct answers. We are of the belief that the design of pictographs under the ‘average’ and ‘difficult to recognise’ categories should be improved in terms of graphical integrity in order to achieve the minimum acceptable level of recognisability as suggested by the ISO. The use of a single pictograph is expected to increase the probability of its use in various settings, and thus, the

Table 3 Pictographs with highest score in the recognisability test for each referent group

Pictograph	Appliance	% of Correct Answer	Category
<i>Referent 1: Locking Control</i>			
 P1	Automatic Washing Machine	56.4%	Average
<i>Referent 2: Cup Filler</i>			
 P7	Water Dispenser	63.1%	Average
<i>Referent 3: Turbo Fan</i>			
 P2	Air Conditioner	40.1%	Difficult to recognise
<i>Referent 4: Timer</i>			
 P4	Microwave Oven	67.6%	Easily recognised
<i>Referent 5: Temperature</i>			
 P16	Electric Thermo-Pot	79.4%	Easily recognised
<i>Referent 6: Cord Rewind</i>			
 P8	Vacuum Cleaner	42.0%	Difficult to recognize

probability of its presence. This expected increase of its presence can thus lead to the formation of pre-established references in the stored, long-term memories of consumers so as to avoid confusion amongst consumers.

4 Conclusion and Recommendations

Generally, the data obtained from this recognisability test justify that most of the pictographs are poorly recognised. Six pictographs intended to represent the referent groups ought to be widely used so they are universally recognised. Similar studies should also be conducted on other pictographs that vary with their conveyance of referents. The tests conducted in this study have only touched upon the design integrity of several pictographs. In the future, it may be tested against the 'context of use', which includes the manner in which the pictograph is displayed, by testing variables such as the size, colour, layout, or physical character (e.g. moulded, engraved, or printed). Additionally, the placement of the illustration upon the electrical product ought to be taken into account as well. The actual product displaying the pictograph can be used as an item of testing as it can allow for the effect of the appearance of the pictograph as well as the consumer's ability to recognise it.

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A Practical Design of Kiln Building: Small-Scale Portable Kiln

Nur Jannah Jamil, Zainal Zakaria, Abdul Rahim Jalil
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Abstract In ceramic manufacturing, firing is an essential stage of ceramic production. There are several designs for a kiln that can be constructed manually. However, kiln design may not be practical enough for an individual operation to fire a low quantity of ceramic product. The problem is the waste of energy in the firing of low-quantity products. Hence, this study was to provide a practical design approach suitable for a simple basic kiln construction for a low quantity of product with various sizes. A kiln was designed and constructed with the use of a thermocouple to measure the temperature. The firing of ceramic wares was very successful.

Keywords Kiln design · Kiln construction · Kiln operation

1 Introduction

Kiln design comes in different sizes according to the size of production. For example, in mass production, the size of the kiln is a larger size to produce the ceramic product. This is different from an artist's production or a batch production whereby the size of the kiln is small. The *raku* kiln is another sample for a practical kiln. The *raku* kiln has a variety of diverse materials which can be assembled to

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construct it [1]. However, some problems may be encountered when firing a small-size product such as accessories in a larger kiln; energy will be wasted because a large amount is used to complete the firing process when using a larger kiln. Huge kilns have a longer interval during firing and failure can cause great losses [2].

For this research, a kiln was built from a dustbin steel container adding a fibre cloth lining inside the kiln. Firebricks also used as the floor of the inner parts. This dustbin container was used because it has handles on both sides where it can be lifted easily. The kiln was built to test the kiln firing performances on bisque and glaze firing.

Burner holes and damper are the basic components for kiln features. The size of the burner hole accords to the sizes of the burner so that it can fix them perfectly. A fibre blanket wall was used inside the dustbin container.

The objective of this experiment was to test the designated kiln through both firing and bisque and glaze firing using this kiln working as a portable small-scale ceramic kiln.

This research was done as another alternative for kiln design which is more practical and easy for an individual to operate. This method will benefit beginners in starting to learn in a ceramic firing lesson.

2 Kiln Design

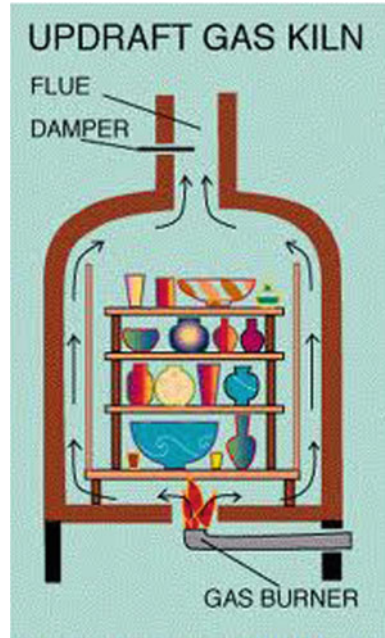
In this research an updraft kiln was chosen to be used in the experimentation. Characteristic of an updraft kiln is the flame, and the heat rises directly from the floor through the pots setting [3]. Basically, updraft kilns consist of three basic components: the firebox, dampers, and chamber area. The chamber area is where the pots are set between the firebox and damper [4]. The updraft kiln has a simpler component and is easy to build as shown in Fig. 1.

The designated kiln for this research was in a circular shape. A circular shape can ensure the firing circulation to flow inside the kiln. Thus the firing circulation could be completed successfully. Apart from that, the cylindrical form is easily to handle. The *raku* kiln popular alternative design joins the lid to the cylinder (also known as a 'tophat' kiln) but to open the kiln one must lift up the upper side of the kiln with the help of a pulley-lift device [5].

3 Kiln Preparation

Preparation of the designated kiln includes the material preparation. There are several components which need to be prepared before assembling and running the firing process.

Fig. 1 Example of an updraft gas kiln



3.1 *Dustbin Steel Container*

Use a dustbin steel container to build the kiln. Cut and drill a hole for the damper and fire hole. The damper hole is on the lid of the container and the fire hole is on the side of the dustbin.

3.2 *Fibre Cloth*

Fibre cloth is a type of material that is considered affordable and can resist high temperatures up to more than 1000 °C [6]. It is also known as a light material and it works as an excellent insulator [7]. In this research the fibre cloth needed to be measured according to the sizes of the dustbin steel container before lining it inside. The thickness of this fibre cloth was 1 in., and the size of the fibre was 0.6 m × 7 m.

3.3 *Firebricks*

Firebricks are a heavy duty material. They have better resistance to heat. Bricks were made from fireclay material with considerable grog added and heated at a high



Fig. 2 Examples of the main materials for portable kiln building

temperature [2]. The base was replaced with insulator firebrick which has been cut in a round shape or following the shape of the kiln. The original size of the insulator firebricks was 23 cm × 11.4 cm × 7.6 cm. Insulator firebricks are a good insulator and they come in a modular unit which can be laid up into a wall quickly with no added material [8]. Examples of materials for a portable kiln are shown in Fig. 2.

4 Kiln Installation

After the component preparation is completed, proceed to the installation stages. At this stage, there will be five main steps to install the component as shown in Fig. 3.

The first step of the installation stage is to place the firebricks inside the center of the kiln as the base. These firebricks have been cut in a circular shape so that they are well fixed. Firebricks also can sustain heavy loads on top of them.

The second step is to line the inside parts of the dustbin with fibre cloth. This fibre cloth then will be tightened up with a metal clip to ensure the fibre cloth does not fall down. Use a hardener material spray all over the fibre cloth and let it dry for a few hours, spraying the fibre wall and also the lid. The purpose of the hardener is to strengthen the fibre cloth so that it can last longer.

The third step is to set the product to be fired inside the kiln. To set up the product, props and bat are other components which will be needed. The sizes of this component must be suitable to the radius size of the inner kiln. For this research the size of bat used was 15 × 15 cm and props 7.5 cm high.

The fourth step is assembling the high pressure gauge (HPG), with pipe hose (2 m) to the burner. A metal clip is needed to secure and tighten them together.

The final step is to start the firing operation. It's begun with the HPG opened from liquid propane gas (LPG) from a 4-kg gas tank. The secondary-air valve on the burner should be open to allow air to flow inside the burner. The setup of the firing process is shown in Fig. 4.

Fig. 3 Five stages in setting firing using a portable kiln

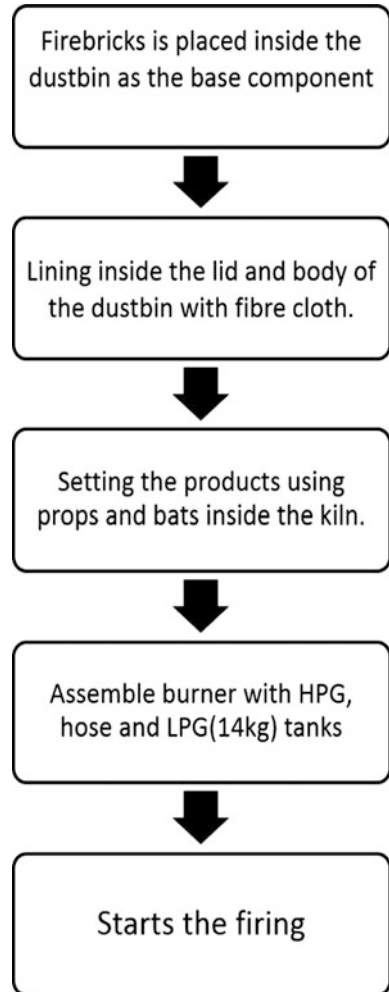


Fig. 4 Firing process using the kiln built from a dustbin container



5 Methodology

There are four (4) stages of the firing process. In this work, the stages were applied to test the capability of the kiln to function as a standard kiln in the market. Further information about basic kiln construction was gathered through literature reading from books and papers. The experiment was set up for 900 °C, bisque firing using the design proposed. The firing profile is shown in Fig. 5. This firing used stoneware as the material to be fired as shown in Fig. 6a, b. The firing took from 3 to 3½ h to complete for bisque firing. A constant control of temperature was held by increasing the temperature every half hour and observing the temperature by using the thermocouple devices.

For glaze firing it will take about 3–4 h of operation. The method for glaze firing is almost the same as bisque firing except the temperature is up to 1100 °C. When at the soaking stage, the damper holes are closed with a fibre cloth. Tongs and gloves are used to hold the fibre cloth. The secondary air valve is closed to shoot the temperature. There is other equipment needed for this experiment using liquid

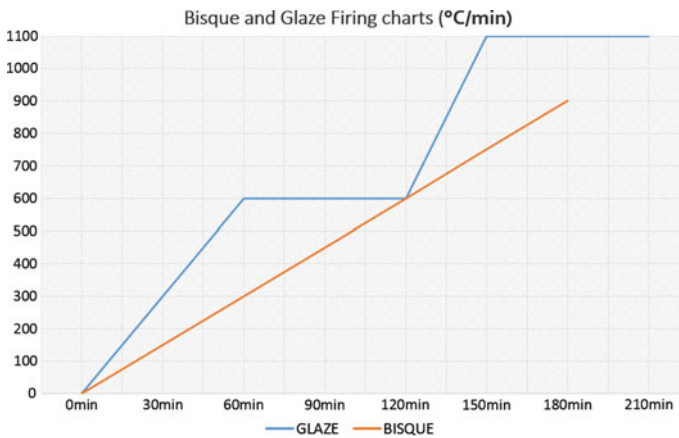


Fig. 5 Bisque firing at 900 °C and glaze firing process at 1100 °C

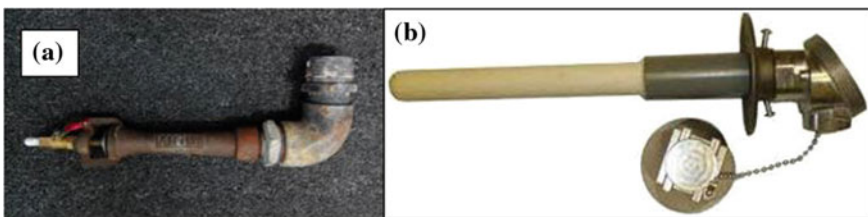


Fig. 6 a Burner and b thermocouple

propane gas such as a thermocouple device and burner (see Fig. 6). Apart from that, safety requirements are needed too. Use a proper heat-resistant glove, eye goggles, tongs, and a mask with proper attire when handling the firing operations.

6 Results and Discussion

Figures 7 and 8 show the results of firing of bisque and glazed wares. Four experiments were performed. Through Experiment 1 and Experiment 2, bisque firing took 3½ h. Experiment 3 and Experiment 4 took only 3 h. Experiments 1 and 2 started smoothly, as the temperature increased every half hour. The temperature was increased slowly to prevent rapid rises of temperature. It is concluded that the heat inside the kiln was well heated by using 14 kg LPG. In Experiments 3 and 4, the temperature could be controlled as the duration of the firing was shorter than in the previous experiments. The heat flow was evenly distributed inside the kiln. Temperature was recorded through the thermocouple readings. Therefore the firing period could change by monitoring the temperature rises evenly to ensure the stoneware product was evenly fired. Note carefully the entire firing and product from the damper hole.

In the glaze firing experiment, there were also two different lengths of time. In this research Experiments 1 and 2 took 4 h whereas Experiments 3 and 4 took 3½ h to process. Experiment 1 for glaze firing started at a slow speed. This is because glazing does not need a rapid increase in the earlier firing stages. At 180 min, the temperature went from 900 to 1100 °C, then soaking took place to mature the glaze for about 30 min. The temperature reading was uneven due to the cold weather

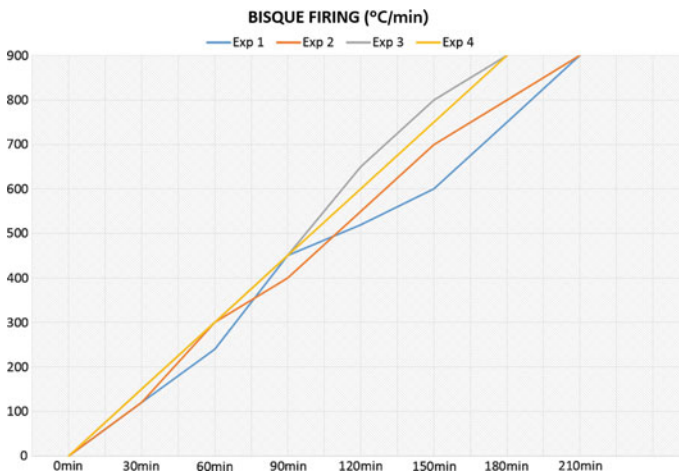


Fig. 7 Firing results on bisque ware

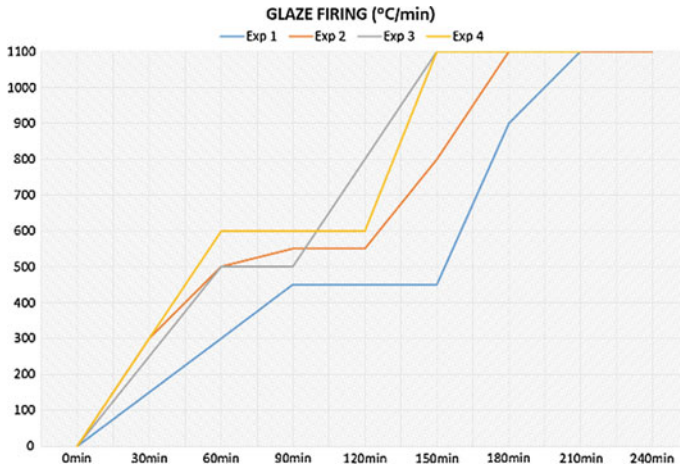


Fig. 8 Firing results on glazed ware

which was a bit rainy, and the amount of LPG gas decreased after using it several times for bisque firing.

Experiment 2 started off in a good condition and the LPG tank was replaced with a new tank. It soaked for 60 min and then increased rapidly from 800 to 1100 °C. Soaking for Experiment 2 was 1 h. In Experiments 3 and 4, as usual the temperature started slowly and the soaking time was 60 min. It was concluded that the firing length could be shortened by controlling the heat process accordingly.

7 Conclusion

Through the experiment conducted using the designated kiln, it was proved that the kiln build was capable of doing a bisque firing and low glaze firing process. In addition, the duration of the firing process could be controlled according to the time interval. As a recommendation, this kiln is easy to build in a short time and easy to maneuver. Beginners also can use this design approach or artists for their work in ceramics. This kiln is also portable inasmuch as it can be placed anywhere the users desire.

Acknowledgments We would like to acknowledge the generous participation of the interaction designers in the research. This study was conducted in the Formgiving Design Research Lab established by the Research Management Institute, Universiti Teknologi MARA (UiTM). We also give full appreciation to the Malaysia Ministry of Higher Education for the financial support under RAGS grant, UiTM for the Research Excellent Fund Scheme (RIF) and UiTM Dana REI Formgiving Design.

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Luminescent Properties of SrAl₂O₄ Activated Eu²⁺, Dy³⁺ for Transparent Glaze Ceramics

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Abstract Green phosphor strontium aluminate activated by Eu²⁺ and Dy³⁺, SrAl₂O₄:Eu²⁺, Dy³⁺ powder was synthesized by solid-state reaction by firing at 1250 °C in a graphite crucible. The glow glaze was produced by a combination of SrAl₂O₄:Eu²⁺, Dy³⁺ powder with transparent glaze. Characteristics of the phosphor powders and the posttreated particles such as crystallinity and luminescent properties were investigated. Observation of the glowing intensity and luminescent properties of the glow glaze showed the dependency on particle size and refiring temperatures. Proper interaction between phosphor/glaze interfaces depends upon the firing process and nature of the SrAl₂O₄:Eu²⁺, Dy³⁺ phosphor powders.

Keywords Phosphorescent · Glaze · SrAl₂O₄:Eu²⁺,Dy³⁺ · Particle size · Temperature

1 Introduction

The application of phosphor powders in glass matrices shows promising applications in optical devices [1]. Strontium aluminate phosphors have been extensively studied because of their excellent properties for lighting and display technology. Technology can take advantage of the size dependent made available for various

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applications especially for surface technologies and street furniture. The properties of this phosphor are particularly interesting when their sizes can be controlled in order to produce high glowing intensity.

Our main goal is to produce a transparent glow glaze by applying $\text{SrAl}_2\text{O}_4:\text{Eu}^{2+}$, Dy^{3+} powder samples and focusing interest on the size dependent of phosphor powder on luminescent properties and the characteristics of posttreated particle phosphor at different temperatures [2]. One of the major problems of strontium aluminate phosphor is the degradation of glowing performance due to temperature quenching when firing at higher temperatures [3]. In addition, the mixing of phosphor powder in the glaze slip would reduce the glowing performance. This might be due to the phosphor powder which is chemically unstable in water or moisture [4]. The glowing performance of phosphor powder may deteriorate once exposed to water or moisture and this has caused the predicted properties of minimum emission effect and thus limited their applications; this was confirmed by Guo et al. [5].

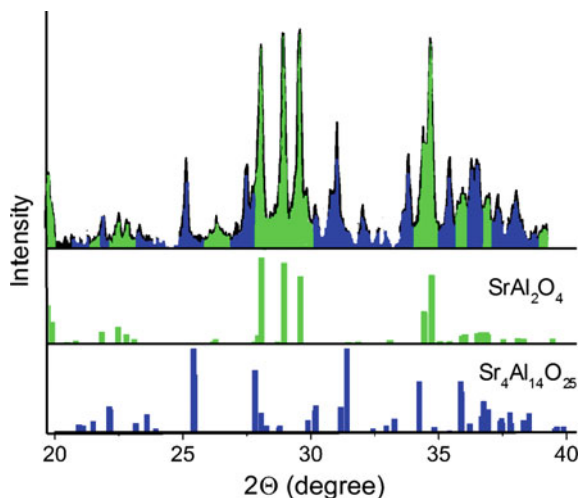
2 Experimental Method

SrAl_2O_4 phosphor doped with Eu^{2+} and codoped with Dy^{3+} were prepared by the solid-state reaction approach using strontium carbonate (SrCO_3), alumina (Al_2O_3), europium oxide (Eu_2O_3), dysprosium oxide (Dy_2O_3), and boric acid (H_3BO_3) as the starting materials. The raw materials were mixed for the first 30 min by dry milling and continued for another 30 min by wet milling. The slurry was then dried at 150°C for 3 h to remove the water content. The white powder was then heated at 1250°C in a graphite crucible for 2 h. The end products were hard solid phosphor that was ground manually to get a smaller particle size. The $\text{SrAl}_2\text{O}_4:\text{Eu}^{2+}$, Dy^{3+} phosphor particles were prepared in three different particle sizes that were produced by sieving. The sieved $\text{SrAl}_2\text{O}_4:\text{Eu}^{2+}$, Dy^{3+} obtained was labeled as coarse (+850 μm), intermediate (-850 + 500 μm), and small size (-500 + 212 μm). About 0.4 gm each of $\text{SrAl}_2\text{O}_4:\text{Eu}^{2+}$, Dy^{3+} phosphor particles were dispersed on the developed transparent glaze and subsequently re-fired at $800\text{--}1000^\circ\text{C}$ to optimize the re-firing temperature. The influence of particle sizes and re-firing temperatures on the optical property was analyzed by x-ray diffraction (XRD) and photoluminescence (PL) spectroscopy.

3 Results and Discussion

From the XRD pattern of $\text{SrAl}_2\text{O}_4:\text{Eu}^{2+}$, Dy^{3+} phosphor (Fig. 1) indicated a major phase as monoclinic structure SrAl_2O_4 and a secondary phase as orthorhombic structure $\text{Sr}_4\text{Al}_{14}\text{O}_{25}$ indicating the formation of a mixed oxide phase.

Fig. 1 XRD patterns of synthesized SrAl₂O₄:Eu²⁺, Dy³⁺ phosphor



To understand the optical properties of SrAl₂O₄:Eu²⁺, Dy³⁺ phosphor powders, it is necessary to evaluate emission and excitation spectra. Figure 2 shows the SrAl₂O₄:Eu²⁺, Dy³⁺ synthesis excited with wavelength 325 nm and the maximum emission band was registered at 507 nm. These results were in good agreement with the literature values [6]. This emission was attributed to the typical $4f^65d^1 \rightarrow 4f^7$ transition of Eu²⁺ ion in the SrAl₂O₄. The spectra shape was symmetric, indicating that only one Eu²⁺ ion luminescence center existed. This was due to Eu²⁺ ions occupying only one type of Sr²⁺ site in the SrAl₂O₄ system corresponding to the Eu²⁺ emission luminescent center as suggested by Fu et al. [7]. For this situation, the lowest excited state of 4f levels of Eu²⁺ was located higher than the $4f^65d^1$ level so that Eu²⁺ could easily be excited to an upper level.

Fig. 2 Excitation and emission spectra of SrAl₂O₄:Eu²⁺, Dy³⁺ phosphor

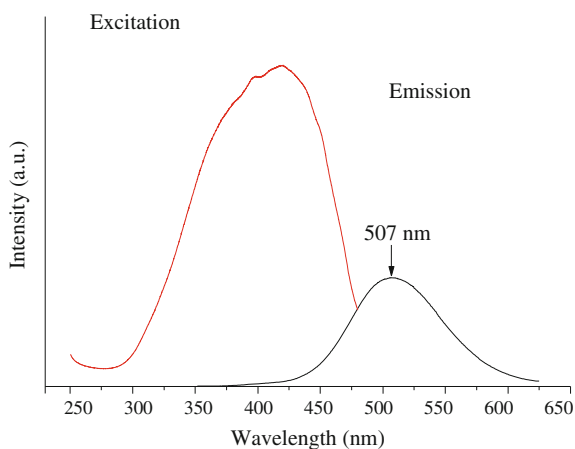


Table 1 Glowing effect of glow glaze at different particle sizes and re-firing temperatures































Temperature	Condition	Particles size		
		Coarse	Intermediate	Small
SrAl ₂ O ₄ :Eu ²⁺ , Dy ³⁺ without firing	With light			
	Off light			
800 °C on glaze	With light			
	Off light			
900 °C on glaze	With light			
	Off light			
920 °C on glaze	With light			
	Off light			
1000 °C on glaze	With light			
	Off light			

Table 1 shows the observation of physical appearances and glowing effect of all samples in the absence of light. The samples were prepared by placing the phosphor on a transparent glaze and the second firing was at 800–1000 °C with 1 h of soaking time and 10 °C/min of ramp rate. All glow glaze samples were exposed to fluorescent light for 20 min to allow photoexcitation to enable the glowing effect in a dark room.

The glow was clearly observed and it was attributed to the excitation of electrons to the conduction band by external energy, in this case, photons. When the external energy was removed, the excited electrons would either return to the ground state or the detrapping of electrons occur, and energy was released as light [8]. From Table 1, it could be observed that only two samples (i.e., coarse and intermediate particle sizes) had successfully exhibited good phosphorescent phenomena upon photoexcitation, whereas fine particles showed poor glow properties upon the second firing.

From the observation, the SrAl₂O₄:Eu²⁺, Dy³⁺ phosphor powder without firing (original powder) at coarse and intermediate particle sizes showed bright green colour. However, it was observed that the glowing performance for small-size

phosphor was reduced as compared to other sizes. This confirmed that the grinding process would cause a reduction of luminescence properties. From the glowing performance, the coarse SrAl₂O₄:Eu²⁺, Dy³⁺ powder re-fired at lower temperatures (800 and 900 °C) could be said to have successfully produced glow glaze. However, the coarse samples re-fired at 920 and 1000 °C showed a bluish-green luminescence effect. This effect was due to the temperature quenching. This quenching process could change the band gap of the host and thus produce a different wavelength of emission during transition of $4f^65d^1$ to $4f^7$ ground state. By referring to Table 1, the results also indicated that the intermediate particle size of SrAl₂O₄:Eu²⁺, Dy³⁺ showed bluish-green and blue colour at 800 °C and higher temperatures, respectively. The colour of this phosphor would have faded after being re-fired at 1000 °C.

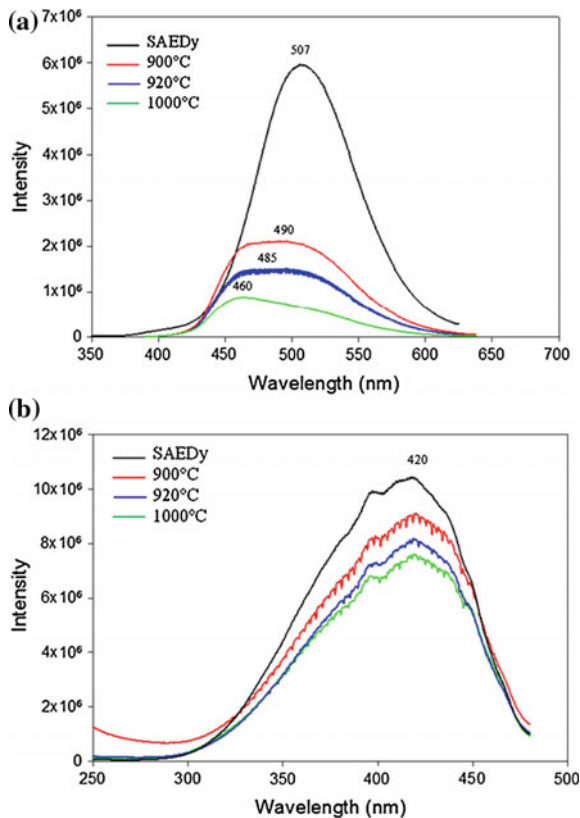
However, the small particle size of SrAl₂O₄:Eu²⁺, Dy³⁺ showed bluish colour with lower persistent intensity at all temperatures applied for the re-firing process and did not show any glowing effect at 1000 °C.

It can be seen that the colour of glow glazes produced was either green, bluish-green, or blue which was dependent on the phosphor particle size and firing temperature. The brightness of the green colour was greater for larger phosphorescent particles and lower temperature as observed. For samples having smaller phosphorescent particles, the glow glazes were bluish colour. When the phosphors were ground to a smaller size, the stability of Eu²⁺ ions and Dy³⁺ ions staying as dopant and codopant, respectively, were greatly reduced and thus changed the phosphor colour.

The glow glaze emission spectra for coarse particles of SrAl₂O₄:Eu²⁺, Dy³⁺ phosphor at different re-firing temperatures are shown in Fig. 3a. The glow glaze re-fired at 900–1000 °C showed different luminescence characteristics from the SrAl₂O₄:Eu²⁺, Dy³⁺ phosphor without firing. When the sample was re-fired at 900 °C, the emission peak intensity at 490 nm decreased by 65 % from the original PL intensity of SrAl₂O₄:Eu²⁺, Dy³⁺ without firing. The decreasing emission intensity was due to the valence state change surrounding Eu²⁺ ions that would decrease the number of luminescence centres, which in turn led to the decrease in luminescence intensity. As for the sample re-fired at 920 °C, the emission peak at 485 nm decreased by 75 % from the original PL intensity of SrAl₂O₄:Eu²⁺, Dy³⁺, whereas for the intensity of the one re-fired at 1000 °C, the emission peak at 460 nm decreased by 83 %. This indicated that the re-fired sample at 1000 °C experienced a more significant decrease of the emission intensity.

It was demonstrated that the emission band around 507 nm for standard SrAl₂O₄:Eu²⁺, Dy³⁺ phosphor was due to the transition from the $4f^65d^1$ excitation state to the $4f^7$ ground state of divalent europium ions (Eu²⁺). However, the emission peaks shifted towards shorter wavelengths as the re-fired temperature increased, which meant a shift of colour coordinate. This result was in line with the previous observation study which showed a change of green to bluish colour with increasing of the re-firing temperature (Table 1). The re-firing of strontium aluminate phosphor would affect the valence of Eu²⁺ ions and thus could cause the lattice structure to be modified. It was noted that the SrAl₂O₄ host structure was not

Fig. 3 Emission (a) and excitation (b) spectra of coarse particle size of $\text{SrAl}_2\text{O}_4:\text{Eu}^{2+}, \text{Dy}^{3+}$ (SAEDy) phosphor before and after re-firing



stable at high temperature which limited its application for a second firing process. This was due to B_2O_3 content in composition which was the driving force of improving the PL intensity during original synthesis. However, Karacaoglu and Karasu [9] confirmed that as the re-firing temperature increased, the formation of a secondary phase such as SrB_2O_4 and $\text{SrAl}_2\text{B}_2\text{O}_7$ could be expected in this phosphor. However, the detailed analysis of phase structure did not proceed because the focus of the study was to optimize the optical properties of the glow glaze.

It could also be observed from Fig. 3a that the $\text{SrAl}_2\text{O}_4:\text{Eu}^{2+}, \text{Dy}^{3+}$ without firing showed a symmetric band and the re-fired samples showed a broad band shape. The symmetry shape was due to the formation of only one luminescent centre [10]. However, the broad band shape was due to the increasing of the zero phonon line as the changing of the nature of the electronic transition took place. As the re-firing temperature rose, phonon-wave splitting was increased and thus limited its intensities, whereas the emission band would be broadened further. This was also reported by Mothudi [11].

Figure 3b shows the excitation bands for coarse particles of $\text{SrAl}_2\text{O}_4:\text{Eu}^{2+}, \text{Dy}^{3+}$ re-fired at different temperatures. The excitation spectra of re-fired samples were similar to the $\text{SrAl}_2\text{O}_4:\text{Eu}^{2+}, \text{Dy}^{3+}$ without firing. However, a decrease of PL

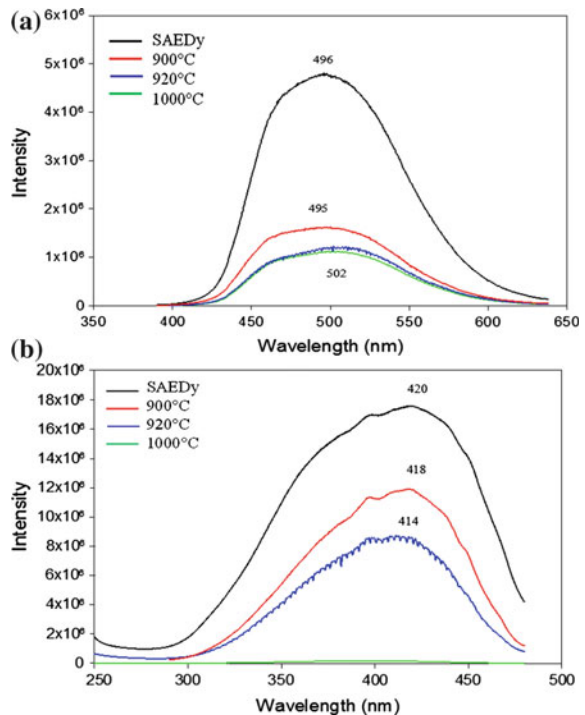
intensity was found in their position maxima spectra. The excitation peaks were observed at 420 and 390 nm. A weak subband at 390 nm appeared in the excitation spectra which had been attributed to *5d* state splitting. The decreasing of PL intensity had resulted from the temperature quenching as a result of increasing of re-fired temperature.

Figure 4a shows the emission bands for the intermediate particle size of SrAl₂O₄:Eu²⁺, Dy³⁺ which were re-fired at different temperatures. It was observed that there was more than 70 % degradation of emission intensity as compared to SrAl₂O₄:Eu²⁺, Dy³⁺ without firing. This suggests that it was due to the particle size reduction and thus the valence state changed. The glow glaze emission peak showed a small blue shift to 495 nm after re-firing at 900 °C.

The emission peaks of other samples were observed at 502 nm after being re-fired at 920 and 1000 °C. After re-firing, the performance of SrAl₂O₄:Eu²⁺, Dy³⁺ phosphor had degraded, resulting in a colour shift and a decrease in emission spectra. However, no emission peak matching the *4f-4f* transition of the Eu³⁺ ion appeared in Fig. 4a. By considering this factor, the colour shift might have to be explained in terms of a change in environment of Eu²⁺ sites.

Figure 4b shows the excitation spectra for the intermediate particle size of SrAl₂O₄:Eu²⁺, Dy³⁺ re-fired at different temperatures. It was observed that there were little changes for the excitation spectra, such as a small shift and a decrease of

Fig. 4 Emission (a) and excitation (b) spectra of intermediate particle size of SrAl₂O₄:Eu²⁺, Dy³⁺ (SAEDy) phosphor before and after re-firing



the photoluminescence intensity. The excitation spectra of standard and re-fired samples remained the same pattern except for the sample fired at 1000 °C. The excitation wavelengths of SrAl₂O₄:Eu²⁺, Dy³⁺ phosphor re-fired at 900 and 920 °C were shifted from 418 to 414 nm. The shifting of these excitation peaks to the blue region resulted from the increasing of re-firing temperatures.

From Figs. 3 and 4, it can be seen that the emission peaks of SrAl₂O₄:Eu²⁺, Dy³⁺ without firing for coarse and intermediate particle size are 507 and 496 nm, respectively. These samples gave similar emission spectra with a small blue shift. The decrease in particle size would increase the surface energy and thus resulted in the distortion of the structure around the Eu²⁺ ions, correspondingly, therefore causing the possible blue shift in the emission peaks [12]. It was observed that the coarser phosphorescent particle size had more greenish appearance and emitted light in higher intensity. The green colour of the glow glaze correlated with the intensity of the emitted light, where the more greenish the glow glaze was, the greater the intensity of the emitted light. The emission intensity decreased with decreasing of particle size and this was attributed to the less energy stored inside the phosphor particles.

4 Conclusions

There were significant changes for the glowing intensity with variation of particle sizes and re-firing temperature. The luminescent property of the glow glaze was very sensitive to second firing and particle size. The observation showed that the coarser SrAl₂O₄:Eu²⁺, Dy³⁺ particles give a more greenish and brighter appearance of glow glaze. Also, the coarser phosphorescent particle size gave a higher intensity of the emitted light. It was also determined that the re-firing process strongly affected the phosphorescent abilities and PL intensity of SrAl₂O₄:Eu²⁺, Dy³⁺ phosphor. The durability of SrAl₂O₄:Eu²⁺, Dy³⁺ phosphor performance was decreased after the re-firing process.

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Theoretical Framework of Replaceable Ventilation Blocks Using Modified Stoneware Body

Mohd Fadhi Yakub, Oskar Hasdinor Hassan, Syaza Abdul Rahim and Rusmadiyah Anwar

Abstract Ventilation is the main factor for generating a soothing and comfortable environment in a building. It is one of the most important factors for maintaining acceptable indoor air quality and human humidity in buildings. The design of ventilation blocks plays an important role in the influence of air circulation in the house. The ventilation blocks basically attach permanently to the house wall and cost a great deal to replace. This study focused on enhancing the existing design of permanent ventilation blocks with replaceable ventilation blocks. We explored the design aspects of replaceable and sustainable ventilation blocks. The methodology of this study was divided into four phases: design development, material investigation, manufacturing, and installation. For the future, the ventilation blocks can be replaced and a variation pattern created. We also introduce a new concept of design of ventilation blocks.

Keywords Ventilation · Ventilation blocks · Replaceable · Design

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1 Introduction

Generally, ventilation includes both the exchange of air to the outside as well as circulation of air within the building. Based on the Oxford Dictionary [1], ventilation provides fresh air. Terms defining ventilation include air changing theory, called infiltration and exfiltration. Basically infiltration means the air moving inside the building and exfiltration is inside air moving through the holes to the outside of the house. Ventilation's purpose is to provide healthy air and its function is to remove air pollutants [2]. Ventilation has three main forces: natural ventilation, mechanical ventilation, and hybrid ventilation [3]. Natural ventilation means outside air forced through the wall and spread inside the house without using any mechanical machines. Natural ventilation is the method of solving thermal comfort and is able to improve the air circulation in the residence [4]. By controlling natural ventilation in a house it will be able to contribute energy savings, have an important role in indoor air quality, and also consume less energy usage in the house [4]. For instance, the energy savings can be supported by government policies in national key economic areas (NKEA) in which Malaysia is now moving forward to focus on a sustainable energy platform for growth in the future [3]. One of the factors contributing to energy saving is developing ventilation blocks design. Nowadays, ventilation blocks are rarely used due to the permanent factor of the ventilation blocks themselves. Ventilation blocks, also known as *Lubang Angin* in Malay, are popularly used in traditional Malay houses. Figure 1 shows the basic design of ventilation blocks that are attached in the house.

There is a variety of sizes of the ventilation blocks. The standard dimension of the ventilation blocks is $(215 \times 102.5 \times 65 \text{ mm})$ [6]. The standard of specification of the blocks is in accordance with Malaysian Standards (MS) 7:6:1972. Based on MS, clay bricks are classified into different classifications based on strength and water absorption. The minimal strength according to MS is 14 N/mm^2 . The requirement for water absorption of the bricks is less than 4.7 %.

The existing ventilation blocks used woods, steel, aluminum, and cement materials in their production. Stoneware clay was one of the ceramics that had been

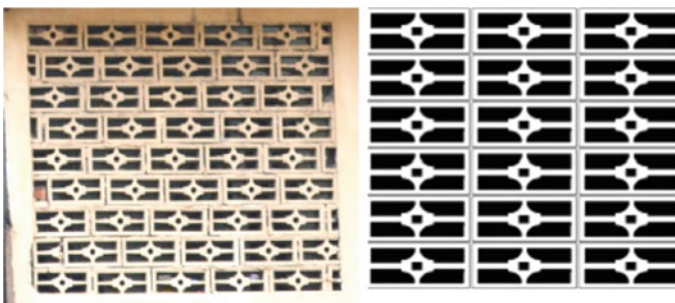


Fig. 1 Existing ventilation blocks *lubang angin*

used to produce the ventilation blocks. The advantages of the stoneware body are a hard surface, water resistance, and ability to be used for electrical insulator refractory and thermal insulator. This material was suitable to create the heavy-duty materials for building if the strength can be achieved in accordance with the MS guidelines. This stoneware clay gives strength and durability through the firing process. Stoneware clay as the ceramics body is one of the natural materials that contain low contamination toxicity compared to manmade materials.

2 Research Methodology

Generally this study was conducted in four phases [4] and covered all aspects of design study, material investigation, manufacturing process, and installation process [5, 6]. The first phase was a study of the existing ventilation blocks and compared the existing ventilation blocks, which are permanent, to the replaceable ventilation blocks. This phase studied the mechanism itself and developed a locking system for the security of removable blocks. The second phase was focused on materials investigation. This phase explained the modifying and processing of the stoneware body and its formulation compositions. For the manufacturing phase it covered manufacturing areas as well as the techniques for producing ventilation blocks. This phase used the standard manufacturing process through extrusion or the extruding process. The last phase studied the installation process. The replaceable ventilation blocks were attached to the house and were the final phase of the research.

2.1 Design Study (Replaceable Ventilation Blocks)

The Malaysian Standard classified three types of bricks: common bricks, facing bricks, and engineering bricks [6]. The dimensions of these bricks based on MS 7:6:1972 are approximately $(215 \times 102.5 \times 65 \text{ mm})$. Figure 2 shows the existing ventilation bricks from Premier Building Materials (PBM). The dimension of these ventilation blocks produced by PBM was $(390 \times 190 \times 140 \text{ mm})$ [6].

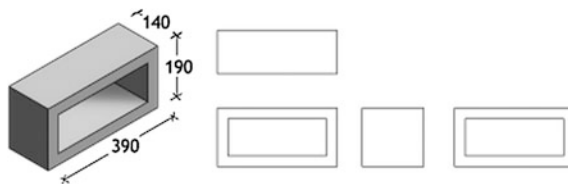


Fig. 2 Existing ventilation blocks

Fig. 3 Ventilation block frame

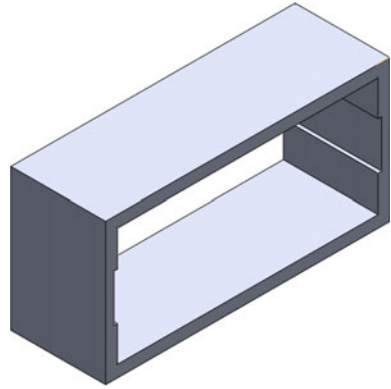


Fig. 4 Ventilation block

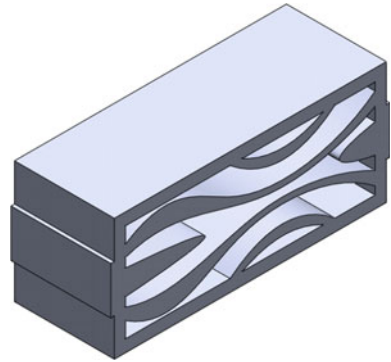
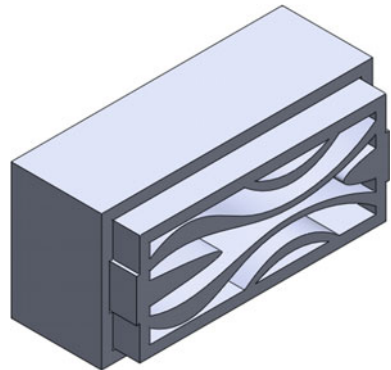


Fig. 5 Assembly block



These ventilation blocks are permanently assembled in the wall. The designs are illustrated in Figs. 3, 4, and 5. The removable ventilation blocks are separated into three parts, the first part of which is the frame. The second part is the ventilation block, and the third part is the locking system.

2.2 Material Investigation

For the materials investigation a stoneware body was selected as the main material for producing the ventilation blocks. The compositions of the stoneware body are kaolin, ball clay, and silica. [10]. Table 1 shows the parameter of the master formulation stoneware [10]. The purpose of this material investigation was to increase the strength of the stoneware body. The strength of the body composition was examined to obtain the suitable composition of the ventilation block. The compositions were segregated into six groups with different ratios of calcium carbonate. The percentages of the calcium carbonate [7] were 2, 5, 10, 15, and 20 %. The purpose of the increased percentage of calcium carbonate (CaCO_3) in the compositions is to increase the strength of the stoneware body. The clay is labeled Master M1, stoneware clay S1 for 2 % CaCO_3 , stoneware clay S2 for 5 % CaCO_3 , stoneware clay S3 for 10 % CaCO_3 , and stoneware clay S4 for 15 % CaCO_3 . Table 1 shows the material percentages of the composition. The composition [8] was mixed with water and sieved through 200 μm mesh. The body was placed in plaster of Paris to reducing water contamination of the clay.

A physical properties test was conducted to test the strength (MOR) of the body, shrinkage, and water absorption. Microstructure analysis was conducted using a scanning electron microscope test (SEM) to obtain the porosity of the body. This test was conducted to ensure the ventilation blocks met the Malaysian Standards guidelines and safety of use and commercialization. The standard formulation for calculation was modulus of rupture as shown in Eq. (1) (MOR calculation formula [10]).

$$\text{MOR} = \frac{3PL}{2bh^2} \quad (1)$$

Water absorption testing was conducted to measure the porosity level of the clay. The procedure to measure the porosity [9] level was to dry the stoneware body in an oven at 110 °C. The second stage was soaking the stoneware body in distilled water for 24 h [10]. Then the body was weighed immediately. Equation (2), the porosity weight measure calculation formula D570 [10], uses the ASTM formula.

$$\frac{W_1 - W_2}{W_1} \quad (2)$$

Table 1 Master formulation of stoneware clay

Materials	Percentage of materials (%)
Kaolin	40
Ball clay	15
Silica	30
Calcium carbonate	0
Water	45

A shrinkage test was conducted to measure the shrinkage of the clay. The measurement of test shrinkage was the original length against the shrink length [10]. The shrinkage calculation formula [10] is shown in Eq. (3).

$$\frac{L_1 - L_2}{L_1}. \quad (3)$$

2.3 Manufacturing Process

The manufacturing phase was separated into three stages, the extruding phase, die design, and firing phase. The first stage studied the extruding mechanism. Extrusion was separated into three sectors, the tube, pressure, and die. The function of the tube is the storage of the clay. The pressure sector is to press the clay through the tube, and the last sector of the extrusion machine is the die. The die sector was the crucial phase. The die design influences the output product of the ventilation blocks. The last sector was the firing process. Figure 6 shows the mechanism of the extrusion technique. Basically the firing process aligned with the materials investigation [11]. The data on the materials investigation were collected and similar formulation parameters and suitable temperature for ventilation blocks were applied. The compositions were fired to obtain the best and most suitable body for the ventilation block.

2.4 Installation Phase

For the installation process the ventilation blocks come with two separate parts which are the ventilation block frame. The frame attaches to the wall and sticks into the cement. Usually the four blocks are used for each section of the installation itself. Figure 7 shows an artist's impression of the installation of the frame attached to the wall. The blocks can be assembled at the end of the process of building the house as shown in Fig. 8.

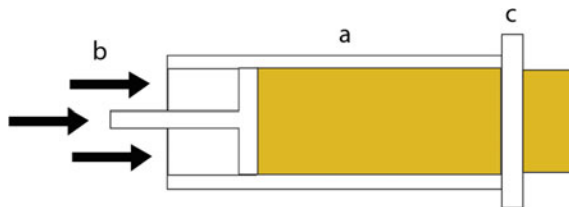


Fig. 6 Extrusion mechanism: **a** cube, **b** pressure, and **c** placement of output which is the die

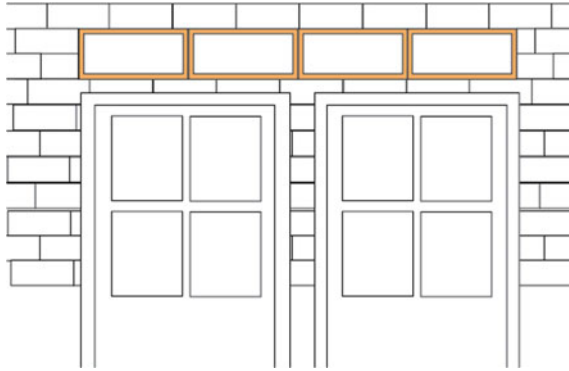


Fig. 7 Frame attached to the wall

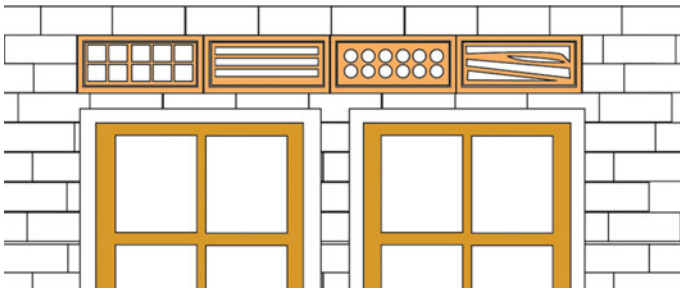


Fig. 8 Design of assembled blocks

3 Conclusion

In this study, the framework explored and enhanced the design and concept of ventilation design. The study also focused on material compositions that support the design of the ventilation block. It is hoped that the replaceable ventilation block will ease construction of the house and decrease the cost of production. In the future, the pattern of the ventilation block will be created in various styles [12]. The material itself can be developed to increase its strength and there will be another study on the soothing environment in the house. Generating natural ventilation gives more benefit for the future [13] to support the government in policies developing eco-green technology [14, 15]. For instance, it can be developed in the manufacturing process [16] for mass production of the ventilation blocks [17] themselves. Another future study will be to design the security locks of the ventilation blocks.

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Traditional Songket and Contemporary Designs Towards Commercial Products

Norwani Md. Nawawi and Rafeah Legino

Abstract The songket is among the few traditional Malay textiles which are still being produced locally. It is considered the queen of traditional textiles in the Malay region (Melayu Nusantara.) No doubt in the olden days the handwoven songket was specially made for the king and the royal family as they were made with real gold threads and with high-quality silk. Songket is a cloth woven in supplementary weft weave technique where the metallic threads as the decorative elements are woven into the fabric of natural or synthetic yarns. Songket is always significant in the Malay culture, as it has been used for centuries by the locals. The designs are usually derived from nature, inspired by the weaver's everyday life. Today the songket is still the chosen textile for both traditional and official ceremonies, and also for many ritual purposes. This chapter describes how the Malay songket can be made into works of art and fashion accessories with contemporary designs. It also explains the development of traditional motifs to contemporary patterns for commercial products such as soft furnishings for interior decoration in private homes or offices. Whilst preserving the basic techniques of traditional songket, contemporary designs in songket are being explored through new techniques developed using different looms for faster production and adopting various materials that give different looks.

Keywords Songket • Traditional • Contemporary • Design • Commercial product

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1 Introduction

For centuries, songket cloths have been woven by Malay women throughout the Southeast Asian archipelago, which includes Malaysia, southern Thailand, Brunei, and Indonesia. Traditionally, *kain songket* was known as the cloth for ceremonies such as Malay weddings, the *potong Jambul* ceremony following the birth of a child, the completion of the Qur'an, and ear-piercing for girls. Basically, in the early twentieth century, songket was woven into *kain sarong*, and in 2-m lengths for the *baju* and *selendang* (shawl) for the ladies. In addition, the Malay shirt and pants known as *baju Melayu*, with *samping* (short sarong) and *tanjak* (headgear), were made for the men. In the past, only royalty and people of the palace were allowed to wear songket. However, by the middle of the twentieth century, these rules had slowly faded away with time and songket become more affordable for the common people. In the 1980s, new designs were introduced by the Malaysian Handicraft Development Corporation and new ideas were developed to enhance people's interest in songket [1].

2 Fabrication of Songket

Songket is fabricated using a Malay loom known as a *kek*. It is a floor loom with four poles to support the warp threads that are stretched across the loom from the back (in the *pasong*) through the beaten (*genera*) and to the front beam (*pesa*) where the warps are placed. The warps then go through the process of being inserted into two shafts for plain weaves. Next is the making of the pattern for songket, known as *menyolek bunga*, which is responsible for the creation of intricate motifs and patterns for inserting metallic threads that characterise the songket fabric. In the process of *menyolek bunga*, the weaver has to lift some of the warp threads manually using *lidi* (bamboo sticks), according to the desired design (Fig. 1). A cord of thread then ties together bunches of warps and stores the pattern



Fig. 1 Weaving songket using lashes of *ikat butang* for making the songket motifs, where the gold metallic yarns are inserted between the warps and firmed with plain weaves

at the back of the loom by the process of *ikat butang*. The weaver can then weave songket, retrieving the pattern by uplifting the *ikat butang* from the back of the loom. The weaving usually starts with half of the songket pattern and then is reversed to form a continuous repeat, until the whole fabric is covered with an overall pattern of gold or silver metallic yarns [2].

3 Traditional Design in Songket

Songket is popular with full-patterned designs for sarongs and spotted repeat patterns for women's dresses. Men usually prefer striped-patterned songkets and full designs for the *samping* (short sarong for men). Traditionally, songket has six main patterns:

- (i) *Songket corak bunga penuh* (full patterned songket)
- (ii) *Songket corak bunga bertabur* (spotted or isolated patterned songket)
- (iii) *Songket corak bunga jalur* (striped patterned songket)
- (iv) *Songket corak siku keluang* (zig-zag patterned songket)
- (v) *Songket tapak catur* (checkered patterned songket)
- (vi) *Songket pucuk rebung* (bamboo shoot or triangle patterned songket)

These patterns can be found in traditional sarong songket, where the structure of a sarong consists of the head panel (*kepala kain*), the body area (*badan kain*), and the border of the sarong (*kaki kain*). The *badan kain* or main body of a sarong contains the larger area, where the pattern can be seen, and the *kepala kain* is a small panel usually situated in the middle of a sarong, with *pucuk rebung* motifs that include two borders (*pengapit kepala kain*) at both sides of the head panel. The *kaki kain* runs along the selvage of the sarong, situated at the top and bottom of the sarong (Fig. 2).

The patterns in songket have been studied and it was found that most of the designs were taken from nature, which surrounds the weavers. Popular motifs are the *tampuk manggis* (mangosteen; Fig. 3), *tampuk buah kesemak* (sharon fruit), *buah cermai* (*phyllanthus acidus*), *bunga cengkih* (clover), *bunga lawang* or *bunga bintang* or *bunga pecah lapan* (star anise). There are more vegetal motifs than faunal motifs, even though the latter have been stylised from their original shapes. Examples of popular faunal motifs are the *gigi yu* (shark teeth), *siku keluang* (flying bat wings), *tapak sulaiman* (starfish), *unduk-unduk laut* (seahorse), *jejari lipan* (centipedes' feet), and many more. In songket motifs, there are also names taken after traditional Malay foods, such as *tepung talam*, *wajik*, *ladu*, and *ketupat*. The Malay people are very observant of their surroundings, which is why the weavers also named motifs after elements of nature, such as the *ombak-ombak* (waves), *gunungan* (mountains), *bintang* (stars), *air moleh* (rippling water), and *teluk berantai* (chained bays). Nowadays, more new motifs are being developed as the craft grows with the demands of the consumers and the need for contemporary designs. In weaving songket, the patterns created will ultimately become geometric in shape,



Fig. 2 The classic sarong of *kain limar bersongket* with *kepala kain* filled with *bunga mahkota raja*, in the *badan kain* section decorated with *bunga kerongsang* and *kaki kain* with *permata* motifs that are sandwiched by two *kendik sisik ikan* (fish scales) showing the typical Malay motifs in traditional songket patterns (Muzium Pekan, Pahang)

Fig. 3 Classic songket of *ikat limar bersongket* decorated with *buah tamar* (dates), *tampuk kecupu*, and *tampuk manggis* motifs arranged in isolated repeats. *Awan larat berjuang* and *pagar istana* motifs run at the border or *kaki kain* (Muzium Terengganu)



because of the use of point paper in songket design. Each motif is repeated and arranged in certain ways that create patterns. Almost all the motifs in songket are designed transversely symmetric, so that they can be woven as half a motif and then reversed to get the complete shape of the pattern. The weavers are mathematical thinkers, as they have to calculate the warp yarns before dressing the loom and they have to calculate the *butang songket* to determine the songket patterns.

4 Innovations in Songket Textiles

Many researchers had tried to produce new innovative songket. In 1985, songket woven using jacquard and dobby looms were introduced by the author. Other researchers have also introduced innovations, such as Dr. June Ngo who had conducted research on sustaining songket by introducing lightweight songket and reflective songket [4], as well as Dr. Suzanne Stankard, who did her PhD research using high-twist spun silk, gimp yarn silk, and wool for songket (Fig. 5), which produced an interesting effect on the fabric, and can introduce new and trendy songket textiles [5]. These kinds of songket are new to Malaysian customers. However, for fashion designers, these types of songket can go far in fashion, particularly towards couture apparel. The development of this type of songket is also being produced by the Yayasan Tuanku Nur Zahirah, using fine silk threads and different types of metallic yarns, which developed songket that is light and comfortable for clothing [6].

Today, many weavers have produced new designs for songket, but they still maintain the traditional methods of producing them (Figs. 4 and 5). Therefore, songket material tends to be quite stiff and the texture is good mainly for making sarongs or *samping*. Some of the designs do not use traditional motifs at all, but rather use the consumer's taste of references, for example, the design of big repeats, such as bunches of multityped flowers with different types of leaves. The motifs are rather new and sometimes mixed with the traditional ones, usually to fill up the gaps or spaces of the main motifs, such as *bunga cengkih* or *bunga renit-renit*. The new songket design started in the year 2000, when the weavers were exposed to new designs introduced by the Malaysian Handicraft Development Corporation and from new weavers from *Institut Kraf Negara* (IKN).

Jacquard weaves have also brought new horizons to the songket textile. In 1985, the author had researched ways to help weavers in songket production and she found that the Jacquard loom was a faster way for producing songket. The idea to use Jacquard's method is to weave small patterns for songket yardage, which is intended

Fig. 4 Jacquard handwoven songket with kerongsang of *tampuk manggis* and *bunga melur* (jasmine) motifs. The weaving here is of plain weaves and mock-leno weaves [3]



Fig. 5 Songket textile, silk and metallic yarns woven by Suzanne Stankard. Sections of warp are drawn together by twisting of floating high-twist weft yarns, which caused a vertical line of texture (160 × 30 cm) [4]



for making small crafts for souvenirs and furnishing products. The local weavers are new to this loom, therefore today most of the songkets made using Jacquard looms are produced mainly outside of Malaysia such as in India, Pakistan, and China. In the first few years of the twenty-first century, songket from India were made and introduced to the Malaysian market with Indian motifs. However, they slowly transmuted to Malay designs as some of the producers are from Malaysia and ordered songket from India and Pakistan with local songket motifs for production abroad. In 2009, Prof. Dr. Jamil Salleh and the author had created a *selendang* (shawl) and sarong songket that was exhibited at the *Textile Convention 2009, Innovation Weaving Through Art and Science* at Universiti Teknologi MARA, Shah Alam. The design consisted of *bunga tanjung* and the Arabic letter ‘*mim*,’ and the piece was presented to Datin Seri Rosmah Mansor. The piece was designed by the author and fabricated by Prof. Dr. Jamil Salleh utilising the electronic Jacquard rapier loom (Fig. 6).

Fig. 6 Songket Shawl with motif of *bunga tanjung* and *bunga ‘mim’ pecah empat* designed by Dr. Norwani Md. Nawawi and fabricated by Dr. Jamil Salleh using Jacquard rapier loom (2009)



5 Products of Songket

Nowadays, songket is still woven for fashion; however, it has slowly diversified into various uses, such as craft products, interior decorations, furnishings, and art pieces [7]. Designs for songket products are developed and introduced by the Malaysian Handicraft Development Corporation with government support, in order to help the weaving industries in Malaysia. The weavers are quick to take this advantage to create other songket products, for example, crafts as souvenir items for tourists and products of soft furnishings for interior decorations. Ultimately, visual artists have also created their artworks using the songket technique, which can be seen at certain hotels and museums. For example, the artwork of Syed Ahmad Jamal can be seen at the Islamic Arts Museum Malaysia in Kuala Lumpur (Fig. 9). The author also created a *songket* wall hanging for interior decoration and as an art piece titled *Gelombang Hidup* (Fig. 7) and tropical flowers, such as the bird of paradise, lily, and heliconia (Fig. 8).

Fig. 7 Design of bird of paradise plant for songket wall framing





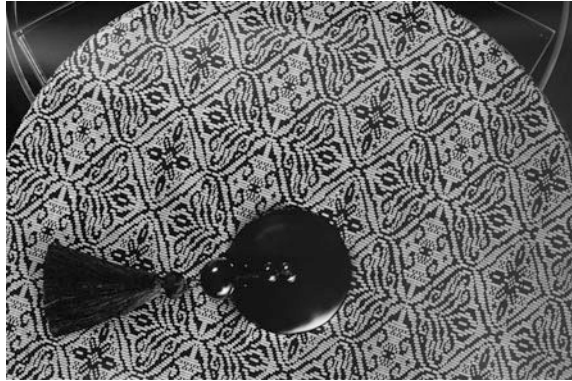
Fig. 8 Songket in abstract Art titled ‘*Gelombang Hidup*’ with *kerawang* and wavy lines and organic shapes indicating the ups and down experiences in life



Fig. 9 Songket wall panel designed by Syed Ahmad Jamal at the Islamic Art Museum in Kuala Lumpur

Songket producers from Kelantan maintain their motifs and patterns. The songket fabrics are mostly for ceremonial purposes and festive occasions; therefore not many craft products have been developed there, except for cushions, placemats, table runners, and wall panel decorations. On the other hand, Terengganu songket is more creative in innovating into songket couture. This has been introduced by Yayasan Tuanku Nur Zahirah. Several designers have created fashions from songket materials and mixed them with other materials, for example, chiffon,

Fig. 10 Rounded box's cover using songket material which looks elegant and exclusive (Yayasan Tuanku Nur Zahirah 2008)



organza, crepe, and batik. Yayasan Tuanku Nur Zahirah has also come out with new craft products and accessories for the Royal Terengganu Songket line, such as songket shawls, elegant folding fans, unique luggage tags, handbags, cushions, table runners, lamp shades, and songket gift boxes (Fig. 10).

6 Conclusion

The future for songket is still bright and the locals are still demanding new patterns of songket, which are often custom-made for the upper-level markets. There are hundreds of new designs with silk and fine 3 *tekad* with small, medium, and big motifs for those who can afford them. The cost of these songkets can be reduced by the use of cotton yarns as the base material, rather than silk. These songkets are affordable by middle-income customers, who can still enjoy beautiful patterns in songket. The lower-income customers would prefer to buy simple songkets with fewer songket patterns and they sometimes purchase imported songkets which are woven with polyester. Therefore, we could see that in songket, there are three types of consumers: the upper-level income, the middle-level income, and the lower-income buyers. From here, we can see that other countries are interested in producing songket for the Malaysian market, as there are now Pakistani and Indian songket. Although some locals are against imported songket, ironically, it will help sustain the use of songket among the locals. As songket is a Malaysian textile heritage, the government should encourage the use of songket as the national dress on official occasions, for example, dinner in national and international functions, for Friday prayers, as well as the use of songket wall hangings or framed art in government offices, especially the front entrance. These can also be made for hotel lobbies. Products made of songket should be encouraged to enhance the use of accessories with songket mixed with other materials, such as lacquer, wood, and silver. What is important for songket is to produce quality handwoven products with contemporary appeal while maintaining our cultural identity. It is hoped that

songket will be sustained and its products will grow better in quality. It should also remain the best local Malay textile made in Malaysia and be known internationally.

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Ceramic Extruder Technique Incorporated with QR Code Bar: A Proposed Ventilation Design

Mohd Fadhi Yakub, Oskar Hasdinor Hassan
and Rusmadiyah Anwar

Abstract Nowadays, the revolution of arts changes rapidly. In ceramics the studio product is a very common technique of creating art forms based on traditional ways. The common techniques used in the studio are by using throwing, hand building, coiling, and pinching techniques. There is more focus on freestanding art forms and ceramics functional products. As we know, the code bar is the one of the graphic advertising methods of gathering information.

Keywords Ventilation · Ventilation blocks · Replaceable · Design

1 Introduction

Nowadays increasingly mobile users, especially Smartphone users, combine many usages onto one small device. QRs (quick response code) are codes seen everywhere such as in shopping complexes and on products. The bar code is a faster method for finding information. Barcodes became widely known because of their reading speed, accuracy, and superior functionality characteristics and they became more popular with international recognition [1]. The QR code and two-dimensional bar code were developed by Denso Wave in 1994. The QR code is the one technology presenting massive uses for industry, and has been used for advertising, gathering information, contacts, and publishing website links. The cost of information transfer via QR code is extremely low compared with other technologies

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Fig. 1 Two-dimensional codes

where specific hardware is always required; QR code is the most widely used information container that has already been applied to numerous printed materials including posters and books [2]. According to Satoshi and Shigeru [3], by holding a mobile phone over QR codes printed on papers, billboards, television screens, or digital signage monitors, users can get decoded information and browse Web sites or send e-mails without typing URLs or e-mail addresses on their mobile phones. To use a QR code, one would need a smartphone, iPod, netbook, or similar device with a camera, a QR code reader application installed, and, in most cases, Internet access, either through a wireless network or through a data phone plan [4]. Currently, there are many design bar codes that are color based on the two-dimensional code called a custom barcode. Colorized QR codes are also in existence. The custom code bar will attract the audience and create an interesting mood by using attractive colors and sometimes it is implemented by advertising industries. The elements of a two-dimensional QR code bar are shown in Fig. 1 [5]. The user can generate his or her own code and the code can be quickly decoded by a small program installed on a computing device such as a mobile phone [6]. This basic code is generated by using QR Encoder software. The code is simply basic using a black and white color background. The custom code bar uses the variation of color and the company logo can be added to create more attractive codes. Figure 2 shows custom QR code from websites of Brainy.com [7]. It uses the variety of colors so people are attracted to see and scan it. The objective of this research was to combine the technology to create the new invention of ideas creating artwork based on the QR code.



Fig. 2 Custom QR code (<http://www.qrcodeworkshop.com/portfolio.php>)

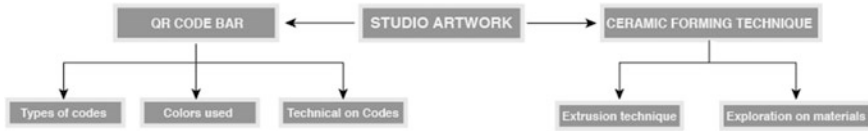


Fig. 3 Design process creating artwork

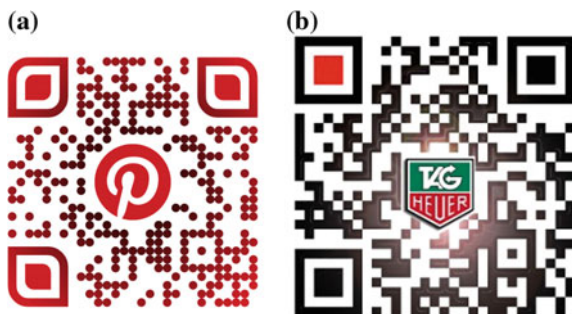
Figure 3 shows the draft that has been drawn which separates the method used to get information and execute the project to create the 3D form of codes. The special element in the code bar is its characteristic as the key to creating the artwork. Through the elements of art such as lines, color, and form it can be prominent to attract the audience. This can influence the audience to see the innovation of adapting of arts by producing the code to express feeling and give some information through indirect message.

2 Custom QR Code

The QR code bar can be made in various ways and shapes. QR code is a matrix symbol consisting of arrays of nominally square modules arranged in an overall square pattern [1]. It influences all aspects. Figure 4 shows the various elements that can be explored by color and shape. It is influenced by organic shapes such as flowers and leaves. Also, it can be influenced by nature. In addition, the QR code bar can be scanned in various ways when the code bar is created in different colors. To advertise something a product must use striking colors. For example, Fig. 4a used harmonizing colors such as orange combined with light blue to create an interesting code bar design (<http://www.qrt.co>) [8]. Another custom QR code design in Fig. 4b shows the Tag Heuer QR code design (<http://www.liberatemedi.com>) [9].

From this element more designs can be created and influence all the things [10]. It can be a more innovative design so that the people will see the new media on advertising and the revolution of design that have been created [11]. Also this

Fig. 4 a The organic shape of a QR code bar. b The geometrical shapes design of a QR code bar



artwork can be more functional on transferring data or giving information and influence on the very creative design and different shape that has been used [12]. This also uses very contemporary colors so that the audience is interested to see the code bar in 3D form.

3 Methodology

The techniques used to make this work are the extruding technique or extrusion technique. Extruder or extrusion is the machine that presses the object creating the shape. According to the Oxford Dictionary [13] extruder or extrusion means thrust and force out. Extruder also is the push [14]. The function of an extruder is to develop sufficient pressure in the material through the die [15]. This will be more efficient during the making of clay. By using extruding production of the shape of clay can be boosted. Hence, it can produce many shapes at the same time. Other advantages of using this method are that it is very easy to handle because it is just like pressing the clay. Extruding gives more accurate size. There are many types of extrusion or extruder such as hot extrusion, cold extrusion, and warm extrusion. There are three sections of extruder in machines: the single screw extruder, twin-screw extruder, and ram extruder [15]. In ceramics the extrusion is the machine that extrudes the clay with different shapes and can create in various shapes. It is normally used in engineering across the world over, including the principles and very fundamental aspects of manufacturing processes, including metal cutting, rolling, forging, drawing, and extruding [16]. Furthermore the injection of moulding machines and extrusion machines is now being used in ceramics processing [17]. This technique is very different because it is more about the technical solution involved. Extrusion is basically the technique forcing the clay through the die and creating the form according to the die. There are many design dies that have been produced. Figure 5a shows the design of a mini-extruder that has been used to create the form. This mini-extruder is small in shape with a diameter of 2 cm. Figure 5b shows the design of the die that has been used. By using the extruding technique it will produce the accurate size of the rectangle. Also, it can be repeated and it is very fast and efficient to produce the parts of the rectangle. The mini-extruder has five parts labeled A for pressuring, clay storage B, die placement C, stand D, and E for controlling. The b1 are clay and are placed into storage, called input, and labeled; (b2) are output because the clay after pressing follows its die shape. For the actual study Fig. 5c shows the cross-section of the process mini-extruder. This figure shows that the clay is forced out and these processes clearly show the actual process of the mini-extruder.

As shown in Fig. 6a, transferring the code grid was generated. This grid will calculate all positions on the grid and color the position in a negative image. From this method the process of creating the 3D code is easy. It can be arranged into its position. Figure 6b shows the arrangement method of the code. The clay must be

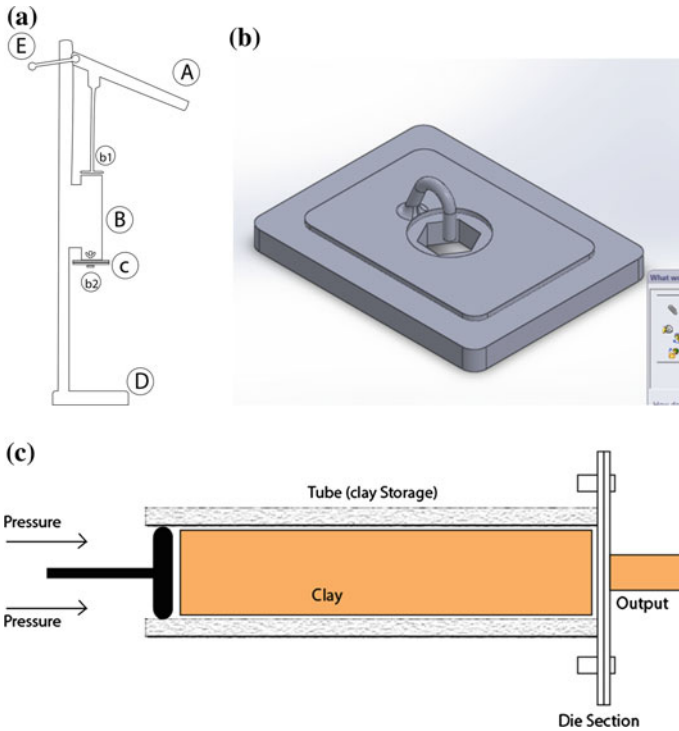


Fig. 5 a Parts of the mini-extruder. b Die of mini-extruder. c Cross-section of process using mini-extruder

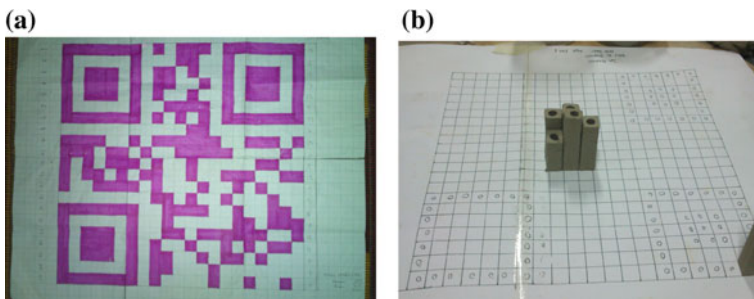


Fig. 6 a Transferring the grid of code. b Arrangement of the clay guidance with the grid

arranged into its position. The height of the clay was cut randomly because it can give more rhythm to the surface at the back of the 3D code bar.

Basically the clay was arranged as shown in Fig. 7a. This stage refers to the guideline before attaching the small parts. Before attaching the surface all the sides of the cube must be scratched and pasted using the slip. The slip is the clay

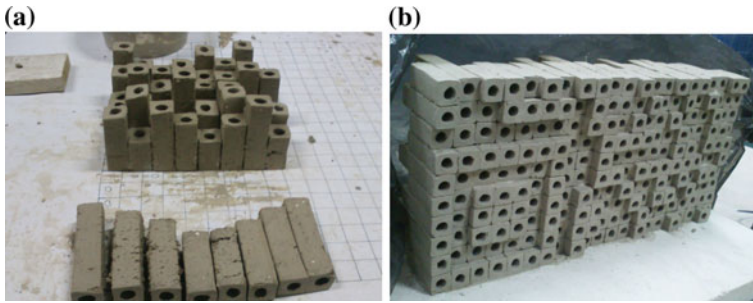


Fig. 7 a Clay attached into its own grid. b Arrangement of the clay using the grid system

containing a high density of water; it is also called glue for ceramics. After attaching the small parts it will be attached in the main part as shown in Fig. 7b. This stage must be given more technical problems. The clay mass is attached accurately referring to the guidelines that have been drawn.

After finishing all the attachments the code bar will appear on the clay. It can be called the leather hard product. Figure 8a shows that the code bar appears on the main 3D object that has been assembled. This stage 3D code bar must be closed using the plastics within three days to avoid clay crack and damaging the attachment. By closing the using plastic the clay can be neutralized by its own; this is because during the attachment the shrinkage of the clay is not the same. It will crack on the attachment joints. By using random cutting of the height of the cube, the rhythm on the back of the code bar can be affected, so that the front and back surface can be more attractive to the audience. This rhythm can be managed into the wave flow or other flows.

The next stage is drying, and is very important [18]. It must be slowly dried to avoid cracks on all parts. The drying process is approximately within 5 or 6 days. It depends on the room temperature. Usually room temperature in the studio is 31 °C. After the works are completely dry, the 3D code bar must go through bisque firing. This stage will change the body into a hard surface [19]. The temperature of bisque

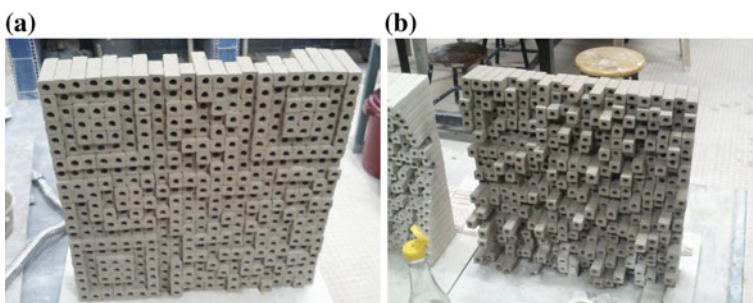


Fig. 8 a Finishing the arrangement of clay. b Rhythm design of the 3D code bar

Fig. 9 Product after being fired at 900 °C

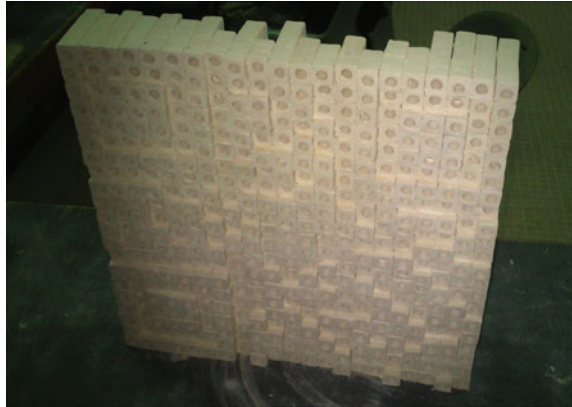
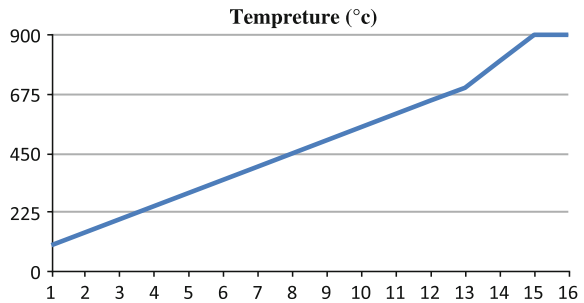


Fig. 10 Standard firing temperature of 900 °C



firing is 900 °C using the electric kiln. The artworks were dried and fired to 900 °C for bisque firing and second fired up to 1200 °C for glaze firing [20]. Figure 9 shows the code bar after firing in 900 °C.

The surface in Fig. 9 is too hard, because the body fired underwent the verification process during the bisque firing. This stage removes the water contained in the clay. The 900 °C will remove all water inside the body so that the body turns hard. It will be easy to glaze the product. Figure 10 shows the graph of bisque firing at 900 °C. For application glazing the product, it will use the white colors and green color. Opaque and matte glazes are used for this artwork. White is used because it can be its background and the green color is used to the position dotting the code. A sparing technique is used to glaze this product. First the white color is sprayed around the body and the green color using painting technique. Figure 11a shows the artwork after applying two glazing techniques, spraying and painting. Before applying all this color, the color must be tested before applying it. Figure 11b shows the sample of the color.

After the glazing process it will be fired at a high temperature, called the glazing firing. The kiln used for firing is a gas kiln. This kiln has many advantages such as it was easy to control according to the graph. It takes 9 h for firing at a temperature of 1200 °C. At this stage the glaze turns to glass. This will affect the color of the

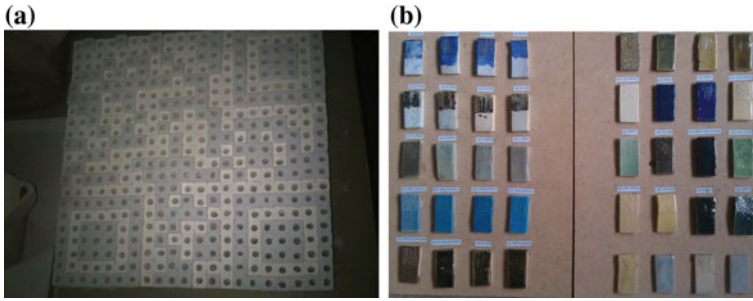
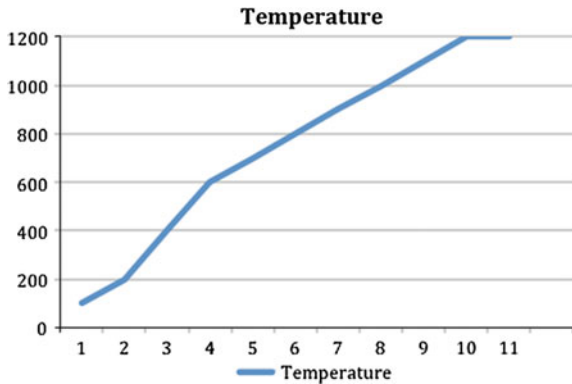


Fig. 11 a Application of glazing. b Sample of the glaze colors

Fig. 12 Standard firing temperature of 1200 °C



artwork. Firing it is the third stage, which is preheat, soaking, and cooling. This stage is the glass formers on the ceramics body. The range temperature of preheat stages is approximately within 40–600 °C. The second stage of glazing firing is the soaking which is the important stage of glass forming in the ceramics body. This stage is 1200 °C for 30 min. The last stage is the cooling process. Cooling is the process that cools the ceramic to normal temperature. Figure 12 shows the graph of the glazing firing. The glazing firing is the most important because it controls all aspects such as colors and its beauty.

4 Findings

Based on this study the ceramic also can be an advertising medium. It can advertise something and it also can give lots of information influence on the code bar. This also can be new media and new ways of transferring the information to an audience. This study also explores the new technique in the ceramics studio to create large and fast works. The extruding technique is the way we can repeat the form

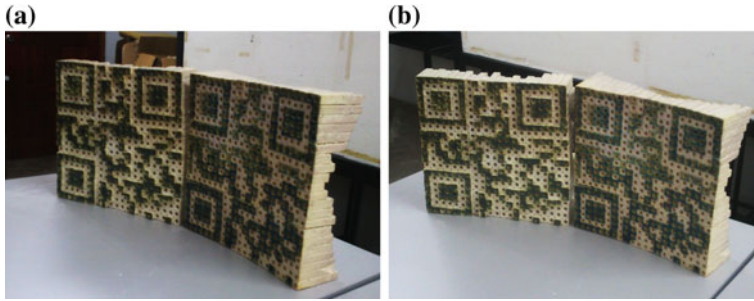


Fig. 13 a The finished artwork. b 3D QR code using ceramic

accurately. Figure 11a shows the 3D code bar after glazing firing. Figure 11b shows that the code appears on the front of the 3D work. This basic QR code was created in 3D form bringing a new revolution of the arts [21] (Fig. 13).

Overall the objective of this project was fulfilled. This new 3D QR code bar was created. It focused more on the new extruding technique for creating the artwork. Nowadays the code bar was created in 3D influenced by its patterns. It is a new revolution in transferring data and giving some information to an audience by using ceramic material [22]. At the same time it can be a new advertising medium. Through this research it can be easy to create many forms from extruding techniques. We hope people can be attracted to see it because it's the details artwork hasn't created. For instance, research on this form has been extended in terms of design and its usages [23]. It will be one of the ventilation wall [24] and at the same time it will be one of media for advertising.

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Relative Theory of Tactile Iconography Array Configuration for a Blind Group

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Abstract The need of a walkway or pathway for a blind group is very important in order to lead them to their destination. Conventional relief tactile blocks with guiding information in Malaysia, however, provide only two guiding signs, which are warning and leading signs. The research was conducted in five phases. These phases comprised the small topic activities of resource, analysis, design, findings, test, result, and discussion. The theory provided the possibility of exploring the environment in a three-way relation of reciprocity: *active way*, *iconic way*, and *symbolic way*.

Keywords Tactile · Blind · Braille system · Reading and writing

1 Introduction

1.1 Research Inspiration

The theoretical aspects of tactile sensitivity research take focus on understanding the process of blind experience and perception towards relief icon images by taking Braille signs into consideration [1–4]. Conventional tack-tile blocks for the blind have weaknesses of providing only two signs, which are warning and leading signs: dot type block for warning (clause 12.5(b) MS 1331:2003 and clause 15.4(b)

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MS 1184:2002)—Malaysia Standard Department [1] and line type block for leading sign (clause 12.5(a) MS 1331:2003 and clause 15.4(a) MS 1184:2002)—Malaysia Standard Department [1]. They are also made of nonlasting material and slippery due to unexpected environmental climate change [2]. We believe to solve such problems through a study on a navigation iconic system by providing new iconic point configuration theory based on Braille's concept that can help to generate new icons which represent such an event or place for the Blind Group (BG). Through the theory, the potential of providing more relief signs can be accomplished thus enhancing the conventional tack-tile walkway for the BG; for example, direction to the toilet, classroom, emergency exit, and prayer room. Under a barrier-free environment, programs on the Ninth Malaysia Plan (2006–2010) targeting the socially vulnerable were enhanced and in 2008 the Persons with Disabilities Act was established. One of the key area scopes was to identify accessibility for the Blind Group in Malaysia [4–6]. In a coefficient to the programs, the authors are striving for research completion with great anticipation.

1.2 Research Objectives

This research study embarks on the following objectives to provide new iconic point configuration theory for recommendations based on the capacity of spatial organization through assimilation of spatial marks in relation to BG sensitive touch and Braille signs, through the identification of arranging rules of iconic graphic relief structures [6–9]. Practically the research objectives emerge through questioning the possible benefits of constructing touch design interaction for the BG in a critical and complex use situation.

However, it is important to understand the available theories and recommendations concerning tactile patterns as a source code adapted to the needs of the designer in performing the standard process of experiments in the scope of the BG user in a user-centred design product. In addition the objective of this research was to determine the critical pragmatic design process towards structuring design iconic anatomy in touch knowledge for the visually impaired and establishing potential technical methodology through a critical live performance designing process and analysis. The main objective of this research was to showcase a relative theory and recommendations concerning touch design and interaction development protocol procedure in aligning to the need and demand of a visually impaired context [10].

1.3 Paper Outline

This research paper outlines four stages comprising the entire research framework namely: Research Clarification (RC), Descriptive Study I (DS- I), Prescriptive Study (PS) and Descriptive Study II (PS-II), as stated by the authors. In accordance

to the DRM—Design Research Methodology of Blessing and Chakrabati [11] the author segregated the study in four stages as illustrated in Fig. 3.

Stage 1: Research Clarification (RC): At this early stage the author engaged in the research through three literature factors summarised from the existing research study. The selection was conducted in pursuit of a clearer research stage in aligning to the main outcome. Theoretical Factors covers the existing design research methodology models, which comply concurrently with the topics. Design Factors discusses the ongoing industrial ceramic product development discipline and processes; in order to clarify the scenario of technical standards and technical procedure there are issues which need to be highlighted. Human Factors focus the target users characterisation and classification. Conducting an empirical data analysis of reviewing and comparing the literature for more influencing factors in addition to making descriptions detailed enough to determine the factors or knowledge gap need to be addressed in improving task clarification as effectively and efficiently as possible.

Stage 2: Descriptive Study I (DS-I): Through the clear goal and focus of the first stage, the author conducts a framework conceptualisation process based on the selection of review on earlier factors. The planning of studying the empirical methodology will be set in two ways: studying an optimal recording and studying the empirical methods.

Stage 3: Prescriptive Study (PS-1): In addition to supporting the research operating system, the author will conduct a critical variable analysis of the three factors which contribute according to the author's scenario and setting. The author will conduct a laboratory study according to the specified measured scope of study to understand the existing situation to correct and elaborate on the initial description of the desired situation. This concept description of the study represents the author's vision on how addressing scoped factors systematically in the real situation would lead to the realisation of the desired improved situation [6]. Upon task clarification on the earlier stage of conceptual development, the author will then need to finalise the concept of an input patterns system (the intended support) that is expected to encourage and support the problem definition as intended. This will enable the author to analyse the decision of focus in realisation efforts on the core of this support, as this should be sufficient to be able to evaluate according to the concept to verify the underlying assumptions [11].

Stage 4: Descriptive Study I (DS-I)—RQ3/RO4: At this stage, the author proceeds to the stage of investigating the impact of supporting factors and the ability of realising the result of the desired situation. Through the process of constructing the result verification the author will focus on two main questions in which to analyse whether the experimented tools can be used to encourage and support the high quality of problem definition and to evaluate the usefulness and success of tools regardless of the criteria developed at the earlier stage.

2 Blind Walkway Phenomenon

There is no clear study theory on analysing the design process of analysing iconic relief symbols to incorporate with tactility. Existing tactiles developed for the BG do not really support the idea of a barrier-free environment [2–6]. If haptic technology is practiced on a tack-tile and Braille theory, then stressed on the fundamentals of designing a form structure, including pattern copositioning, great research findings on iconic configuration theory will serve as a new study on cultivating the education for the Blind Group [12]. It automatically suits to its surroundings making such a built environment more user-friendly.

In continuation of the title, which relates to touching knowledge, the author tries to understand the correlative study of human–product interaction factors. The physical appearance of a designed product justifies the philosophical effect through the way it is perceived. The designing process is crucial to determine the momentous factors in the designer’s success. “Design” is both a noun and a verb and can either refer to the end product or to the process [13], both of which are important for the researcher to understand. In order to create good end products, there is a need for knowledge of the capabilities and limitations of the general human touch, the technical possibilities of designing for touch, and how resulting designs affect haptic interaction and overall use [10].

Marta Garcia on May 10, 2008 said that humans have five senses: touch, sight, hearing, smell, and taste. Our sight organ senses are the eyes. We can see light, shape, and colour with our eyes. The organ of touch is the skin. It is located all over the body because our whole body is covered with skin. We can feel different things with our skin whether the object is rough or smooth, cold or hot. Some parts of the body are Braille-alphabet more sensitive than others. The most sensitive parts are the cheeks, the palms of the hands, and the soles of the feet.

Based on Bjelland [10] in order to separate the general knowledge of touch from the specific needs of the designer especially in haptic technology development, user-centred design (UCD) can be used as a framework reference in understanding the nature of the design process. UCD is both a design perspective and a process in which the needs, wants, and limitations of the end user of a product are given extensive attention throughout the development of a product. It is related to both product design and human factors [12, 14].

Touch has traditionally received little attention in design or research on ceramic performance-critical products. Isaksson [15] concluded the designer-crucial process when dealing with tactile enhancement in product development is rarely documented. It is very hard for designers to articulate their knowledge of their long-term experience and skills [16]. A designer is not a researcher due to the time or habit to study even few research publications and writings [10]. Through lack of general presentations or summaries on touch in relation to haptics or touch interaction with technology that could introduce the topic to designers, there is no standard protocol study of the designing process focusing on touch interaction onto a product design especially for the visually impaired. A theoretical background study in performing

touch design particularly for the visually impaired group is far less experienced especially conducting a protocol analysis in defining proper research study.

Towards achieving the main aim of icon development, methodology processes are based on a special learning strategy towards the elaboration, understanding, and organizing of the perceived material. These proper key learning methods are by investigating data from the real model. A series of questionnaires and testing towards exploring and understanding perception of tactile images for the blind will be conducted. The main principle of designing the iconic tactile images was based on exploring the simplest graphic elements (simple vertical, horizontal, oblique, and curved lines). When these elements are properly perceived and identified, the next step is exploring the combination of different lines. For example, by enclosing different lines such as vertical with horizontal, or vertical with oblique, and so on, different angles can be developed, which contribute afterwards to the development of geometrical shapes.

However, this process has to be approached as a complex, very important item, which needs going through three stages of exploring and perception of concrete object, exploring and perception of tactile images, and finally assimilation of the Braille System for reading/writing. Figure 1 shows the overall methodology developed from the research design suggested by Anwar [17]. In conjunction, this study embarks on the following phases.

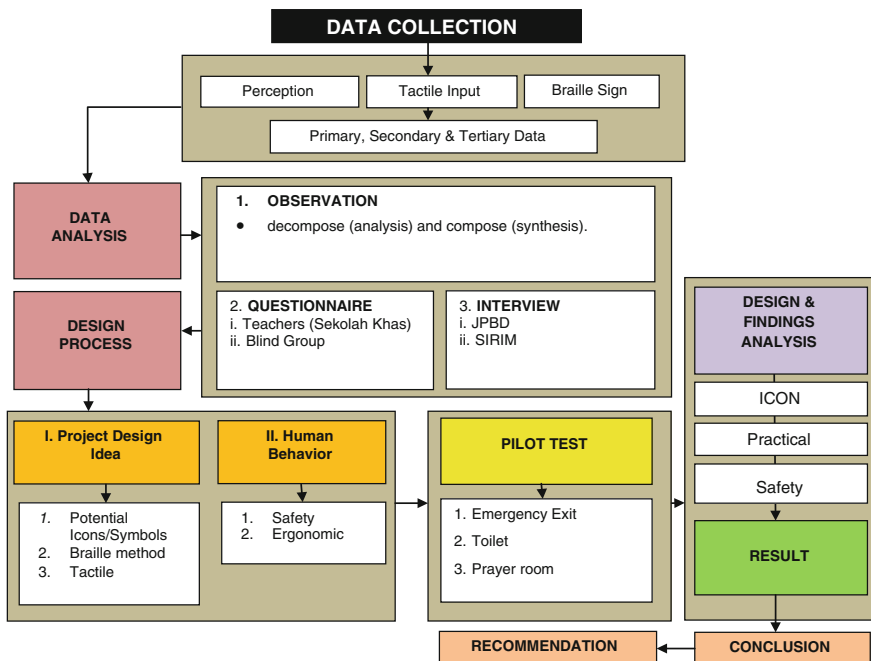


Fig. 1 Description of methodology: research design framework to investigate tactile Braille

2.1 Data Collection

Visual Input—Appearance and Aesthetic Responses

Tactile Input—Tactile Stimulation and Haptic Responses

Braille Sign System.

2.2 Data Analysis

This is the process of understanding the relation between new knowledge and knowledge already stored in the memory, in order to develop a pattern of active and flexible knowledge. This hypothesis explains the important activities of exploring tactile images from the simplest elements—lines to complex ones—square and combinations among different geometrical elements, which develop images such as a house.

2.3 Design Process

This is elaboration, using previous knowledge concerning the concrete objects in order to identify and to enrich the materials, which have to be assimilated.

2.4 Pilot Test

A pilot test will be conducted in the form of an experimental test, which involves a group of blind people of certain ages to perform and identify information exploration and perception. Only by performing this test can the result be valid and applicable to the subject group studied. The pilot test will be performed in alignment with the verbal protocol analysis standard procedure which elicits verbal performance from respondents.

2.5 Findings and Evaluation Review

Final findings and evaluation will be recorded as per development of a learning program, which has to include more than a simple exploration of the environment. It has to include an intermediary step before passing to the Braille reading and writing system, which is too complex and too abstract in order to be understood by the blind group.

3 Consideration of Observation Analysis Approaches

The complexity of the research framework proposed will be evaluated with the respect to the capabilities of the human observer. It is difficult to identify and understand apart from other human thinking approaches, because the information roughly is not equal. So, designers have to consider the relation between the technical workings of any design. It also includes interaction with users and the environment, and aesthetic issues.

In this context, Maier has come out with a model of the complexity of the designer–artifact–user (DAU) system [12, 14]. This model shows the important chain benefit to three important stakeholders, which are designer(s), user(s), and artefact(s). The importance of each party signifies the pre- and postperformance of the developed design.

Figure 2 graphically shows the interaction between the three parties. Maier defined that this is the relation where designs arise and several factors that influence it. Maier explained that any given DAU system might contain many designers

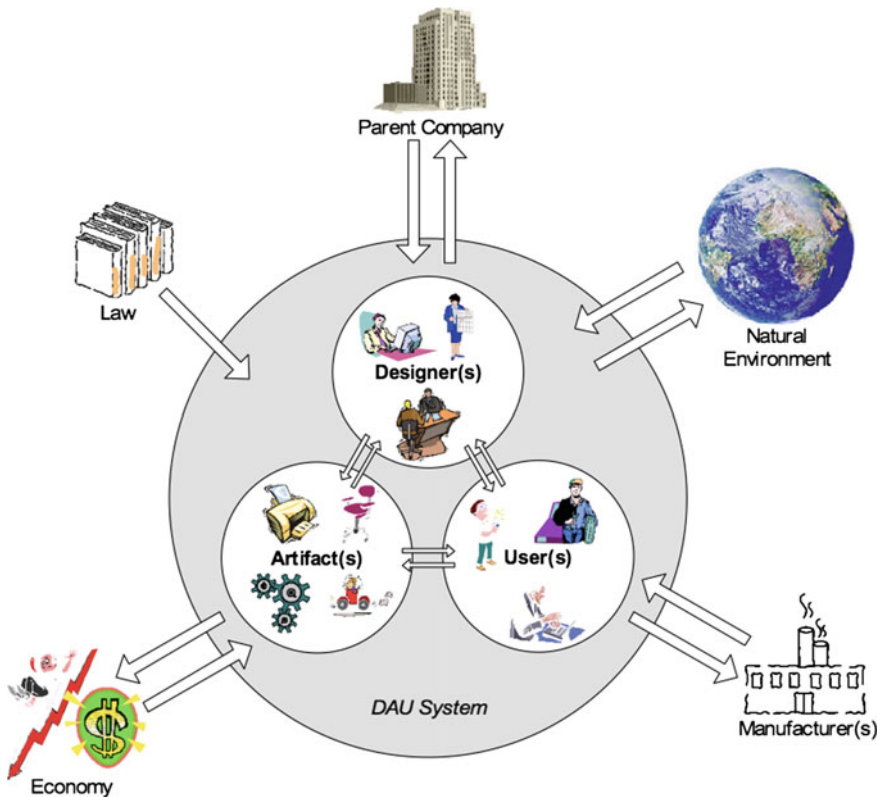


Fig. 2 Generic designer–artifacts–user system [14]

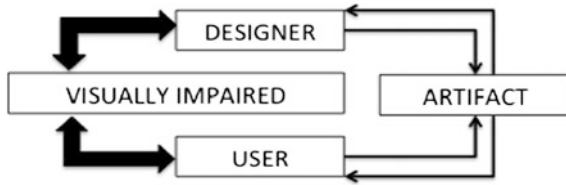


Fig. 3 Improved model especially for visually impaired tactile design

(collaborative design, design teams, etc.), many artifacts (product families, over space and time), and many users, from manufacturing technicians to consumers (each of whom are different) to recyclers [12]. However, this model did not mention the consideration for visually impaired product design. One important category of interaction within the DAU system should bring the user (BG) into practice. The problem is where we should put this subject matter into the system. As explained above, a product of tactile not only involved with a case study on physical needs by the BG, but they should be designers as well. They are the only ones who feel and understand the important need of tactile design for the blind.

Having this issue as the main subject to be fit into the system, we suggested investigating the design thinking between the professional designer and the blind. Referring to Fig. 3, the BG (visually impaired) should become designer and user as well. By setting them in the middle between designer and user as a bridge is to make sure both requirements are achieved. This is the purpose of the observational



Fig. 4 Protocol analysis lab setup procedure [18, 19]

analysis required, to confirm the design thinking of BG. In this case, the BG design information will be visualized by the designer following the CSWD research model [11, 12, 14]. On the other hand, artificial environment, empirical design approaches, and verbal protocol analysis have been standardised following the protocol lab setup as shown in Fig. 4 [12, 14, 18, 20].

4 Conclusion and Future Work

In conclusion, research findings are purposely to serve a new study on cultivating education for the Blind Group to suit its surroundings making such a built environment more user-friendly.

New learning theory of refining tactile icon graphics for visually impaired group

New icon to represent direction of emergency exit, toilet, and prayer room

Well-planned tactile linkage system to support a barrier-free environment

These issues are to be studied and proposed as a fundamental guideline in improvising tactile icons for educating the Blind Group. The final result can be proposed as a guideline in developing urban building environment ethics and to be printed as a template and guideline for *Garis Panduan Reka Bentuk Sejagat/ Jabatan Perancangan Bandar dan Desa Semenanjung Malaysia* and printed as a reference for the Malaysia Standard Department [4–8]. The impact of the outcomes is to be commercialized and mass-produced in order to support future urban building development and barrier-free environments.

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Variations of Malaysian Batik Sarong Design Motifs

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Abstract This chapter discusses the variations and developments of motif designs in Malaysian batik sarongs and how these motifs reflect shifts in Malaysian national and cultural life. The study focuses on the characteristics of various motifs used in traditional batik sarong design. Samples of Malay batik sarongs were gathered from museums and private and personal collections. The samples were selected, traced, and classified according to their features, inspiration, and arrangement. This analysis found a shift in the style and design of motifs after 1957, the year of Malaysian independence. It was observed that there has been a gradual emergence of more Malay motifs while the decorative traditions originating in Indonesian patterning remain influential. The period from 1957 to 1971 saw the evolution of Malay aesthetics in the visual arts and crafts of Malaysia including the batik sarong industry. In 1971 the National Cultural Policy initiated more dramatic changes with the active promotion of motifs that were considered representative of Malaysian cultural identity. Influences from regional Malaysian and indigenous cultures, desirable traits, and strong Islamic design concepts were the three key factors outlined by the cultural policy makers. Government agencies were instrumental for the batik makers to develop a Malaysian style through financial support, training, and research, along with the active encouragement of the population to support the batik industry. The policy had a direct impact on the design of the Malaysian batik sarong.

Keywords Malaysia · Motifs · Design · Traditional · Batik sarong

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1 Introduction

This study is part of on-going research into the development of motif designs on traditional batik sarongs in Malaysia. The study embarked with various reviews of the relevant literature on motifs design to enhance the types of classification motifs. Following this, the several batik sarong samples were photographed and analyzed and according to the sources of motifs of which the design was created. The variations of motifs were identified from the layout of the various samples examined from the museums, galleries, and personal collections. The beauty of a batik sarong comes from its structure and the arrangement of its motifs following the hidden structure. This is related to the relationship between a design and its function and also significantly linked with the period from 1957 to 1971 which saw the evolution of Malay aesthetics in the visual arts and crafts of Malaysia. The implementation of the National Cultural Policy in 1971 initiated more dramatic changes as more people thought about representative Malaysian cultural identity. Influences from regional Malaysian and indigenous cultures, desirable traits, and strong Islamic design concepts were the three key factors outlined by the cultural policy makers. Ultimately, the policy had a direct influence on the process of producing batik motifs design.

2 Malaysian Batik Sarongs

Batik sarongs are part of traditional Malay clothing; they were introduced from Java in the early nineteenth century and their use in Malaysia spread through trade and cultural migration. This type of cloth was recognized and easily adapted to be worn as everyday clothing. The British noted the local clothing styles when they reigned over Malaya (now Malaysia); for example, Swettenham [1] recognized that “Java produces the painted cotton sarong so much admired by Malay; they called Kain Batek” (p. 8). Batik sarongs’ significant characteristics were that they were modest, comfortable, and the fabrics were usually made from cotton, which is very suitable for Malaysia’s tropical climate. Therefore, with those suitable features, as an alternative creativity for making a batik sarong, the Malays learned how to make batik sarongs from the Javanese batik experts [2, 3].

Significantly, around the 1930s the Malays in Kelantan and Terengganu ultimately succeeded in producing their own batik sarong workshops [4]. Furthermore, even after Malaysia independence in 1957, the increased demand for batik sarongs contributed to the growth of the textile craft industry in Malaysia. As Sheppard [5] indicates, “[P]resent-day Malay women prefer batik sarongs to any kind for the everyday use. Batik has become popular because a Malay batik industry has come into existence, and inexpensive sarongs of good quality are now available all over the country” (p. 121). Hence, locally produced batik sarongs became readily available in Malaysia and this meant that people wearing batik sarongs contributed

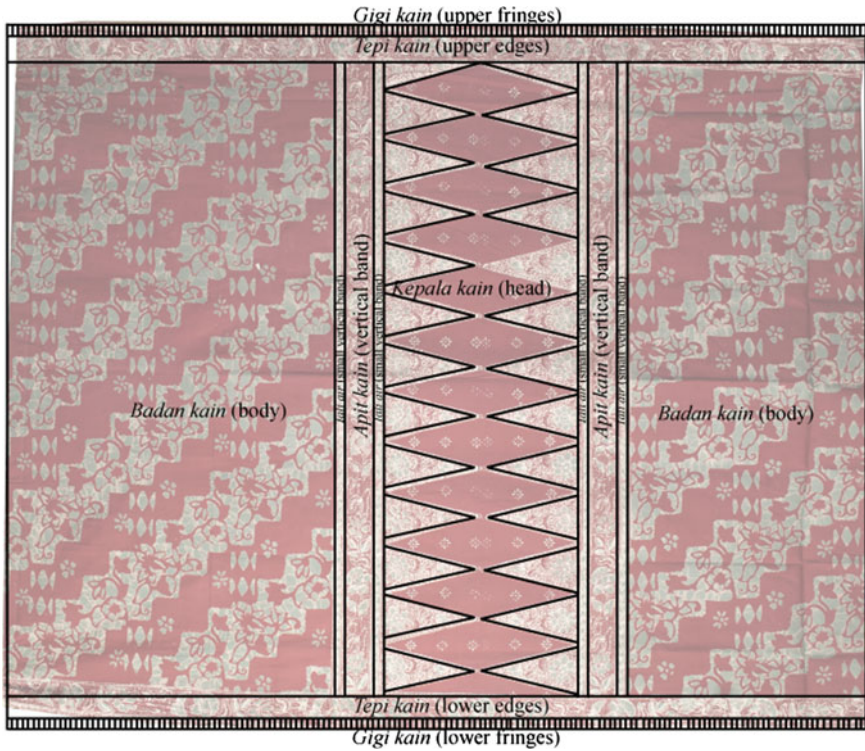


Fig. 1 The batik sarong layout in Malaysia shows the design segment. Photo and drawing by Rafeah Legino, 2015

to preserving traditional designs and helped to expand craft techniques and textile skills. Therefore, the consistent development of the batik sarong industry in Malaysia ensured the continuity of traditional designs—layout, motif, and color—that are featured in local batik designs. For example, as shown in Fig. 1, the samples clearly displayed the basic design arrangement of the batik sarong segments, with the basic composition that placed various types of motifs. Creativity enhanced the rich variation in motifs that still exists today and is the result of safeguarding traditions in the craft form but also batik use as part of the dress culture and innovation, and creativity is still being explored by the current generation of batik makers. A significant characteristic of Malaysian batik is the use of Malay symbols in its motifs that are inspired by floral and botanic, geometric, locally grown fruit, and motifs derived from other traditional crafts. These unique features of batik sarongs produced in Malaysia demonstrate the continuity of traditional sarongs that have been adapted by the Malaysian batik-making communities.

3 Features and Changes

In Malaysia, there are various factors that contributed to the features and changes of the batik sarong design motifs. The formation and cultural development in Malaysia have been developing through significant occurrences such as with the glories of the Malay empires, the colonial period, and after independence. Therefore, every episode has been marked with different historic and cultural influences. The local traditional culture and the mixing with foreign influences have developed the uniqueness of arts and cultures of this country. Al-Ahmadi [6] stated that:

Malaysia's geographical position is unique since it is related racially and ethically with its neighbours – Indonesia, Brunei Darussalam, Philippines, Singapore and Thailand. Moreover its strategic situation on the major sea-lane from the West to the East provides the locational factor, which makes it the recipient of multifarious cultural elements from the great civilizations of the world – India and China, as well as the Middle East and the cultures of the West. (p. 40)

Furthermore, the locations of Malaysia exposed to several foreign cultures have easily enhanced the development of textile handicraft in this country. Over the past time, the documentation created over the colonial period (1511–1957) was significant; for example, there were design characters from different places. The sarong made from batik techniques significantly has its own types of composition, which also were developed and reconstructed within the final clothes design, such as the different fabrics of sarongs, shawls, and also sari design. Hence, Vining et al. [7] clarified that:

Traditional textiles or fabrics popularly used in the three countries include *batiks* and *songkets*. *Batik* fabrics use a wide variety of motifs and feature numerous bright colors. Women use them for *sarongs*, a tubular or wrapped fabric skirt with no seams or defined waist. Urban women would wear these mainly during festive seasons. The woman always covers her head and should be depicted properly dressed with long sleeves in any advertising. (p. 24)

Therefore, in the crafts and visual arts, “Malaysia is characterized by its great and ethnic diversity” and through the “foreign influences affected the development of Malaysia’s visual art tradition” [8, p. 9] that develop over time. On the other hand, of course, the diverse character of design elements that spread from the many media could sometimes merge with the local tradition or sometimes not be suitable [9]. For example, clothing, such as sarongs, which are created from different types of fabrics, is displayed with their regional traditional characters and sustains with a new breath for future heritage. In ordinary situations, people do not realize the significance of layout or structure as a basis for making a balanced design.



Fig. 2 Batik sarongs decorated with floral motifs and the combination of floral and geometric motifs. Photos by Rafeah Legino, 2015

4 Motif Classification

The appreciation of the Malaysian batik sarong in Malaysia can be carried out through the motifs contained in their sarong layouts. The motifs have undergone the process of imitation and creation in order to produce various motifs. Mostly nature is the main source of inspiration in making the design, created either from flowers, fruits, or flying insects. The beauty of batik sarongs engages with the creative processes that are involved in motif development. The unique beauty of the batik sarong can be seen in its structure, which is designed to fulfill its function as a lower body garment. All the diversely shaped motifs are arranged carefully on the surface of the batik sarong in a specific composition that reveals the beauty of its design.

The classification of batik sarong motifs produced in this country is defined based on the types of motif sources from which they are derived. Mainly, the character of the motifs possesses its own identity, due to the use of motifs inspired by nature such as vegetal (flowers, leaves, shoots, tendrils, fruits, and stems), fauna (birds, butterflies, and small insects), geometric, and others. The motifs are used to fill the space in the *badan kain* (body), *kepala kain* (head), *apit kain* (vertical lines), and *tapi kain* (edge). Therefore, the imitation process, referring to batik sarongs imported into this country, used these as a source of inspiration. However, the design was developed through the local environment that displayed a great range of creativity. Figure 2 shows how the batik sarong motifs have been designed from flowers and combined with geometric elements.

5 Conclusion

To sum up, the main concern of this study has been to examine the variations of Malaysian batik sarong design motifs through the widespread review of the related literature, analysis, and classification of batik sarong motif design from samples that

were photographed. The study has carried out new adaptations through the different types of sources of motifs that have been created by the batik makers. The imitation process is one of the stages of the formation of a motif, which is generally inspired by observation of the environment. Thus, geometric shapes, the flora, and the fauna are common sources of inspiration. In order to create a motif, the batik maker will refer to the source of inspiration and apply the maker's creativity to it. The element of repetition is used to form a pattern from the motif created, and the beauty of the sarong arises from the suitability of the repeat pattern used to decorate each part of the sarong. Moreover, the evolution of Malay aesthetics in the visual arts and crafts of Malaysia including the batik sarong industry occurred from the period of 1957–1971.

However, the national cultural policy initiated more dramatic changes with the active promotion of motifs that were considered representative of Malaysian cultural identity. Therefore, in certain designs, the adaptation and the influences of the regional Malaysian and indigenous cultures, desirable traits, and strong Islamic design concepts were clearly determined on the design motifs. Along with the research, government agencies supported and encouraged the batik makers to develop variations of Malaysian batik sarong design motifs. Indeed, the establishment of the policy had a direct impact on the design of the Malaysian batik sarong so as to secure the tradition and design identity.

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Innovation Method of Smoke Firing for Labu Sayong Blackening Technique: Kiln Design

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Abstract The conventional way of blackening Labu Sayong, traditionally or modern style, was by taking out pots from the firing chamber piece by piece after firing reached the maturing temperature of 900 °C. During the process, there is potential for standardizing the blackening effect of the Labu Sayong through the smoke firing process. However, there are slight chances of obtaining an even blackish effect from the firing reduction process. Through this experiment, it is expected to achieve a standardization effect from a smoke firing technique for the blackening of Labu Sayong through a single firing.

Keywords Black effect · Innovation · Labu Sayong · Firing · Standardization

1 Introduction

Smoke firing or carbonized ceramics are the result of carbon trapped in the clay body where fire draws oxygen from the clay to assist combustion [1]. Smoke firing is also a practical way of low-temperature firing whereby the kilns can be manually constructed. Smoke firing's significance is due to a reduction effect during the firing

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process that produces diverse effects each time depending on multiple factors such as application timing of the combustion Materials and methods used for the application. For internal kiln firing, smoking can be achieved by introducing a fuel into the firebox and preventing access to air which leads to blackness [1].

Smoke firing has its own flaw whereby it naturally provides an unsystematic effect on the ceramic body. Through smoke firing there is a small possibility of achieving an optimum blackish effect to the Labu Sayong body, moreover, a standard effect due to the traditional reduction method of manual application of combustion material.

The objective of this experimentation is to improve the firing technique of blackening ceramic products suitable for the traditional Labu Sayong product [2]. Other than that it is to define the reduction temperature hence the amount of rice husks used to achieve the maximum standardized blackish effect.

2 Literature Review

2.1 *Labu Sayong Traditional Firing*

The firing of Labu Sayong was done in three stages: smoking, firing, and varnish [3]. The varnish process, known as *menyepuh*, was when the surface of the clay was rubbed with a shiny object, for example, a rounded river stone to shine the Labu Sayong. Traditional firing was often conducted by the elder entrepreneurs due to the simplicity of the process. The firing was done openly without the use of a kiln. Dried Labu Sayong were arranged on the rack upside down and covered with a banana leaf. A small fire was lit under the rack for approximately 5–6 h until the Labu Sayong turned brownish. This process is called preheating.

Next, the preheated Labu Sayong was arranged on the ember covered with small branches until it became a bonfire. Each of the Labu Sayong that was currently burning was then transferred from the firing set and buried in a dump of rice husks to obtain the optimum blackish effect. The footing of the Labu Sayong is rubbed with resin to make it shine and reduce water absorption.

2.2 *Labu Sayong Modern Firing*

Modern firing is done using specific equipment such as a kiln. For Labu Sayong, it is often fired using an updraft kiln that is divided into three main categories [4]:

- Fire box
- Combustion chamber
- Damper

Heat supplied by the fire will run through the combustion chamber to fire the Labu Sayong and exit through the flue. The firing starts by preheating at a temperature of 100 °C with a small fire to dry the Labu Sayong. Preheating is done for 5–10 h depending on the Labu Sayong moisture condition. A bigger fire is then required to achieve the maturing temperature of approximately 800–900 °C. The firing is able to be executed at a low temperature considering that there is no glaze applied to the product; otherwise the glaze will need a much higher temperature to mature during firing. The Labu Sayong that has been fired is directly transferred from the kiln to be buried in a dump of rice husks to achieve a blackish effect similar to the smoke firing process.

2.3 *Smoke Firing Method*

One of the methods to burnish a pot remarkably was to fire it black. The technique of blackening ceramic was often done by applying smoke. Essentially to turn ceramic material black was by smothering the fire which prevented oxygen from touching the fired ware before cooling down [1]. As a result, carbon dioxide and carbon monoxide started to develop in the kiln drawing oxygen from the clay body consequently changing its color [5]. In the kiln, smoking can be achieved by introducing fuel that traditional firing often consumes, industrial and agricultural wastes such as straw, dung, coconut fronds, and sugarcane pulp, depending on the suitability of the geographic area [1]. There are multiple ways to blacken ceramics, particularly burning combustible material in which for this particular trial would be paddy husks which produce a rich black color due to the fact that they burn at a higher temperature compared to paper [6]. A raku kiln is also suitable for blackening Labu Sayong products, however, it must be done cautiously. Defects might easily occur due to manual handling of the product.

Therefore for this research the method of smoke firing that was undergone by the researcher was:

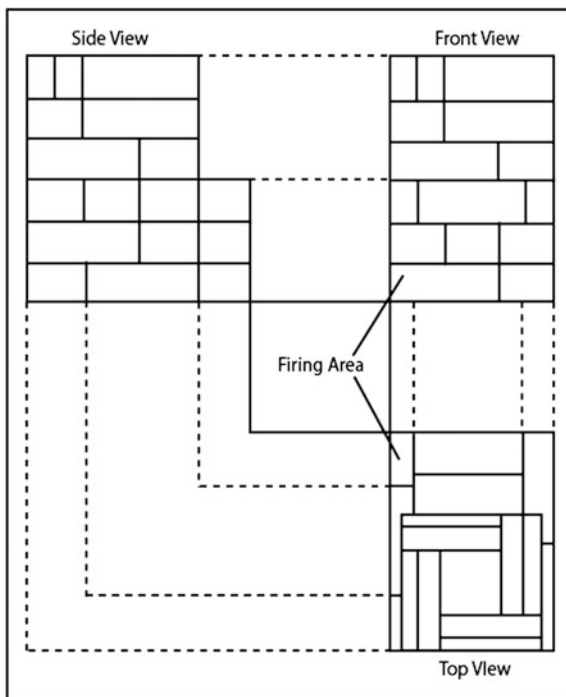
- Building the wall and base of the kiln by arranging insulating bricks and applying mortar cement in between the joining walls to shape the firing chamber and firebox.
- Placing the test pieces on the base surface of the kiln and covering the kiln.
- Connecting the burner and gas to the firebox and covering up the extra space just enough to hold the burner to control the air input to the firing chamber.
- Lighting the fire and controlling gas input in addition to managing the kiln temperature; checking the firing temperature using a thermocouple.
- At the correct temperature after the burner has been turned off, depositing the rice husk in the kiln and closing all air access into the kiln.

3 Kiln Construction

A type of updraft kiln was built that distributes heat flow to the top. The kiln that was used for this research measured 44.5 cm in height, 34.5 cm in width, and 46 cm in length. The kiln contained four layers of insulating bricks which were arranged alternately for a stronger structure. One layer functioned as the kiln’s foundation; the other three layers were for the fire box up to the firing chamber and another layer as the damper [7]. Based on the kiln dimension as stated above, this particular kiln was quite small, however, it was suitable for the sizes of the samples fired. Even a small kiln needs a similar basic construction [8]. The main function of the kiln was to perform a firing simulation of the Labu Sayong. Figure 1 is a technical drawing of the simulation tunnel that was built by the researcher.

The whole kiln layout was required to help construct the kiln perfectly in order for it to be sturdy. It was an important aspect for withstanding the heat pressure during the firing. The kiln was constructed using multiple nonmetallic materials that suited and were capable of resisting high thermal stress. These kinds of materials are of refractory character which were capable of withstanding physical deformation when applied with high heat. The two main refractory materials that were used to construct the simulation kiln were insulating brick and mortar. Basically, insulating brick functioned as a thermal insulation to avoid heat passing through the

Fig. 1 Technical drawing of simulation kiln used for the trial



wall of the kiln. Insulating bricks were made of fire clay and kaolin both of which materials were blended until they formed clay that contained pores by chemical means. The batter was then shaped into a form that looked like a cellulose sponge. It was later dried, fired, and cut following its required size. Air bubbles that were trapped at the insulating brick provided a good function of thermal insulation in addition to contributing to reducing its weight and porosity, and conferring resistance to high heat.

The measurement for the insulating brick that was used for the kiln construction was 9 inches in length, 4.5 inches width, and 3 inches in height. There were 23 insulating bricks used to construct the kiln and each brick weighed 1.1 kg. Figure 2 shows the appearance of the insulating brick.

The merging process of the insulating brick was done with mortar, a specific cement type. Mortar has similar characteristics to insulating brick. It was suitable for kiln construction due to its smaller crack potential even if high heat were imposed. Mortar consisted of components such as kaolin, ball clay, flint, and feldspar. Those components were blended together with fine sand and water according to the ratio of 10:7:3. The usage of mortar, in addition to insulating brick, increased the insulation properties from being released to the surroundings and additionally it amplified the simulation kiln's efficiency. Table 1 explains the mortar's composition.

Fig. 2 Insulating brick



Table 1 Mortar composition

Material	% Weight
Kaolin	12.5
Ball clay	12.5
Flint	12.5
Feldspar	12.5
Grog	35.0
Water	15.0

4 Methodology

This research was mainly based on experimentation, however, there were numerous books regarding this research topic that have been a huge contribution. A simulation kiln was built as the main device to conduct smoke firing testing [9]. For the purpose of testing on the blackening level of reduction firing effect, the kiln was built according to planned specification and a total of $23\frac{1}{2}$ insulating bricks were involved. A lining piece which measured 42.6 cm in length and 27.7 cm width was used as a damper. Kiln construction required raw material precision handling such as insulating brick and mortar. Mortar was applied and its excess that was still attached to the insulating brick parts was cleaned for neatness, moreover to facilitate other insulating bricks that continued to be stacked up.

While attaching the insulating bricks with other insulating bricks, a piece of scantling board and hammer were used to knock as well as tighten the insulating brick together with mortar. This factor should be taken seriously because if one insulating brick was not level it would affect other insulating bricks that were attached to it hence the whole kiln structure.

The arrangement of the insulating brick was also considered properly. It was all arranged alternately whereby on every two insulating bricks, one insulating brick was attached in between the joints of two insulating bricks. This kind of arrangement is illustrated in Fig. 3; it increased kiln stability along with strength. Mortar characteristics when dry strongly grip the insulating brick. The first firing was done to fire mortar and permanently harden its particles in order to prevent deformation if water or other pressure were applied.

The kiln which was now solid was then drilled to make a hole at the nearest area to where the samples were placed for the simulation experiment. The diameter of the hole was 1.7 cm and it was drilled for the thermocouple to be inserted. The thermocouple's function was to detect the firing temperature at the chamber area. Approximately 2.5 cm length of the thermocouple was inserted through the hole which was lined with insulation fiber to minimize heat release at the drilled area. It was seen that the kiln construction needed high precision and detail as even a small neglect would affect the kiln's thermal insulation efficiency [10]. Figure 4a, b show an illustration of the simulation kiln which has been constructed and used for this

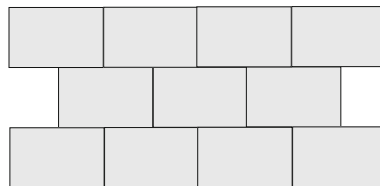


Fig. 3 Insulating brick arrangement pattern

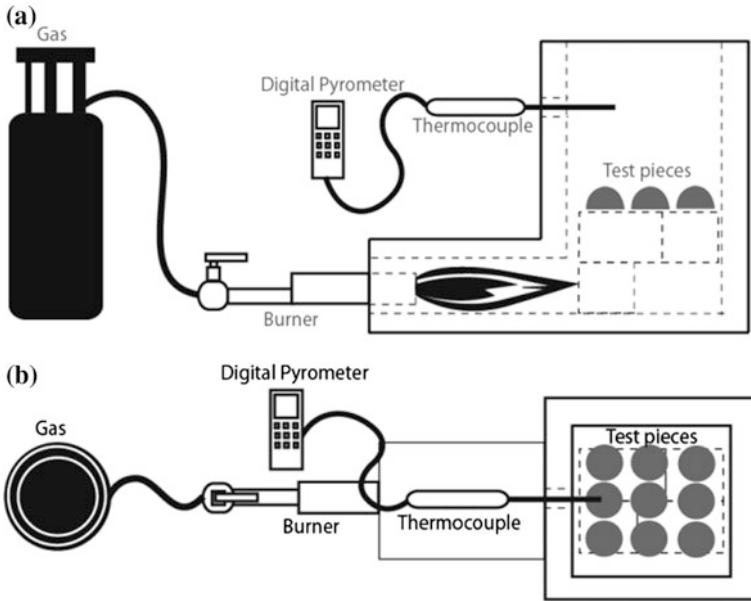


Fig. 4 a Firing process layout. b Arrangement of test pieces in the firing chamber

research. The gas tube was distantly located as a safety precaution for the firing process. The location of the pyrometer was where it could be seen by the researcher for a more systematic firing process whereby the researcher would be more alert to the temperature adjustment and moreover turn off the burner at the acquired temperature for the firing to stop.

The firing was done multiple times to test for the suitable temperature to deposit the rice husk and the amount of rice husk needed to produce the maximum blackness effect. The firing temperature was set at 900 °C for a total of 4 h firing process. For each firing, 100 g of rice husk were deposited at the starting temperature of 300 °C, adding 50 °C for every other firing until it reached 700 °C. The firing was conducted as usual until it reached the temperature of 900 °C. The burner was turned off and during the cooling process the researcher deposited the rice husk accordingly. Table 2 provides an outline for depositing rice husk on the firing experimentation done for this research known as Experiment 1.

Based on the results obtained through Experiment 1, another batch of experiments took place experimenting on the quantity of rice husk to be deposited during the firing. The researcher chose three temperatures to conduct the experiment with a varied quantity of rice husk usage for each temperature. Table 3 provides an outline of Experiment 2 with a total of 15 firings.

Table 2 Experiment 1

Experiment	Temperature (°C)
1	300
2	350
3	400
4	450
5	500
6	550
7	600
8	650
9	700

Table 3 Experiment 2

Rice husk (g)	X °C	Y °C	Z °C
10	Sample A	Sample F	Sample K
20	Sample B	Sample G	Sample L
30	Sample C	Sample H	Sample M
40	Sample D	Sample I	Sample N
50	Sample E	Sample J	Sample O

5 Results and Discussion

The kiln design has proven to be usable and we have managed to perform multiple firings and hence produce positive results that fulfilled the objective of this research. Precision was the main factor of undergoing experiments that were done using this particular kiln design. The kiln was constructed thoroughly following the right kiln construction method which was arrangement of insulation brick as well as a neat mortar application for a strong and stable construction.















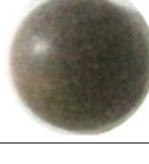
A total of 25 firings was done using this particular kiln design. The first firing was to fire mortar that was applied in between the insulating bricks for the purpose of strengthening the kiln construction. The second to tenth firings were done to complete the first batch of Experiment 1 and the rest for Experiment 2. Refer to Table 4 for results of Experiment 1 and Table 5 for results of Experiment 2.

The results that are shown in Table 5 are the suitable temperatures of depositing rice husk which was ± 500 °C regardless of the amount of rice husk tested which was between 10 and 50 g. However, the most effective amount of rice husk would be 30 g, which provided the darkest shade of black compared to other samples. For the rice husk amount that was deposited at the temperature of 350 °C, the results declined with the increase of rice husk amount deposited; however, the results were reversed for depositing rice husk at the temperature of 700 °C. The samples' black hue increased as the amount of rice husk deposited increased.

Table 4 Result of firing sample for experiment 1

Temperature for depositing rice husk (°C)	Condition of flue	Sample
300	Soot	Black with no soot
350	Soot	Black with no soot
400	Soot	Black with soot
450	No soot	Black with no soot
500	Soot	Black with soot
550	Soot	Black with soot
600	No soot	Black with no soot
650	No soot	Black with no soot
700	No soot	Not black

Table 5 Result of firing sample for experiment 2

Rice husk amount (g)	350 °C	500 °C	700 °C
10			
20			
30			
40			
50			

6 Recommendations

This experiment was conducted intentionally for firing small-size test pieces; therefore the size of the simulation kiln was built accordingly. The idea of realizing this project initially came from current design practice that allows the artist or creative designer to expand his or her design knowledge through transdisciplinary media [11–13]. For larger products, the kiln ought to be built according to the products that will be arranged and stacked in the firing chamber area, however, following the accurate scale of the simulation kiln that was constructed for this experiment [14]. The utilization of burners will need to be multiplied as well to accommodate the larger-scale kiln alongside more gas usage to support the firing process.

Achieving pure clay color effect is best done with an application of white base [15]. The same also goes for products that will undergo smoke firing, which are advised to be coated with white slip first in order to achieve a pure black hue depending on the required effect. According to the ceramic process, the best clay condition to apply slip is during leather hard. Potters use slip partially to create a different colored surface or create a different texture [16]. However, it is possible to do a smoke firing with material that is not white based although the effect will turn out differently. The rice husk amount would be more appropriate to be increased to fire bigger products to make sure that the smoke produced is enough to assist with a balanced carbon application on the whole. These are the recommendations for improvisation of the methods used for this research, however, it would need to be tested accordingly before the actual firing were done.

7 Conclusions

Good kiln design was proven to be a powerful mechanism that will assist with good firing, hence produce the required effects which in this research would be blackening. Through firing, the complete ceramic will be produced and the firing will determine the success of a product. Based on the results of Experiment 1, the cooling process had successfully managed to produce a positive result of blackening through smoke firing using rice husk as the combustible material. Experiment 1 focused on concluding the appropriate temperature to deposit rice husk which leads the researcher to explore further the related factor of blackening. Experiment 2 on the other hand has managed to educate us on the best temperature and amount of rice husk suitable to produce the blackest effect.

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Genetic Algorithm as a Generative Tool to Search for Malaysia Product Design DNA

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Abstract Scandinavia is a patchwork of Northern European nation states that form a cultural and regional entity that is very distinct from the rest of Europe. They deeply embedded design in every facet of their culture, from a piece of print media to huge city planning, in which kind of strategy in structure countries also promote a common national belief, values, and attitude in addition to driving togetherness among societies and helping to create national unity. Instead of creating unity in societies, this idea also results in a cultural comprehensive overview of functions and aesthetics to present democratic values, pragmatism, social equality, ingenuity, and resourcefulness. The other successful country based on cultural adaption in design, Japan, has a long history of combining the newest technology with clever, striking, and intricate design aspects. Japanese products that are deeply rooted in the concept of lifestyle and reflect the personalities of their designs in return, result in the traditional aesthetic of *monozukiri*, or “the art of making things”. In this case, the appreciation of design is elevated because design expresses national and local character, and character of the individual to pursue a common nature and this linkage of relations generates social development and fulfills their people’s needs. From both Scandinavian and Japanese design, it can be stated that they have gloriously created their national unity through design. There are no permanent studies of formulation of country’s design DNA, however, this research tries to search for Malaysian product DNA using a genetic algorithm as a generative tool that will indirectly share common features and appreciate the Malaysian identity.

Keywords Design language • Genetic algorithm • Product DNA

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1 Introduction

Malaysia has three dominant races which are Malay, Chinese, and Indian. The Malay is the largest community in the country. In Malay cultures, there is a lot of variation among the races and culture itself. Based on “On the *Malayu Nation*,” Stamford Raffles mentioned that with regard to Malacca royalty, Sultan Muhammad Shah married a Tamil from South India and Sultan Mansur Shah married a Javanese, a Chinese, and a Siamese; the Siamese wife bore two future Sultans of Pahang.

Furthermore, the Malays are the people who inhabit the Malay Peninsula and portions of adjacent islands of Southeast Asia, including the east coast of Sumatra, the coast of Borneo, and smaller islands that lie between these areas. Malay culture itself has been strongly influenced by others, the Siamese, Javanese, Sumatran, and especially Hinduism. The influence of Hindu India was historically very great, and the Malay were largely Hinduized before they were converted to Islam in the fifteenth century.

The diversity of races, cultures, and influences has given the modern Malay race the rich and unique heritage it has today. However, current globalization challenges sweeping the world require the reassigning of strategies so as not to be excluded or isolated from the speed of development or become victims of oppression by certain quarters. In April 2009 Dato Sri Mohd Najib Tun Abdul Razak, the prime minister of Malaysia, introduced the concept of 1Malaysia to overcome this situation. Malaysians, regardless of race or religion need to think and act as one race, that is, the Malaysian race, that thinks and acts towards a common goal to build a world that is prosperous, progressive, peaceful, and safe thus enabling it to compete with other communities in the world.

There are various mechanisms that have been proposed in order to unite the Malaysians. The Federal Constitution has provided in Article 152 that *Bahasa Melayu* shall be the language of the federation. If the mastery of the language by all races in Malaysia could be improved, other policies and efforts to improve unity and integration will follow suit. The Rukun Negara is another mechanism that could be used to achieve the goals of 1Malaysia and the NKRAs. The five tenets promote faith, loyalty, respect for the law of the land, and wholesome proper conduct. Those qualities are needed to move towards a better Malaysian society and identity. Arts and other cultural aspects of Malaysia should also be enriched by the amalgamation of the myriad cultures available in Malaysia. Thus far, this kind of togetherness could mostly be seen only during festive (especially the Independence Day celebration) seasons. This should not be the case. Fashion, performance arts, music, and so on must be able to portray the essence of unity 1Malaysia tries to achieve.

Hence, our Minister of Information, Communication and Culture, Dato Dr. Rais Yatim has transformed Malaysia in the context of culture to be 1Malaysia with the enhancement of the beautiful old traditions and performing the arts and culture activities while tightening the relationship between races in Malaysia [1]. However,

in the role of uniting the nations through design, the Scandinavian and the Japanese are two classic models that can be studied.

Scandinavia is a patchwork of Northern European nation states that form a cultural and regional entity that is very distinct from the rest of Europe. They share a common economic and cultural history and linguistic roots (except for Finland). They each possess a unique character that reflects their different geographies and environmental conditions. More than anywhere else in the world, designers in Scandinavia have investigated and nurtured a democratic approach to design that seeks a social ideal and the enhancement of the quality of life through appropriate and affordable products and technology [2]. Hence, they deeply embedded design in every facet of culture, from a piece of print media to huge city planning. This influenced the country with an iconic design structure that developed people-centric societies with the citizen as the marking point of design and technology development and the country's valuable assets [3]. In this kind of strategy in structure countries also promote a common national belief, values, and attitude in addition to driving togetherness among societies and helping to create a national unit, from the Lego blocks toy to public benches, the field of architecture, and design of airports were particularly designed to reinforce the national spirit. Instead of creating unity in societies, this idea also resulted in a cultural comprehensive overview of functions and aesthetics to present democratic values, pragmatism, social equality, ingenuity, and resourcefulness. "Scandinavian design shows love for the simple things in life and people" to point up the essence of Scandinavian design eloquently [3].

The other successful country based on cultural adaptation in design, Japan has a long history of combining the newest technology with clever, striking, and intricate design aspects. As a result of changes, the new millennium has given birth to numerous Japanese products that are deeply rooted in the concept of lifestyle and reflect the personalities of their designs and result in the traditional aesthetic of *monozukiri*, or "the art of making things" [4]. As do other countries, America takes design as a platform for investment and making money, Northern Europeans claimed design as a part of their lives, and meanwhile the Japanese adapted design as their culture to present their nation's existence. The design itself was directly related to the increment of economic lifeline to their country inasmuch as they only have specialties and are expert in electrical equipment and gadgets and they have no natural resources for trading. In this case, their appreciation of design was elevated because design expressed national character, local, and individual character to pursue their common nature and this linkage of relations generated the social development and fulfilled their people's needs. Hence, the transformation of social trend will not interfere with their economic structure because this situation will immediately get the designer's attention for exploration and theory formulation.

Social characteristics, peoples, and communities lead in design; nationalist and attractive ideas overcome the good interpretation to the world and fill up those things that peoples want. From both statements regarding Scandinavian and Japanese design, it can be stated that they have gloriously created their national unity through design.

2 Design DNA

Design DNA is a formal inscription and formalization of “style”. This style is then broken down into information that could be accessible so that it becomes tangible [5]. Practitioners in many companies are talking about the idea of “design DNA” in employing design to create visual recognition of their brands’ core values [6].

The analogy with DNA suggests that the visual identity of companies and their brands is inherited and develops as a matter of course, and it implies that change in visual identity comes slowly and over many generations. The relationship between design and brand identity that has been found here is one that can be planned, has to be internalized, and is open to radical change. The notion of design DNA may also point to design as an inner strength of the company that keeps it fit for the market. It was found that design can sometimes be such a driver, but it is also driven itself by a host of internal and external factors. It is thus recommended that design become a less primal and more self-reflective strategic force in a company, working together with corporate, technological, and commercial strategic forces [7].

DNA is captured by aesthetic character and expression. Semiotics basically describes the study of signs and symbols with the inclusive signifier–signified relationship as identified by Saussure [8]. Models by Morris’ syntactics–semantics–pragmatics [9] and Barthes’ denotation–connotation [10] can be applied to any design style [7].

3 Methods and Evolution in Formulating Product DNA

DNA is familiar in the area of medicine and biology. It was first found by the Swiss physicist, Friedrich Miescher in 1868 when he isolated something no one had ever seen before from the nuclei of cells called the compound “nuclein.” Almost a century later, the structure of DNA and formulation that was explored and discovered by Watson and Crick is still used today [11].

Scientifically, DNA stands for “deoxyribonucleic acid.” DNA is the module that carries genetic information and material that controls legacy or inheritance of eye color, hair color, stature, bone density, and many other human traits. It is a long, thin string-like object and the body’s cells each contain a complete sample of DNA. Many properties of the body’s cell can be coded. The DNA code, or genetic code as it is called, is passed through the sperm and egg to the offspring. DNA testing is conducted in the areas of criminal investigation, paternity issues, and tracing ancestry [12].

Inspired by the genetic codes, human traits, and the structure of DNA, the molecule of which uniquely describes the traits of a living organism, there are studies of DNA in the product design field called “product DNA” (PDNA). DNA in the design field exposed the encoded gene and some of the design into a systematic process of product arrangement of factors in making things, although contributing to product identity development. DNA that is being used for health diagnosis and

disease treatment also has a wide range of engineering applications such as PDNA including (1) quality inspection by comparing the decoded genome with that of the nominal design. By constantly monitoring the PDNA during the product life cycle, people can determine when the part has a significant quality change and needs to be repaired or replaced; (2) correlating the genomes of PDNA to manufacturing parameters and conditions enables us to better understand manufacturing and diagnose process faults; furthermore, (3) PDNA is of great importance for design optimization and the physical attributes can be modified to achieve the desired functional performance based on the relationships between the physical attributes and functional performance. Last but not least, (4) PDNA can serve as a linkage to better understand the relationships between the manufacturing process and physical performance [13].

In power train manufacturing, a “stream of variation” model has been designed with genome application in PDNA. It is a procedure to deal with the diagnosability problem from the perspective of dimensional and surface quality characteristics [14].

3.1 Genetic Algorithms and Techniques

Basically, the algorithm system was applied in order to solve the complicated issue of searching things from the mathematical field to the area of the sciences. It's role and definition started in the early 1970s at the University of Michigan, United States. John Holland was the person who invented GAs and declared them an abstraction of biological evolution and thus a method for chromosome (string of bits) movement from a population that naturally selected into a new community together with the genetically inspired operator of recombination, mutation, evolution, and inversion [15].

To strengthen the theory, there are four steps to apply GA to solve design problems: (1) representations (definition of individual) of genotypes and phenotypes for the specific design problem are defined; (2) a suitable GA for the manipulation of the representations is designed; (3) selection criteria for the evaluation (fitness function) of design objects are formulated; and (4) factors of user interaction that affect the performance of the evolutionary process are considered [16].

The phenotype representation describes all permissible solutions that can be generated by the system. It enumerates the design space for evolutionary search by GA. The main aspect to be studied is what elements of a grammar rule can be evolved and the second is how to represent the elements for manipulation by a GA. In manipulation of the representation with suitable GA, the GA performs three functions: modifying alleles (group of gene) within chromosomes using genetic operators, decoding the genotypes to produce the phenotype, and evaluating the phenotypes to identify the fittest solution.

In previous research of evolutionary algorithm (EA) study, T. Back [17] said some of the better candidates (Gen DNA) are chosen to seed the next generation by applying (mostly use) recombination and/or mutation to them. Additionally,

recombination was defined as an operator applied to two or more selected candidates (the so-called parents) and resulting in one or more new candidates (the children), whereas mutation applied to one candidate and results in one new candidate. In the study, Back also proposed the general scheme of an EA to be to let the user easily understand the process of evolution in this area of study.

As the EA took its place as a main character or platform to further this research, GA concepts were selected to generate the development process according to its capability and consistency compared to the other three evolutionary engines. The genetic algorithm is a method of optimization; there should be more than one item or genes needed and coded as genotypes to achieve success in the gene formation process. Following the literature, we show below a study taking the genetic algorithm method as the direction in the field of making things.

4 Methodology

In this study, Morris’ and Barthes’ models (Fig. 1) of aesthetic style and semiotic signification were used to analyze and synthesize the meaning of perceived features in design and in addition to these models, the main construct that influences design DNA is the genetic algorithm.




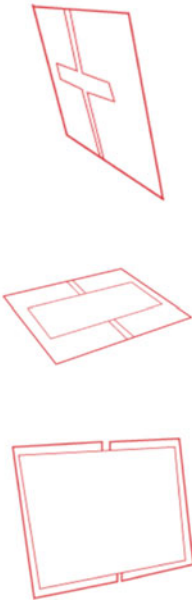
CONSUMER PRODUCT CATEGORY		
SYNTACTICS	SEMANTICS	PRAGMATICS
Pearl White Gloss Black	Slim Sleek	Minimalist
<i>Denotative Signifier</i> SURFACE	<i>Denotative Signified</i> FORM	
<i>Denotative sign/ Connotative signifier</i> SMOOTH GEOMETRIC FORM		<i>Connotative signified</i> APPLE PRODUCT
<i>Connotative sign</i> HIGH QUALITY AND INNOVATIVE TECHNOLOGY		

Fig. 1 Consumer product category. Morris’ and Barthes’ models of aesthetic style and semiotic signification

Table 1 Consumer product encoding

PRODUCT/ YEAR	SHAPE	FEATURES	STYLE
Consumer/2007	Geometric	Slim and Sleek	Minimalist
			COLOR
			Pearl White, Gloss Black
			FINISHING
			Glossy

Below are the steps in formulating data from the initial stage until identity or design DNA is generated.

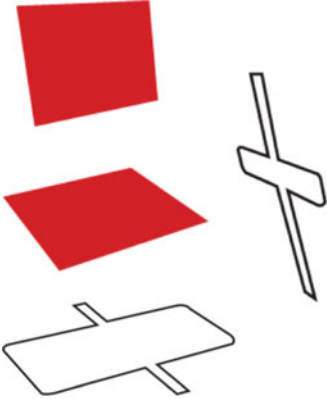
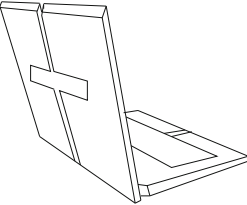
4.1 Product Category and Measurements (Step 1)

The product features characters and DNA was identified from original subjects including the inner level of emotion, cultural meaning, and stories behind the products. This study focuses on the three main product classifications of the consumer, wireless, and agriculture products (Table 1).

4.2 Product Features and Encoding (Step 2)

Each selected product was measured according to its specifications of the outer level of colors, texture, and pattern. At this stage, the shape grammars of the

Table 2 Consumer product encoding

PRODUCT/ YEAR	GENOTYPE	PHENOTYPE
Consumer /2007		

product were identified and then encoded into chromosomes. This is important to ensure if there is any similarity between shapes or elements in aiming to achieve unity (Table 2).

4.3 *Product Genes and Decoding (Step3)*

At this stage, all the product genes have been selected according to their capability through self-criteria and surviving aspects of product features and style grammar. The fitness is used by the selection method to choose those who will produce and move on to future generations (Table 3).

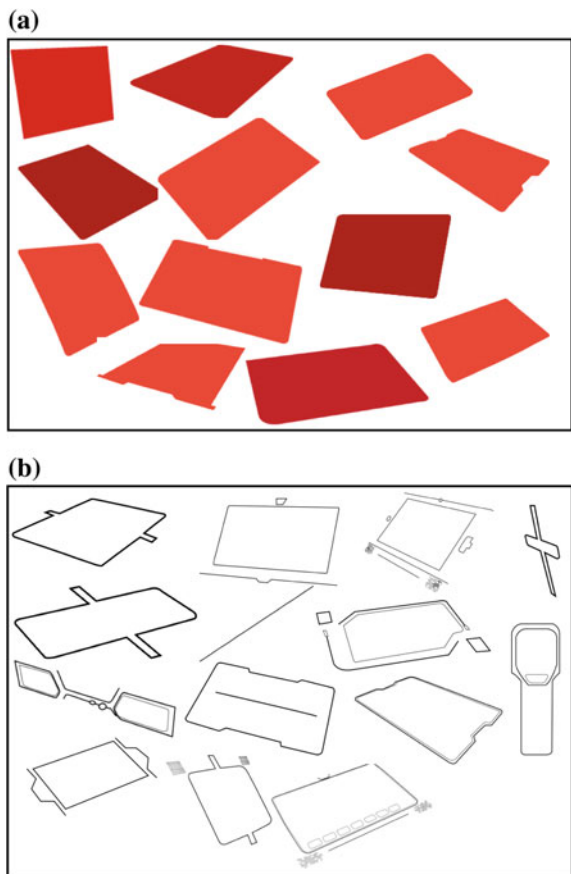
4.4 *Mutation of Genes Using Evolutionary Algorithm (Step 4)*

Based on gene analysis, refinement, and combination, the genotypes of the shape gene and element gene should be formulated in generating the new design DNA. As those genotypes become pioneers and parents in their own categories, this final combination or stage will fulfill the requirement in creating DNA (Figs. 2a, b).

Table 3 Consumer product decoding (2007–2012)

Shape	Features	Style	Color	Finishing
Geometric	Character and emotion	Emotion + Tech “Glow Line”	Titanium, black	Glossy
Geometric	Minimalist and slim	M-Shape + Character	Gloss black titanium	Glossy
Geometric	Minimalist and slim	Emotion “Blade”	Titanium, black	Glossy Matt
Geometric	Character and emotion	Emotion + Tech “Glow Line”	Titanium, black	Glossy
Geometric	Character and emotion	Emotion “Blade + Chequered”	Titanium, gloss black	Glossy
Geometric	Character and emotion	Emotion “Blade + Chequered”	Titanium, gloss black	Glossy

Fig. 2 **a** Fittest gene of shapes. **b** Fittest gene of features



5 Results and Discussion

This section presents results using a genetic algorithm to create the new design DNA. The fittest genes of shape and feature form a cross-product category such as the consumer, wireless, and agriculture were combined to create new design DNA. Figure 3 illustrates the result of the fittest gene of shapes and features to create a new design of a consumer product.

The following section describes the result of the fittest genes selected to create new design DNA of a consumer product. The new DNA of a consumer product was generated by combining the wireless gene features and shapes (Fig. 4).

Figure 4 shows the direct overview of the genetic algorithm process in this study. The new DNA was generated from the coded approach into shapes mode and the arrangement started with the geometric shape of wireless (shape genotype) then added with line and shape features of wireless products (element genotype) and resulting in the new DNA (phenotype).

Figure 5 visualizes another example of how the new DNA of a wireless product could be generated by combining the fittest genes of the cross-product category.

Figure 6 shows an example of how the new DNA of an agriculture product was generated.

Fig. 3 Fittest genes of cross-product category

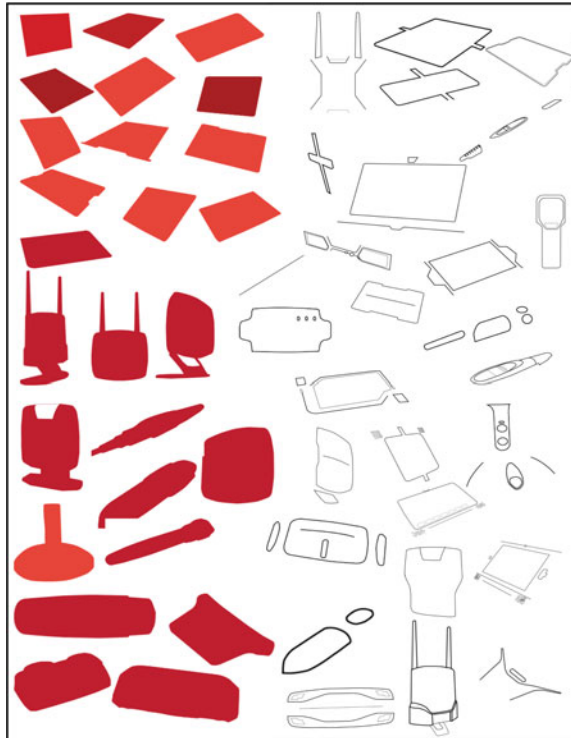


Fig. 4 New DNA of consumer product

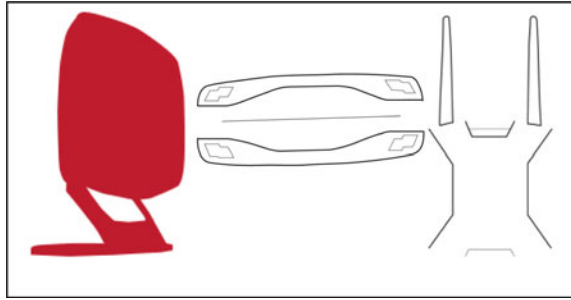


Fig. 5 New DNA of wireless product

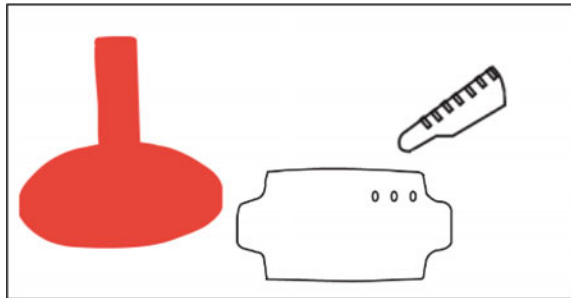
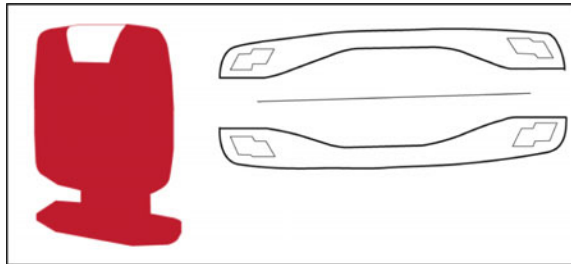


Fig. 6 New DNA for agriculture product



The application could be suggested in any area of product design. Theoretically, in the making of product design DNA, the phenotype gene (DNA) applied was not bound as shown in Figs. 2–4. Aesthetically it can be stylized according to tasks, needs, and demand. It can be signified that the importance of language descriptors and identification of product genes is a means of generic expression and translation of design language. The proposed model as a generative tool to search for Malaysian product design DNA holds relevance and significance for designers. The model has the potential to be expanded across the field of design language.

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Impact of Agricultural and Industrial-Based Waste in a Stoneware Body: Comparative Study

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Abstract This work describes the studies carried out on agricultural and industrial-based by-products on the $\text{SiO}_2\text{-Al}_2\text{O}_3\text{-CaO}$ system, aimed at comparing their effects on a stoneware ceramic body by addition of different shares. After the drying process, modified stoneware was then fired at two temperatures and characterized in terms of relevant functional properties by shrinkage, water absorption, mechanical strength, and SEM examination. Based on the observed findings, the potential for reuse of wastes in stoneware formulations in different ceramic production was confirmed.

Keywords Stoneware · Agricultural sludge · Industrial sludge · Oil palm kernel shell · Ceramic · Waste material

1 Introduction

There are several particular materials that are produced by industrial activities, which can be variable and contrary to production process aims [1]. In accordance with evidence from the past, it used to be common to eliminate the waste materials by means of soil conditioners or land filling although it is harmful not only economically but also ecologically. As a result, the motivation to replace an appropriate and efficient solution with the traditional ones has been increased. Moreover,

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various reusing or recycling of potential waste should be found and studied in order to be applied in the process [2, 3].

Basically, the chemical composition of a particular waste material is based on its source and influenced by the previous production with which it was involved. The amount of primary oxides in most of the waste materials refers to silica (SiO_2) and is tightly followed by alumina and lime (Al_2O_3 , CaO), and continues to fluxing oxides (alkalis and iron) [4, 5]. The ceramic industries as a potential target for waste material can utilize this material with the least alteration to the related process [6]. The waste material might be simply modified to an alternative raw material or auxiliary agent for ceramic production. Wastes should be nonhazardous and exist in great quantities. To illustrate, some waste materials being utilized in the ceramic fabrication process are akin to the natural raw material in terms of composition and they consist of some materials that boost the fabrication process [7–10]. By a glance at this logic, various waste materials both industrial- and agricultural-based, have been investigated and utilized as raw materials for ceramic fabrication such as sediment [8], stone and granite rejects [11–13], sewage sludge [14, 15], coffee and tea waste [16], and also petroleum waste [17]. In accordance with the result of the waste application, it is obvious that application of these waste materials in the ceramic production process not only is viable technically, but also it would be able to modify the final product characteristics.

Camera lens polishing sludge and palm oil sludge are being left from their related industries in different processes. Palm oil sludge is the agriculturally based by-product of the edible oil industry. The waste, which is being applied in this study, is kernel shell. Palm kernel shell that is being left from the oil industry is the crackled shell when the nut has been removed after crushing in the palm oil mill. In the past kernel shell used to be used as grit for road maintenance [18, 19]. Currently, kernel shell is being implemented in biomass products as a biofuel resource. Additionally, kernel shell has been applied in the construction sector in order to promote lightweight concrete [20, 21]. Camera lens polishing sludge is the waste that is the result of the polishing process during the manufacture of lenses by a polishing machine in order to achieve a translucency and sufficient surface [22]. These two waste materials have been selected in order to implement in a stoneware ceramic body because of their high amount of silica as the main elements in their chemical composition and their great accessibility.

By a glance at the evidence of the waste application, in this research it has been tried to compare and achieve the influences of agricultural- and industrial-based waste on a stoneware body with their resembling compositional characteristics. In the following study, the wastes have been added to the stoneware in amounts of up to 20 wt% in order to evaluate the physical and mechanical characteristics of the modified stoneware body after implementation of these two wastes. As a result, various tests such as water absorption, linear shrinkage, modulus of rupture (MOR), and scanning electron microscope (SEM) have been applied in order to appraise the capability of the wastes in application in ceramic production process.

2 Experimental Procedure

As the application of materials in a ceramic matrix is a complicated process, every step of the production process should be studied and carried out very carefully. As forementioned, the dry or wet phase of the ceramic body, mixing, drying, and firing process of the body preparation should be investigated and carefully chosen [2].

2.1 Raw Materials

Palm oil sludge as a residue of the edible oil industry and camera lens polishing as a by-product of the lens polishing process have been collected from their relevant industries and used in this experiment. In order to eliminate moisture and ligno-cellulosic content from the sludge and also to obtain the specific particle size, the samples have been calcined at a temperature of 400 °C for an hour. The stoneware used in this study was taken from the Industrial Ceramic Department Workshop at Universiti Teknologi Mara (UiTM). In order to identify the percentage of the composition of both sludge and stoneware, they have been analyzed and investigated by Philips (PW2404) X-ray fluorescence device (see Table 1).

2.2 Formulation and Preparation of Specimens

As illustrated in Table 2, palm oil and camera lens polishing sludge as waste have been combined with stoneware in different shares and categorized for each material in particular abbreviations. The groups that contain various percentages of palm oil sludge and stoneware were abbreviated as PO1 to PO5 and camera lens polishing

Table 1 Chemical composition of raw materials by XRF

Element oxides	Content (wt%)		
	Stoneware	Palm oil sludge	Camera lens polishing sludge
SiO ₂	69.86	70	70
Al ₂ O ₃	13.94	22	22
Fe ₂ O ₃	5.75	5	5
K ₂ O	2.60	0.90	–
MgO	1.09	3.50	3.50
TiO ₂	0.63	0.60	–
P ₂ O ₅	0.21	–	–
CaO	0.12	3.50	3.50
Na ₂ O	0.12	0.50	–
MnO	0.08	–	–

Table 2 Mixture ratio of both wastes

Groups		Raw materials (wt%)	
		Sludge	Stoneware
PO1	CL1	0	100
PO2	CL2	5	95
PO3	CL3	10	90
PO4	CL4	15	85
PO5	CL5	20	80

groups were abbreviated as CL1 to CL5. Pure stoneware was used as a reference in order to compare with the results. The raw materials have been dried, ground, and passed through sieve No. 100 and then combined with sludge. Added to the mixture were 100 ml of water as plasticizer agent. The ceramic bodies were molded into $3 \times 12 \times 1$ cm test bars in a plaster mold. After forming the test bars, they were dried out in an electric drier for 24 h at 110 °C and then fired at 800 °C and 1000 °C, respectively for 4 and 6 h in an oxidation furnace.

2.3 Characterization of Specimens: Physical and Mechanical Properties

Different tests such as water absorption, linear shrinkage, bending strength (MOR), and microstructural characteristics (SEM) have been done on the ceramic specimens. In order to measure the water absorption, the Archimedes method has been used in accordance with ASTM C-373/94 standards [23]. The linear shrinkage was determined by the difference in the length of the shrinkage line on the test bar before and after firing with standard ASTM C210/95 [24]. Additionally, the mechanical strength (MOR) of the sintered specimens has been tested by means of a universal testing machine (PK 1000) in three-point bending tests in both immersed and nonimmersed states according to specification ASTM C-773/88 [25]. In order to carry out the scanning electron microscope test on the specimens to investigate the phases generated after the sintering process, Hitachi S-2500, at 20 kV has been used.

3 Result and Discussion

The study of physical and mechanical changes in the ultimate body was the primary concern of the majority of the ceramic projects that had been done on ceramic body composition [26]. With regard to this, the microstructure of ceramic (SEM) and other ceramic characteristics such as mechanical strength (MOR), dried and fired shrinkage, and water absorption have been assessed on the modified bodies by addition of both wastes [27–30]. During thermal treatment, changes in sample

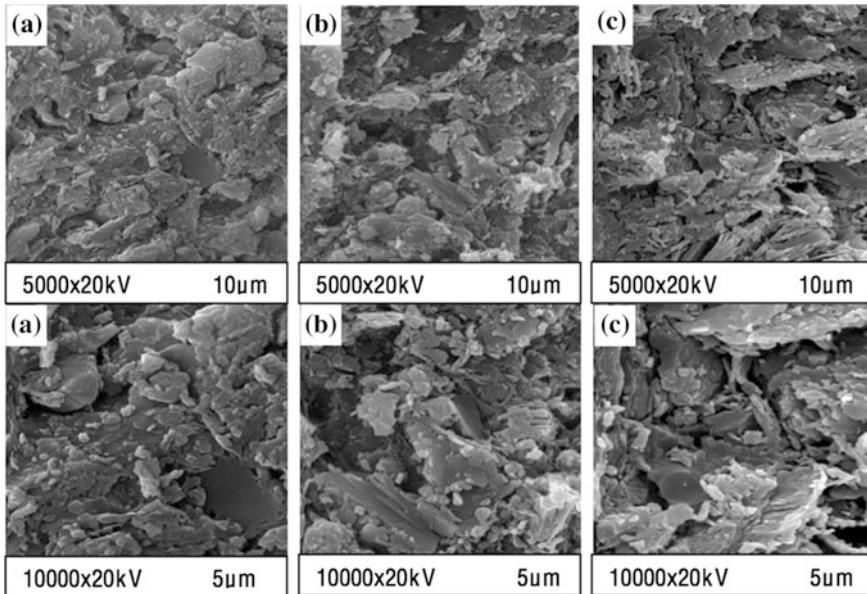


Fig. 1 SEM images of stoneware (a) (0 %), modified stoneware by (b) (10 % of PO) and (c) (10 % of CL)

dimensions were not significant. There was no sign of defect and failure such as cracks on the test bars during and after drying and firing steps. A series of 10 samples have been utilized on each test. The average results and findings of the tests are presented and discussed in this section. Figure 1 and Tables 3 and 4 illustrate the findings on modified body assessment after addition of both wastes in different shares.

3.1 Shrinkage

The shrinkage of the samples has been measured for dried and fired states. In order to carry out the shrinkage test, 100 mm of the shrinkage line has been marked out on the samples [31]. As shown in Tables 3 and 4, shrinkage in both the dried and fired states remained steady by addition of more CL as the same reaction is visible in the dried state by addition of PO. On the other hand, after firing at 1000 °C, the modified body has shrunk from 6.3 to 7.8 % after addition of PO. The shrinkage results are derived from the densification of the samples. A high amount of fluxing oxides such as Na_2O and K_2O in the PO addition system may promote the formation of glassy phases that fill in the pores, which result in shrinkage gain during firing. Moreover, results stand that the combination of a higher amount of the PO waste raises the shrinkage of the stoneware.

Table 3 Average results on properties of modified stoneware by palm oil sludge

Sample no.	CL (wt%)	800 °C				1000 °C					
		Water absorption (%)		Shrinkage (%)		MOR (N/mm ²)		Water absorption (%)			
		Dried	Fired	Dried	Fired	imm	Non-i	Dried	Fired		
LP1	0	9.2	2.8	2.0	2.8	37.63	33.48	2.7	6.7	132.27	137.91
LP2	5	8.9	3.0	2.0	3.0	34.10	33.72	2.4	6.8	155.14	179.87
LP3	10	9	3.2	2.2	3.2	22.55	23.63	2.4	7.0	96.80	120.04
LP4	15	8.8	2.6	1.9	2.6	27.01	29.69	2.9	7.2	96.93	99.33
LP5	20	9.1	3.1	2.4	3.1	25.18	25.21	3	6.3	87.98	113.51

Table 4 Average results on properties of modified stoneware by camera lens polishing

Sample no.	PO (wt%)	800 °C				1000 °C					
		Water absorption (%)		Shrinkage (%)		MOR (N/mm ²)		Water absorption (%)			
		Dried	Fired	Dried	Fired	imm	Non-i	Dried	Fired		
PO1	0	6.9	3.5	2.4	3.5	37.02	47.84	4.3	6.3	114.48	159.33
PO2	5	8.6	3.6	2.4	3.6	31.14	35.80	0.6	7.1	100.23	109.48
PO3	10	9.6	3.2	2.2	3.2	28.79	36.50	0.1	7.3	116.46	166.76
PO4	15	9.7	2.9	1.9	2.9	32.17	29.24	1.9	7.2	81.28	116.12
PO5	20	9.5	3.9	2.7	3.9	33.81	35.03	1.2	7.8	86.76	116.96

3.2 Mechanical Strength (MOR)

In this experiment, the three-point bent test apparatus has been used in order to measure the strength of the samples at room temperature in immersed and non-immersed states. The distance between lower tension rods was 80 mm with cross-head speed of 0.1 cm/min. As shown in Table 4, there was a decrement in body mechanical strength in both immersed and nonimmersed states after addition of CL at 800 °C. On the other hand, after addition of 5 wt% of the sludge and firing at 1000 °C, an increment of mechanical strength occurred as it reached 155.14 N/mm² in the immersed state and 179.87 N/mm² in the nonimmersed state. According to the mechanical strength findings of the modified body by PO, it is clear that after firing at 800 °C, there was a drop in strength of the body. Moreover, after 1000 °C firing temperature, by addition of 10 wt% of sludge in the immersed state, the strength increased from 114.48 N/mm² of the control group to 116.46 N/mm² and from 159.33 N/mm² to 166.76 N/mm² in the nonimmersed state (Table 3). Material composition, dimension, and morphology of the flaws are the factors that affect the flexural strength. The mechanical behavior of the specimens can be assessed with respect to different microstructure development during firing [32, 33]. The bending strength increases with the firing temperature and is related to the porosity and water absorption level of the material. The material in the pores between the ceramic granules of the material is also responsible for the increase in the mechanical behavior of the samples [34, 35]. The samples containing both waste materials had the highest water absorption that resulted in lower mechanical strength.

3.3 Water Absorption

Fired samples were boiled in water for 2 h in order to investigate the water absorption [36]. With regard to the results gathered in Tables 3 and 4, it can be seen that by addition of CL at both firing temperatures, water absorption remained steady even by addition of more sludge. Additionally, water absorption rose drastically to 9.7 % by addition of 15 wt% of PO at 800 °C firing temperature although there was a sharp drop at 1000 °C by addition of more waste.

By application of 10 wt% of PO, water absorption remained under 1 %. The water absorption values depend on the volume fraction of open pores. The amorphous silica with sintering temperature exemplified that this phase acts as a binder in the space between the granules of the material that is the justification for decrement in water absorption [37]. In accordance with results from the water absorption assessment, it can be observed that water absorption decreased significantly by addition of PO when the temperature during the treatment was greater than 800 °C after the formation of the amorphous phase. The presence of

amorphous silica depicts the result of this work with regard to the firing temperature and also proves that added sludge displaces the silica content of the samples [38].

3.4 *Scanning Electron Microscope (SEM)*

In order to carry out the SEM test, the fresh fracture of the modified stoneware by both sludges has been sputter-coated with platinum by using an Hitachi S-2500 instrument. The final SEM imaging was taken at high-vacuum conditions with secondary electron imaging using a high-acceleration voltage of 20 kV and a working distance of 5 and 10 μm [39, 40] (see Fig. 1). The grey background of images represents mainly the glassy phase and white areas were identified as mullite and the dark zones depicted the phases with iron and aluminum. It is noteworthy that mullite is a phase that is obtained by heat treatment of kaolinite, which is a main part of clay. Nevertheless, the promotion of the glassy phase in products as a result of application of both wastes provides higher performances than those obtained originally from the pure stoneware [41].

4 Comparison

With regard to the achieved result, camera lens polishing and palm oil sludge have significant potential to be reused as contributory raw material, in particular in ceramic products, where their raw material is ordinary raw material. Concerning water absorption, modified stoneware by PO shows the highest rate of 9.5 % by addition of 20 wt% of sludge at 800 °C although addition of PO in stoneware decreased the water absorption rate to 0.6 and 0.1 % by addition of 5 and 10 wt%, respectively, at 1000 °C. However, addition of CL to the stoneware had negligible changes on water absorption at both firing temperatures. In terms of dried and fired shrinkage of the modified body, by application of CL, the shrinkage rose in both dried and fired states after addition of 20 wt% of sludge to 6.3 % after firing at 1000 °C, however, by addition of PO, the modified body shrinkage increased dramatically by addition of the same amount at the same temperature. The mechanical strength of the modified body by both wastes was dropped after firing at 800 °C (see Fig. 2). Moreover, after firing of the modified body at 1000 °C, the mechanical strength increased sharply by addition of 5 wt% of CL and 10 wt% of PO. In accordance with the modified body characteristics after addition of both sludges, it is obvious that it is capable to be used in different ceramic production processes such as tableware, sculpture, ceramic filters, and bricks based on the specific characteristic required for each production [42, 43]. In conjunction with the success of this investigation, aesthetic design issues discussed that were limited by material were able to be resolved [44, 45].

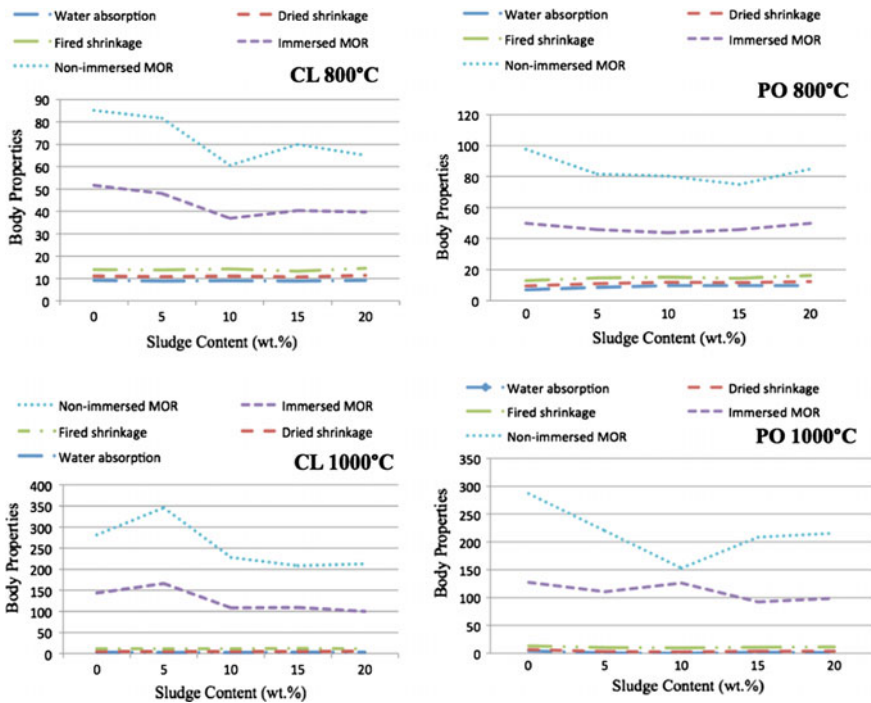


Fig. 2 Physical and mechanical properties of modified stoneware by CL and PO in different ratios at 800 and 1000 °C

5 Conclusion

By a glance at the obtained results, it can be concluded that both conformation processes induce a final product with appropriate quality. According to the findings of the experiments, the modified stoneware by addition of both sludges has a great range of applications and is highly competitive with the majority of traditional and conventional ceramics that are currently being utilized in the market. Based on the physical and mineralogical assessment of the ultimate product, camera lens polishing and palm oil waste are recommended as auxiliary agents in ceramic production. Application of these wastes could have practical implications as a means of recycling and cost savings.

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Strength of Modified Stoneware Body for Extrusion of Ceramic Vent Design

Mohd Fadhi Yakub, Oskar Hasdinor Hassan, Verly Veto Vermol and Rasmadiyah Anwar

Abstract Fabrication is the crucial phase for ceramicists or manufacturing. The objective of this study was to create the vent block incorporated with extrusion or an extruding technique and identify the suitable properties via extruding techniques. The technique for fabricating the vent blocks is influenced by the strength of the fired modified stoneware body. Typical strength testing was performed using the modulus of rupture (MOR) method. The final strength of about more 100 kg/mm² was obtained for samples fired at 1200 °C.

Keywords Fabricating · Extruding · Vents block

1 Introduction

The vent block is known as the ventilation block [1]. The function of this ventilation block is to exchange outside and inside air circulation. The basic theory of the circulation is called the exfiltration and infiltration process. By implementing this vent block it will generate the force of natural ventilation. The vent block is also known as the “*Lubang Angin*” in a Malay house. The materials used for the *Lubang Angin* are basically made of wood and influence Malayan motifs [2]. This is the

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argument circulating among local designers on how far that toleration is allowed in terms of the *Lubang Angin* of Malayan motifs using materials other than wood [3, 4].

The extruder or extrusion is the machine that presses the object creating the shape. According to the Oxford Dictionary [5], the extruder or extrusion is thrust and force out. The objects are forcing, thrusting out, and forming the shape that is wanted. Extruder also is the push [6]. The function of the extruder is to develop sufficient pressure in the material through the die [6]. This will be more efficient during the making of clay. There are many types of extrusion or extruder such as hot extrusion, cold extrusion, and warm extrusion. According to Ref. [6] there are three types of extruder machines, the single screw extruder, twin-screw extruder, and ram extruder. In ceramics the extrusion is the machine that extrudes the clay with different shapes and can create various shapes.

2 Methodology

2.1 Study of Extruding Machines

This stage studies the characteristics of the die and extruder. From the previous study the extruders are the machines that have been used for creating the actual scales of shape and the different materials used to extrude. According to ASM International (American Society Metals), “Extrusion is a plastic deformation process in which a block of metal (billet) is forced to flow by compression through the die opening of a smaller cross-sectional area than that of the original billet.” This extrusion forces any material that can be used for plastic, metals, clay, and food. For the actual study, Fig. 1 shows the cross-section of the process mini-extruder. This figure shows that the clay is forced out and these processes clearly show on the

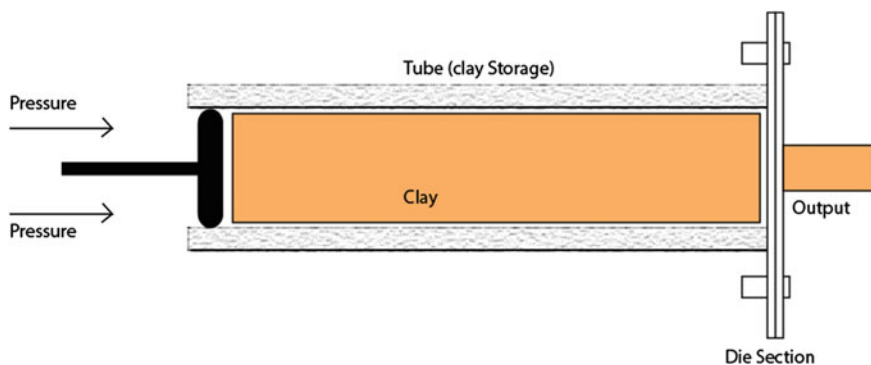


Fig. 1 Cross-section of extruder in ceramic department studio

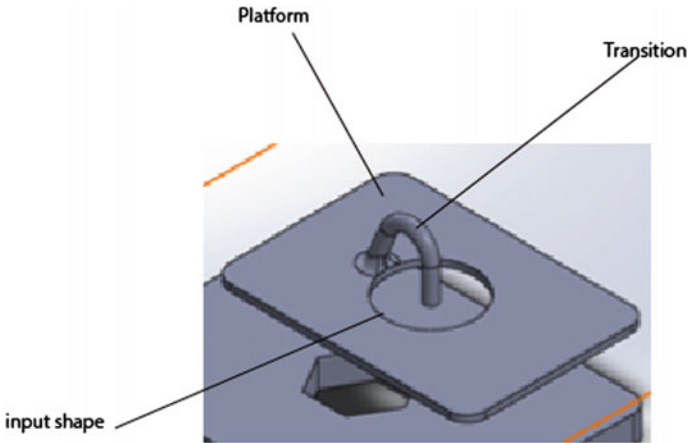


Fig. 2 Components of the die

actual process of the mini-extruder. Figure 2 shows the design of the current die, which is divided into two designs: the hollow die and the solid die. The differences of these two dies are that the output of the first die is hollow and the second output is the solid output [7].

Die is one of the extruding machine components [8]. The die design has more influence on the output of the clay. The effect of die design on the output is considerable and is a subject on which generalities can be misleading [9]. The structure of a die is shown in Fig. 2 with the three sections of platform, transition, and input shape. The main function of the transition is to create the hollow shape. The design of the input shape was the most influencing in the end of the output [10] shape during the extruding.

The major problem of this extruding technique is that it is hard to control the clay because the clay can crack [11] and the clay will be short or broken [12] as shown in Fig. 3.

This observation extruded 50 pieces of clay as shown in Fig. 3. Its technical problem was that the die was not sustainable in multiple use because the die was created by single pieces as shown in Fig. 2.

2.2 Clay Properties Study

The characteristic of the clay study is a focus on the plasticity of the clay and the body strength composition [13]. From the extrusion characteristic, suitable plasticity of the clay can be identified during extruding [14]. The study was focused on the stoneware body. The stoneware body composition is shown in Table 1.

Fig. 3 The extrusion of clay bars



Table 1 Composition of Stoneware body

Material stoneware	wt%
Kaolin	40
Ball clay	15
Potash feldspar	30
Silica	15
Calcium carbonate	30

Table 2 Additive contents of modified stoneware body

Stoneware body label	Content of additive in wt%	
	Ball clay	Grog
SB1	15	–
SB2	20	–
SB3	25	–
SG1	–	15
SG2	–	20

The stoneware body was modified into two groups of additives. The additives are ball clay and grog. The stoneware body is denoted S, B for ball clay, and G for grog. Table 2 shows the composition of additive into the stoneware body.

Fig. 4 a Material used for the test. b Mixture of ball clay in stoneware body



The addition of ball clay and grog into the stoneware body is shown in Fig. 4. The addition of ball clay and grog involve weighting, labeling, mixing, and finally extrusion.

2.3 *Firing of the Modified Stoneware Body*

There are two maturing temperatures used in this study. The temperatures are 900 and 1200 °C. Figure 5 shows the firing profiles involving two maturing temperatures.

2.4 *Strength of the Modified Stoneware Body*

The strength of the modified body was performed using the modulus of rupture (MOR) technique as reported in Refs. [15, 16]. There are two body samples that fired at 900 and 1200 °C. Figure 6 shows the MOR setup and the breakage of the test bars from the modified stoneware body.

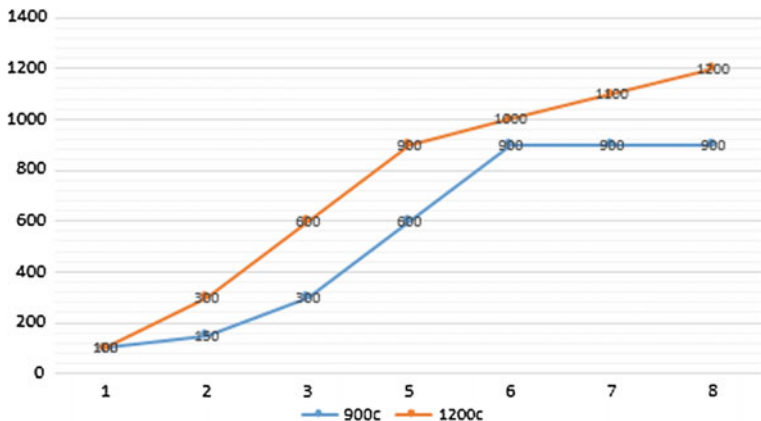


Fig. 5 The firing profile of the modified stoneware body

Fig. 6 a The MOR machine and test bars. b The breakage of test bars for MOR testing



3 Result and Analysis

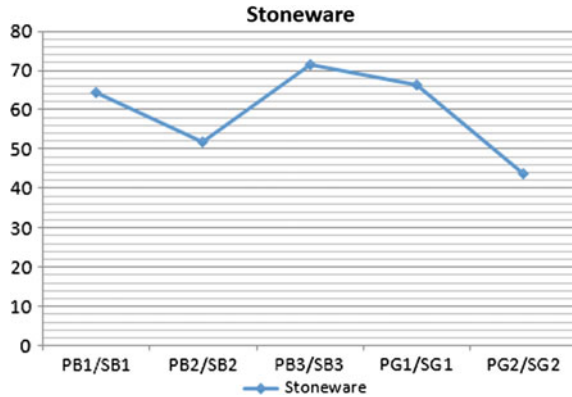
The results of the modified stoneware body strength as fired at 900 °C are shown in Table 3.

Based on the strength (MOR) as shown in Table 3, the strength was observed in term of the ratio of stoneware body, ball clay, and grog contents. The highest

Table 3 Strength of modified stoneware body fired at 900 °C

Batch	Average test bar (b) cm	Average thickness (h) cm	Original line length (L) cm	Force of rupture (F)	MOR (kg/mm ²)
SB1	10.9	1.5	9.6	182	64.27
SB2	10.9	1.5	9.3	151	51.66
SB3	10.6	1.5	9.5	210	71.37
SG1	10.6	1.5	9.3	199	66.20
SG2	10.6	1.5	9.2	133	43.77

Fig. 7 Trend of modified stoneware body fired at 900 °C



strength obtained was 71.37 kg/mm² for sample PB3. The trend of the strength is shown in Fig. 7.

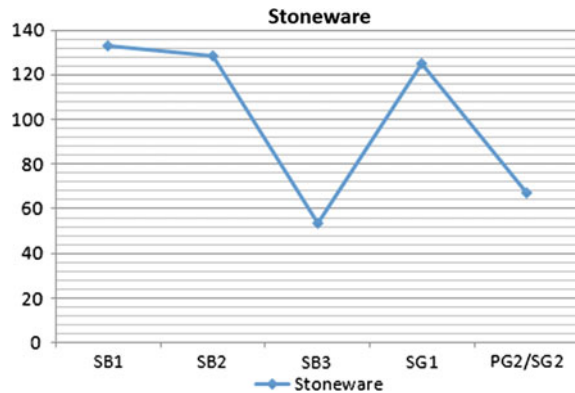
The modified stoneware body strength as fired at 1200 °C is shown in Table 4.

Based on the strength (MOR) as shown in Table 4, the strength was observed in terms of the ratio of stoneware body, ball clay, and grog contents. The highest strength obtained was 132.90 kg/mm² for sample PB1. The trend of the strength is shown in Fig. 8.

Table 4 Strength of modified stoneware body fired at 1200 °C

Batch	Average test bar (b) cm	Average thickness (h) cm	Original line length (L) cm	Force of rupture (F)	MOR (kg/mm ²)
PB1	9.4	1.3	8.3	672	132.90
PB2	9.5	1.3	8.3	642	128.32
PB3	9.5	1.3	8.3	267	53.36
PG1	9.6	1.3	8.3	620	125.23
PG2	9.6	1.3	8.2	337	67.25

Fig. 8 Trend of modified stoneware body fired at 1200 °C



4 Conclusion

From the study conducted above, it can be concluded that the highest strength obtained was for the modified stoneware body fired at 1200 °C for the composition of 15 wt% ball clay added to the stoneware body. The strength (MOR) was 132.90 kg/mm². This finding suggested that the modified stoneware body is suitable for ceramic extrusion for ventilation application.

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Applied Research of Semangat Lita'rafu Entrepreneurship Model: An Empirical Case Study of Rural Residents in Malaysia

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and Rusmadiyah Anwar

Abstract Based on a previous research paper, “A Hypothetical Methodology of Transferring Graduates Knowledge Through Ceramic Art Entrepreneurship,” this chapter discusses results from the case study of rural residents of the Semangat Lita'rafu entrepreneurship model. Through interviews with academics, postgraduates, and rural residents from Jabatan Kebajikan Masyarakat (JKM), UiTM lecturers and students, and rural residents in Sabak Bernam, this chapter uses a semi-structured interview and observation through the entrepreneurship model applied. Multiple-choice questions and open-ended questionnaires were distributed to interview the respondents to get a clue of the nature of the entrepreneur and the characteristics of business problems. The observations were based on a resident group with rural thinking about metaphorical business activities through real-life production activities.

Keywords Entrepreneur · Entrepreneurship model · Lita'rafu

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1 Introduction

The development of skills aligned with application, sharing, and division of creative work is thought by Bridgstock (2012, 2013) to define an art entrepreneur [1]. In Schumpeter's [2] words, entrepreneurship is introducing new combinations.

Semangat Lita'rafu can be defined as introducing something of value to someone. In other words, Lita'rafu means recognizing or educating people [3]. Bibliography and literature by Hans Kochler (2001) mentions that Lita'rafu can be defined as dialogical which means a peaceful jihad or sobriety jihad [4]. Munawar-Rachman [5], in his writing on Islam Pluralis Wacana Kesetaraan Kaum Beriman, 2001 stated that in Al-Quran (Al-Hujurat; 49, paragraph 13) confirmed in a letter that it is very important to build a network and instill tolerance among religions to social that swept the nation. Sugimoto [6], also stated that Lita'rafu means interaction.

Being a useful entrepreneurship model is significant because that shows the foundation of entrepreneurship is the entrepreneur [7]. The entrepreneurship model processes are hypothetically tremendously demanding [3]. In another way, Porter says that it's a foremost challenge to develop a model and theories for researchers back in the 1990s on solid foundations from social science [7].

By definition, Semangat Lita'rafu is the spirit of cooperation, in which a group of people who put themselves, understand each other for a dynamic life.

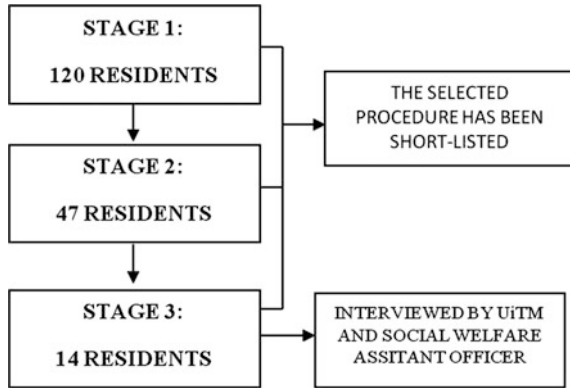
2 Demography Selection

Demography selection is a characterizing of the human population by area of places, education background, and human life style. This study is based on descriptive study and empirical research [8, 9] through entrepreneurial activities.

It seeks answers to questions that were formulated in literature reviews and what is often practiced by graduates in focusing on three elements involved between professional, resident, and rural society, especially the understanding of business practice.

Interviews began with the academics from the Universiti Teknologi MARA (UiTM) and from the collaborating parties, Jabatan Kebajikan Masyarakat (JKM), fresh graduates from industrial ceramics, and selected areas of rural residents. The art entrepreneur model design was created based on discussions between UiTM and JKM about introducing a new concept of business model. Both organizations had to develop their line of work based on their proficiency. As for JKM, there are three stages [3] of selected procedure. As shown in Fig. 1, it started with stage one (1); 120 resident were selected according to the criteria based on that requested by UiTM. In stage two (2), the selected procedure was short-listed to 47 residents and in stage three (3), 47 residents were interviewed by a panel from UiTM and a social

Fig. 1 Three stages of selection procedure



welfare assistant officer and short-listed to 14 residents. Selection participants from UiTM were based on the 0 % knowledge of skills and were mentally and spiritually prepared to improve and extend their financial income. The selected participants also represented 1 participant in a family for their suitable time management. UiTM also want to establish cooperation with the parties involved who were appropriate to the locality areas with land area, adjacent to a residential area, and the location for participant classes.

Sabak Bernam is a suitable area of entrepreneurship because many areas of SME industry are conducted in there. The other factor is related to land area. Paddy with lowlands certainly have clay and other alternatives to find clay areas with water sources such as rivers.

Boarded by the state of Perak to north, Hulu Selangor, the population of Sabak Bernam is 106,158 with 1056 km², a huge area with interconnected clusters in a populated area whereby the potential to get clay from lowlands is very convenient [10].

After interviewing, it can be concluding that most of the rural population are housewives and the self-employed in addition to expecting the fund from JKM every month. Most of them are hoping their selection through the programs could generate their income. Also based from those interviewed, they reported that most of the programs that they attend are incomplete with no direction after the program is complete. Rural residents also mention that if the classes are far from their house area, it is difficult for them to participate in the programs.

Rural residents' classes are located in Pusat Aktiviti Warga Emas (PAWE) in Sungai Besar, Sabak Bernam. The project collaboration between UiTM and JKM in the ceramic art entrepreneur project is called Rumah Gemilang [3].

3 Case Examples of Semangat Lita'rafu Entrepreneurship Model

3.1 Business Strategy

Fourteen of the respondents (rural residents) who had been shortlisted after being interviewed were placed in a control group where they were selected on the basis of the criteria. The sample size tended to depend on what was deemed to be required [11–13].

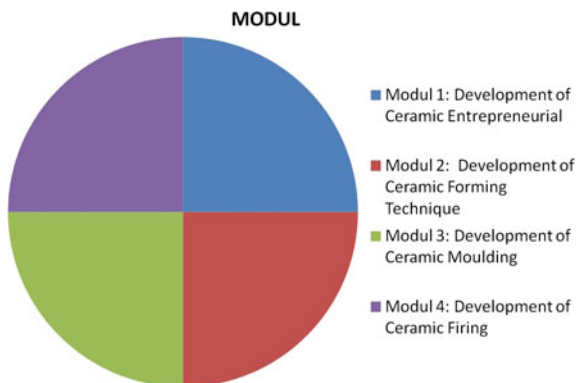
According to the plan that had been set up, rural residents will learn to identify the clay, up to the combustion products. After that, they will produce their own products and become a supplier to graduate entrepreneurs. The entire product will be taken by the graduates and sold to the accurate place.

The interview session occurred before they entered the programs, and after they finished the programs. Observation was done when they were running the activities in the programs. Among the things to observe was transferring the knowledge by following the technique, the creative idea during designing the product [14], and were they enabled to survive until the program was completed.

3.2 Claywork, Plaster Mould, and Firing

The first module can be seen in Fig. 2, the development of ceramic entrepreneurial, rural residents visited Malacca to make them see on their own view of ceramic entrepreneurs and the manufacturing process. Besides that, rural residents attended a ceramic talk presented by the speakers from academia from the ceramic field to expand their scope of ceramics before they began practical study. Rural residents also enjoyed their Latihan Dalam Kumpulan (LDK) which is a grouping team and played sorts of games related to creating a creative and innovative product by using recycled item [15].

Fig. 2 Development module for rural residents



The knowledge transfer began from the second module: development of ceramic forming technique [16] where graduates worked as instructors to educate rural residents. Rural residents were introduced to clay, plaster, and ceramic tools before they learned forming techniques such as hand building and plaster mixture.

In the third module, the instructor (graduates) taught them the development of ceramic moulding starting from siege, plaster mixture, and pouring plaster. In the fourth module, the development of firing process, they were taught to fire the product according to the temperature. Firing temperature for ceramic products reached 900 °C. Glazing technique was added to give them the opportunity to color their own products and fire again.

4 Discussion

4.1 The Academics, Graduates, and the Locality Area

In an overall view of the academics, graduates, and the location, all parties needed to know their responsibilities to accomplish the programs. Becoming an entrepreneur is a fundamental of a business plan and needs a continuous planning process [11].

The organization parties, JKM expertise was in finding a rural resident as a trainer and finding a location for the programs with the criteria required by the UiTM. UiTM's field of expertise was finding the instructors who were experts in the field of ceramics to educate the rural residents. As for graduates, their responsibilities were how they wanted to distribute the knowledge transfer process to the trainer. In addition, it can be seen that the graduates were given the opportunity to work in their own field based on collaboration with the UiTM and JKM parties.

4.2 Six Subject Matter Experts (Academics)

Academics from six members of subject matter experts [17] consisted of lecturers from the Faculty of Art and Design. They had extensive knowledge that related to their field of work, ceramics, and had expertise in studying soil types, suitability for kiln construction, and in marketing studies.

The academics searched a fund from Kementerian Pendidikan Malaysia and provided utilities for the Rumah Gemilang programs. Besides that, they searched for graduates capable of being instructors for rural residents and finding a suitability location for the programs.

4.3 One Respondent (Department of Welfare)

JKM is an organization that collaborated with UiTM. Their department provided protection and security for the target groups, developing the community through behavioral changes and increased capacity for self-reliance; improved the social welfare through social welfare services and professional development and strategic sharing of responsibilities.

From this program, JKM selected respondents who met the criteria required by UiTM. In collaborating with UiTM, what they expected from this program was the capability to make the rural residents compete among themselves and be able to raise their value of self and motivation. JKM also hoped that through this program, they can increase their household income. Based on those interviewed, they also revealed that this program was compatible with the requirements of the local social.

4.4 Five Graduates (Entrepreneur)

Entrepreneur graduates were selected from ceramic industrial. Their task in these programs was to become an instructor or mentor for the trainees. The selection procedure for graduates was directly from UiTM by an interviewing session. Graduates who had been shortlisted were up to five people. Criteria required from them were that they needed to have their first degree, have a registered company, the owner of ceramic industry, and they were established less than two years.

4.5 Fourteen Respondents (Rural Residents)

Fourteen respondents (rural residents) were selected and the selection was very selective in order to minimize the variables [15, 17]. The respondents were in a control group and they were selected on the basis of criteria such as low-income earners, majority of their education background was secondary school, most of them did not have a stable income, and their daily living was supported by the JKM fund. Besides that, all respondents lived in Sabak Bernam district area.

Based on these observations, majorities were interested to commit to the programs because their products would taken by graduates to put up for sale in an accurate marketplace. According to them, most of the programs that they attended, after the programs ended, they did not know where to sell the product because none of people from the programs could be asked [18].

The second reason: they preferred to complete the product from the existing mould. This simplified the process of their manufacture because working with the mould does not take a long time to be out from the mould and the product was produced quickly and widely [19].

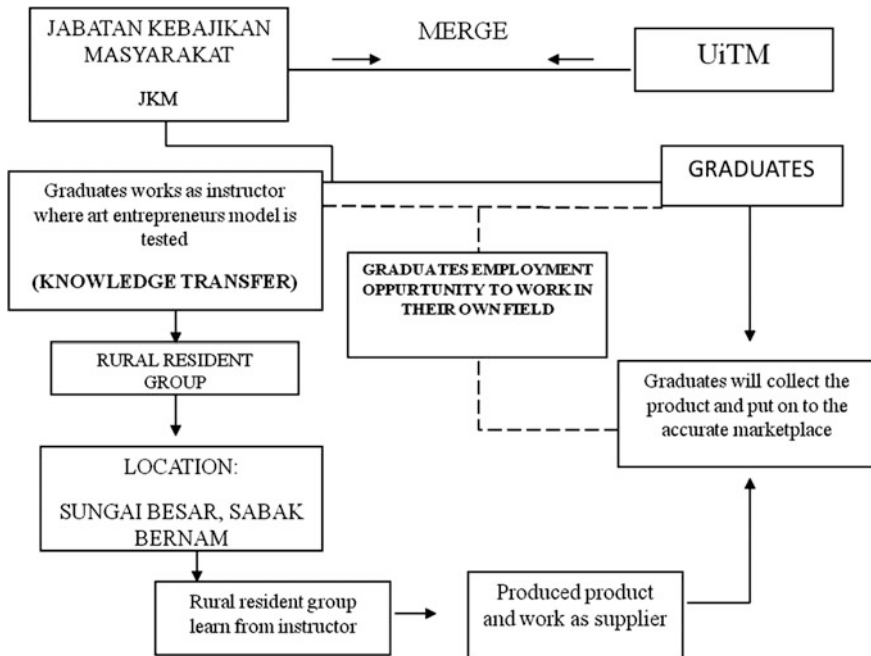


Fig. 3 Framework based on collaboration

And the third: they were interested to do the product because the graduates would make [20] the mould for them. When the programs were complete, graduates would give them a variety of mould designs. They could just work on it without creating or thinking the idea of the product because they knew the graduates gave the best design for them. It can be concluded that the rural residents could transform the clay to become ceramic products and the entrepreneurship model was successful because the graduates had to be in their place where they should be in terms of Semangat Lita'rafu [3] by transferring their knowledge to them as shown in Fig. 3.

5 Conclusion

As a conclusion, to improve the socioeconomic outlook, it must be viewed from few aspects such as selection through interviewing a rural resident's mental and spiritual preparation, involvement from the expert, suitable locality, project management, and the role of involvement, financial, and the support before and after the program.

As a recommendation, this achievement can be used in other local areas in Malaysia.

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Ablution Tap Design: A Solution for Water Consumption

Nor Haliza Johari, Rusmadiyah Anwar
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Abstract Ablution is a washing procedure that involves all Muslims before they get closer to God (Allah). Ablution has become synonymous with water consumption; in order to store and dispense water the Muslims have introduced the station to perform the ablution ritual. The practice of ablution has led to a variety of architectural ablution stations from basic to high technology designs that have been developed. However, based on the previous research, the variation designs of the ablution tap are much more challenging in their design because there are no design guidelines that help designers provide users with safe and comfortable ablution spaces. The ablution tap design will influence waste water consumption in performing the ablution ritual where too much water has been consumed while performing the ablution ritual. As a conclusion, we propose a tool or control system on the ablution tap design as a guideline to the ablution tap and to control water consumption, in order to minimize the usage of water consumption while performing the ablution ritual.

Keywords Ablution ritual · Water · Ablution tap · Design

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1 Introduction

In the context of Islam, the ablution ritual is known as a spiritual washing to cleanse oneself from small impurities. The ablution ritual involves all Muslims before they get closer to God (Allah) to perform prayer [1]. Besides, the ablution ritual is a method of washing specific body parts and it has a specific procedure while performing the ritual, where it starts by washing of the face, hands, forehead, and both feet [2–4].

Water has become synonymous with the ablution ritual, because in term of language, ablution is an act of water consumption to cleanse oneself from a small impurity before performing the prayer. Because the ablution involves water consumption, in order to store and dispense water the Muslims have introduced the ablution station to perform the ablution ritual. Based on research, the practice of ablution has led to a variety of architectural ablution stations since the fourteenth century and it has many variations of design concepts as built at the mosque from low to high technology design that have been developed until today [5–7]. Figure 1 shows an example variation of the ablution tap design concept.



Fig. 1 Variation of the ablution tap design concept

Besides, this research examines the impact of ablution tap design (ablution station) towards water consumption while performing the ablution ritual and a solution for excessive water consumption in performing the ablution ritual.

2 Problem Statement

Based on previous research and observation, the existing designs of the ablution tap in the mosque currently were designed without accommodating the principle of ablution [x]. According to Mokhtar research, ablution stations are much more challenging in their design because many designers may not be familiar with the ablution tap design especially the design of ablution taps or water faucets and there are no design guidelines that help designers provide users with safe and comfortable ablution spaces. Unfortunately, as an expected result of such a design environment, there are some well-designed ablution spaces, but there are many more badly designed ones. The bad designs not only cause discomfort in using the space, but can also constitute a safety hazard [8, 9].

From the fact, ablution taps design will affect water consumption while performing the ablution ritual. Based on previous research it indicates too much water consumption during the ablution ritual, where the typical average of water consumption while performing the ablution ritual required about 6–9 L of water [10]. However, about half to 2 L of water is enough to complete the whole ablution ritual, and it is more explicit when it has a sahih hadith as was mentioned that Prophet Muhammad PBUH performed the ablution ritual with one mudd of water (equal to 2/3 L) and he used to wash himself before prayer using less than one litre of water and bathe with less than 3.5 L of water [11–15].

3 Research Methodology

This research is commenced to capture information on knowledge and understanding of consumers with regard to the ablution tap design and to analyse the impact of water consumption towards the existing designs of ablution taps [16]. Based on a survey at Masjid Sultan Salahuddin Abdul Aziz (MSSAASS) Shah Alam Selangor has conducted it to observe the effectiveness of the existing design of ablution taps when the consumer performs the ablution ritual. In other, the research method used for this study was through the distribution of survey questionnaires to 100 respondents. The questionnaire covers several aspects to capture the understanding of respondents towards the ablution station design and water consumption towards the existing design of ablution tap.

4 Result and Discussion

Results of the findings were obtained based on several statistical analyses by the Statistical Package for Social Sciences (SPSS). The data were analysed to identify, describe, and explore the perception of knowledge and understanding by respondents regarding the design of ablution taps and water consumption towards the existing design of ablution taps. Based on the result of the finding on the design of ablution taps, it indicated the majority of respondents agreed the piping system is commonly used in performing the ablution ritual compared with other designs of ablution taps (see Table 1).

In conclusion, the piping system is a commonly used water dispenser in performing the ablution ritual. This is because based on the result it shows the piping system has the higher respondents agree compared with the other; about 91 respondents agreed that the piping system is commonly used in performing the ablution ritual.

Additionally, although the piping system is a common design used during the ablution ritual, the most chosen comfortable position during the ablution ritual is the bending position (see Table 2).

Based on Table 2, when the bending position is compared with other positions it shows that the bending position has been chosen by most respondents. As a conclusion the bending position as a comfortable position while performing the ablution, although the number of respondents who agreed with bending as a comfortable position is less than the number of respondents who did not agree. However, when bending position is compared with other positions, it shows that the bending position has the higher number of respondents who did agree the bending position is a type of comfortable position while performing the ablution ritual.

Moreover, based on the result of findings on water consumption towards the existing design of the ablution tap, it indicates a majority of respondents agreed that water consumption during the ablution ritual needs to be controlled and the existing

Table 1 Type of ablution tap design

		Sink	Piping	Tank/pool	River
Valid	Yes	16	91	24	3
	No	84	9	76	97
	Total	100	100	100	100

Table 2 Type of comfortable position while performing ablution ritual

		Sitting	Hanker	Standing	Bending
Valid	Yes	39	20	29	41
	No	61	80	71	59
	Total	100	100	100	100

Table 3 Water consumption towards existing design of ablution needed to be controlled with control system

		Frequency	Percent	Valid percent	Cumulative percent
Valid	Yes	89	89.0	89.0	89.0
	No	11	11.0	11.0	100.0
	Total	100	100.0	100.0	

design of the ablution tap needs a control system for the user in performing the ritual; the details are shown in Table 3.

It indicates the majority of respondents agreed the design of ablution stations needs a control system for the user in performing the ritual and this is equivalent to 89 respondents who answered yes (see Table 3). This is because while performing the ablution ritual conserving water is challenging due to human behavior, where the behavior of humans is something that comes naturally and is uncontrolled action [17]. Consequently, the existing design of the ablution tap in conserving water

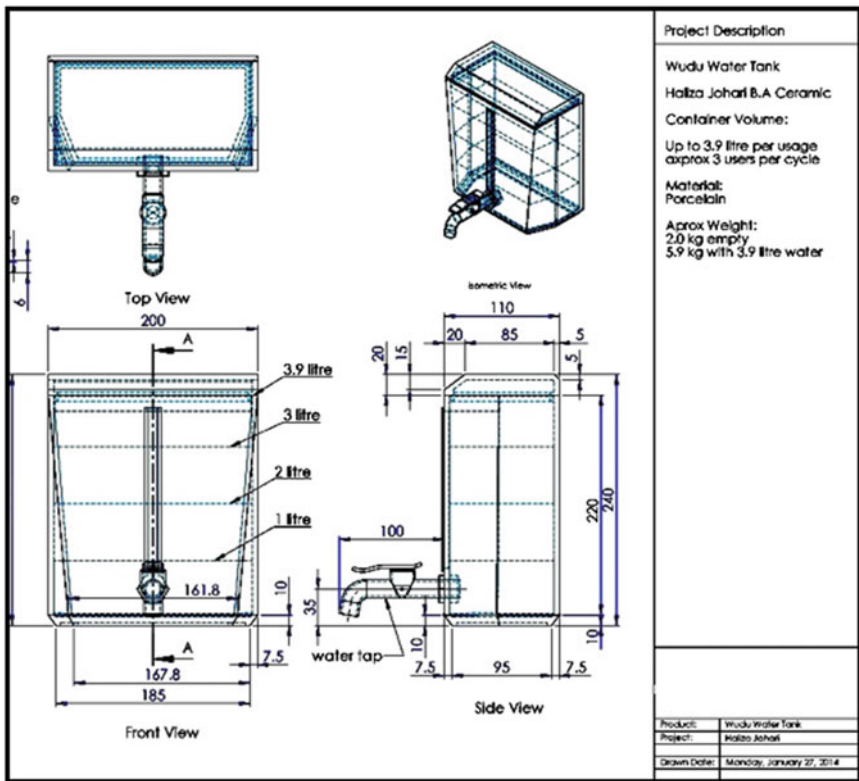


Fig. 2 Technical drawing of the product design

while performing the ablution ritual needs a control system to control behavior while performing the ablution ritual and the ablution system will be able to control their habit while conserving water [18–21].

5 Conclusion and Recommendations

Based on results and discussion findings, it can be concluded that the existing design of the ablution tap on bending concept design is a comfortable position when performing the ablution ritual and the existing design of ablution tap design needs a control system to control wasteful water consumption while the user performs the ablution ritual.

Based on the problem explained [22] and results and discussion findings, this research proposing a product design as a guideline or control system on the ablution tap design to control water consumption while performing the ablution ritual also

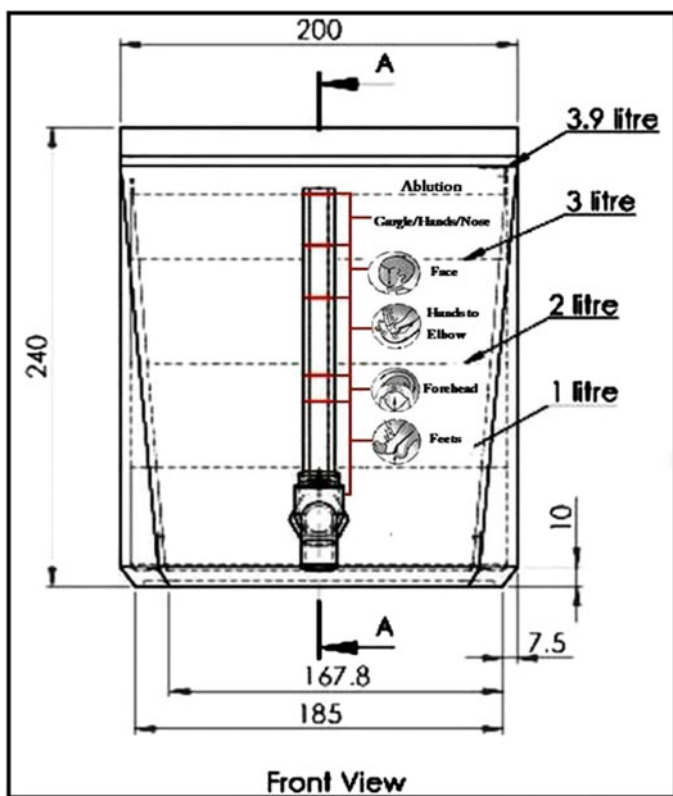


Fig. 3 Detailed measurement area in the product design

has the opportunity to minimize the usage of water. The design of the product will propose an ablution station that will feature a designated 3.9-L water capacity tank complemented with a piping system. The detailed size of the product designs is shown in Fig. 2.

In addition, the proposed design of the product will have a specific measurement area for individuals to view the capacity of water level when washing each part of compulsory bodies of the ablution ritual, therefore, it will minimize usage of water. The details of the measurement area in the product design as shown in Fig. 3.

Furthermore, the design of the proposed product will have to attach to the bench on ablution, since the result [22] and discussion finding it indicate the bending position is a comfortable design. Based on the design structure and measurement of the bending design on the ablution tap it required the user to bend the knees or back and as a result the product prefers to attach at the bench. This proposed work can be a design guideline for future work of industrial ceramic design [23, 24].

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Application of Low-Temperature Transparent Glaze in Sustaining Luminous Grains for Ceramic Artwork Surface Treatment

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Abstract Ceramics, as a medium in artwork execution with significant esthetic value always attempted to discover a novel method or investigation in order to enhance these valuable artworks. In this study, we attempted to explore the possibility of luminous glaze to be applied as a third layer decoration on a glazed surface for ceramic artwork. Literally, the application of luminous glaze as a treatment toward a ceramic surface is determined by the underglaze technique of the glaze application itself. The goal of this study was to match the luminous glaze effect with glazed ceramic artwork as a third decoration to enhance the esthetic value of the artwork. This study was done where glazed ceramic artwork was applied with luminous glaze using an underglaze technique with low temperature as a binder. Then, the artwork indicated to sinter in an electrical kiln at 800 °C for 6 h in a mild oxidation atmosphere. Noteworthy between the application technique of glaze (on glaze stage) and sintering temperature (800 °C) intended to determine a low-temperature luminous glaze proved by sustaining luminous grains. As a result the underglaze technique in the glaze stage is the best technique for applying the luminous glaze on glazed artwork as a third decoration. It sustained the glow of luminous grains $\text{SrAl}_2\text{O}_4:\text{Eu}^{2+}, \text{Dy}^{3+}$.

Keywords Artwork · Luminous glaze · Underglaze technique

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1 Introduction

The exploratory approach with material can often involve an experimental, design-by-practice approach, where the artist explores the nuance and idiosyncrasies of the material in order to approach a body or surface of artwork that challenges what we know to be true. The artwork explores the nature or characteristic of the material itself [1]. We explore the possibilities of enhancing the esthetic value of ceramics artwork with techniques used at the decorating stage through glazing and even postfiring methods. The final piece of ceramic artwork possibly needs a value added in order to achieve the philosophy or an issue behind it. In this study both materials, transparent glaze and luminous grain, are compounded to be matured at low temperature as early as 800 °C of sintering process. Therefore, this study embarked on an experimental approach to the application of glazing technique on glazed ceramic artwork as a third ceramic decoration. The ceramic product, artwork, or surface can be decorated in several stages and techniques [2]. In this context of study, the stages are commonly known as in glaze and on glaze. The in glaze stage is where the pattern or the surface decoration has been done after the bisque sintering but before the glazing process. An example of the in glaze technique is the stencil technique using engobe (clay in form of liquid) to draw some pattern on the product or artwork. This kind of decoration technique is usually applied on tableware products. The other stage of decoration that can be applied is the on glaze stage. The on glaze stage means the decorations are done on the glazed surface or in the other words is after the glaze sintering process, for example, by the using of decal (ceramic pattern sticker) or readymade on the glaze mixture. However, this kind of decoration technique at this stage required a third sintering in a low-temperature atmosphere, probably at 750–800 °C to make the pattern long lasting. Therefore it is called third decoration in ceramics [3].

Currently, long-lasting phosphorescence has attracted much attention and interest in an assortment of applications and in this context of study it is such as pigments, arts, and craft. Several attempts were initially used for the luminescence synthesis route, such as conventional solid-state reaction, sol-gel method, combustion, and microwave heating synthesis. Typically, the synthesis process will be more complex to obtain a good phosphor that consists of high intensity and long persistence glowing properties in an efficient, cheap, and simple way. The solid-state reaction process has been extensively used for phosphor synthesis [4].

Nevertheless this process often results in poor homogeneity leading to high calcination temperature, irregular morphology, and long calcination period. It has been reported that strontium aluminate phosphors were generally prepared at high temperatures (1400–1600 °C) for developing a well-crystallized structure [5].

The artwork is made of soil. The soil used is typically white, black, buff, and yellow in color. The soil can be categorized as stoneware, earthenware, and porcelain. The stoneware and earthenware body can be categorized as a low-temperature body which has a sintering temperature of 1000–1180 °C [6, 7].

The current situation of artwork making in Malaysia is changing based on trend and influence from advanced materials and technology. The changing began at the phase where the artist and designer manipulated the method, material, and style in making the artwork. Therefore, mixed material became a trend among artists and designers [8]. The trend of artwork making involved interdisciplines and mixed materials, for instance in manufacturing and art work production where ceramic advanced materials or additive material, for example, marble dust waste and industrial sludge or palm oil sludge give advantages in term of strength and character of the ceramic material. Marble dust waste is incorporated with stoneware slip to enhance the strength of the sanitary ware cast product [9]. The palm oil sludge adds to the ceramic body; the stoneware body thus improved the ceramic artwork in terms of weight. The addition of palm oil sludge resulted in the porosity of the stoneware body thus the artwork became light [10]. This kind of approach purposely solved issues or problems.

The main goal of this work is to determine the best technique in applying the low-temperature transparent glaze in sustaining luminous grains for ceramic artwork. Moreover it sustained the luminous grains' glow as a decoration technique for ceramic artwork using low-temperature glaze. Therefore, it will enhance the esthetic value of ceramic artworks as solving the issues or the philosophy behind the artworks, which can be called the third decoration in ceramic.

1.1 Flux

In ceramics, to support the glaze-forming process, the addition of a flux can help to lower the melting point of the body or glaze. In particular they affect the melting point of silica (SiO_2), which melts to form a glassy phase during the sintering process, which bonds the ceramic body or forms the basis of a glaze [11].

1.2 Luminescence ($\text{SrAl}_2\text{O}_4:\text{Eu}^{2+}, \text{Dy}^{3+}$)

Luminescence is the emission of light by a substance not resulting from heat; it is thus a form of cold body radiation. It can be caused by chemical reactions, electrical energy, subatomic motions, or stress on a crystal [4]. In ceramic material, photoluminescence is the type which occurs by a ceramic chemical reaction. As discovered by Nor Nazida et al. [5] green phosphor $\text{SrAl}_2\text{O}_4:\text{Eu}^{2+}, \text{Dy}^{3+}$ with improved properties was successfully synthesized by a solid-state reaction and the optimum sintering temperature was greatly reduced to 1250 °C. In this study, the glazed artwork was used in order to enhance the esthetic value of the artwork. Therefore, the luminous grains require being banded in low-temperature glaze.

Table 1 Glaze composition

Material	Borax acid	Potash feldspar	Kaolin
Composition (wt%)	80 %	10 %	10 %

2 Experiment

2.1 Material

The standard conventional method is mostly used for the preparation of low-temperature glaze. As shown in Table 1 low-temperature glaze was prepared by a standard glaze mixing approach using 80 % borax acid (H_3BO_3), potash feldspar ($Al_2O_3 \cdot 2SiO_2 \cdot 2H_2O$), and kaolin ($K_2O \cdot Al_2O_3 \cdot 6SiO_2$) 10 % each as materials which indicated 800 °C in an oxidation atmosphere. The raw powders were mixed with water to a specific consistency.

The low-temperature luminous grains $SrAl_2O_4:Eu^{2+}, Dy^{3+}$ are synthesized by the ceramic base material where europium oxide (Eu_2O_3) and dysprosium oxide (Dy_2O_3) act as activator and coactivator of the substance [5].

The experiment on glaze mixture (low-temperature transparent and luminous grains $SrAl_2O_4:Eu^{2+}, Dy^{3+}$) have been tested in three methods in glaze application: on glaze, under glaze, and in glaze [2]. The artwork base or clay is the same as samples during testing where stoneware clay as body or base was used. Afterwards, the low-temperature transparent glaze and luminous grains were applied with the under glaze method.

2.2 Method

First, the glaze mixture dry milling was used for 20 min, and then an amount of water was added to the specific consistency. The mixing was not fully dissolved because of the borax acid contained in the mixture. Due to the high concentration of mixing, a plastic spatula was used to apply the glaze mixture on artwork then was indicated by glaze sintering at 800 °C for 6 h in a mild oxidation atmosphere.

In order to determine the performance of the low-temperature glaze in sustaining the luminous grains' glow, the tests were carried out by only using transparent glaze.

3 Result and Discussion

3.1 Experiment

After the experiment was done, the glaze mixture successfully sustained the luminous grains' glow. The results showed that the glaze composition as shown in

Table 1 successfully sustained the luminous grains of $\text{SrAl}_2\text{O}_4:\text{Eu}^{2+}$, Dy^{3+} on typical stoneware ceramic artwork surfaces.

The results and discussion showed the technique of applying the ceramic base luminescence on ceramic artwork was successfully obtained via the under glazed technique. The success of this innovative technique was extended to its glowing effect on the artwork. Therefore, it is also protecting the luminous decoration so that it lasts longer as the low-temperature transparent glaze becomes a coating of the luminous grains. The artwork surface had shown the precise effect because the luminous powder was mounted in the texture area on the artwork surface.

3.2 Sintering

The firing is significant to ensure the result of glaze maturity and temperature achieved. The core motivation is to determine sustained luminous grains' glow after firing. The temperature of 800 °C has to be maintained 30 min for the soaking stage. The purpose of the soaking stage at this temperature is to equalize the heat to the whole furnace.

4 Conclusion

In wrapping up, the aim and motivation of this study was to revive the appearance and enhance the esthetic value of ceramic artwork and was successful. After the experiment was completed, the result and discussion revealed that the study on ceramic artwork surface obtained a successful outcome. The experiment on temperature and glaze composition was capable of fabricating a low-temperature glaze with mature range as low as 800 °C. The glaze composition shown in Table 1 sintered at 800 °C is the best result of the glaze composition for low-temperature transparency. The goal to achieve a low-temperature glaze in order to sustain luminescence substance $\text{SrAl}_2\text{O}_4:\text{Eu}^{2+}$, Dy^{3+} for the purpose of decoration to enhance the esthetic value on glazed ceramic artworks was successfully achieved.

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Design Study of *Walet* Scaffolding Nest

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Abstract Recently the supply and demand for edible bird nests (EBN) in Malaysia was phenomenal. It was believed that the content of the nest is very nutritious. It was identified that the nest was produced by a swiftlet species, *Aerodramus Fuciphagus*. In Malaysia, the swiftlet is called the *Walet* and the EBN was built entirely from threads of its saliva; normally it was collected for the medicine that can cure some diseases. The EBN can only be found in the vicinity of the cave wall that been made up naturally of calcium carbonate. At present, a *Walet* house was used to lure the birds from surrounding areas to come in and build a nest. Thus a consistent production of the nest was introduced and established the modern supply and demand. However, young swiftlets are not able to build the nest as they should. This led to an odd form that reduced its commercial values. Therefore, the swiftlet scaffolding nest was introduced as a guide form to the young swiftlet to build a typical form that would increase its commercial values. In this study, the design of the natural scaffolding nest was explored and it was determined that the scaffolding had to be in the concave form for the ease of the swiftlet's saliva deposition. Finally, the hook was redesigned in order to adapt to the ceramic material's brittleness. The designed hook and installation of the stoneware scaffolding nest in the

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Walet house was successful, easy and fast. The finding of this stoneware scaffolding nest will enhance production of the *Walet* nest hence it will increase the income of the entrepreneur.

Keywords Walet · Edible bird nest · Swiftlet · *Aerodramus fuciphagus* · Stoneware

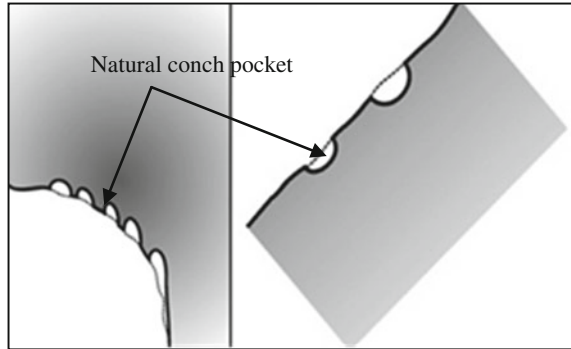
1 Introduction

Nowadays, the edible bird nest (EBN) has emerged as the most popular and expensive animal product consumed by people. The sales of EBN in Asia were USD 2500 per kilogram in 2004 [1] and increased to USD 4500 per kilogram in 2012 [2]. EBN was traditionally believed to provide health benefits, such as aiding digestion, alleviating asthma, and an overall benefit to the immune system [3]. In general, *Walet* built a shallow cup stuck to the cave wall. The nests are composed of interwoven strands of salivary laminate cement [4]. The EBN price was categorized based on its size, weight, and shape [5]. The standard size of a raw unclean EBN is < 3 cm to > 4.5 cm [6]. The thickness of the nest's wall is 1–2 mm [7] with 4 angles which are 90°, 135°, 165°, and 180° [6].

At present, a *Walet* house was used to lure the birds from surrounding areas to come in and build a nest. Thus a consistent production of the nest was introduced and established modern supply and demand. From the reviewed work, it was discovered that the young swiftlets are not able to build their own nests as they should [8]. This led to an odd form that reduced its commercial values. Hence the swiftlets' scaffolding nest was introduced as a guided form to the young swiftlets to build a nest [8, 9]. This statement was also supported by Supaluck et al. [10] that nest sites characterized as smooth and concave with a supporter (scaffolding nest) site are the most favorable sites chosen by *Walet*. Figure 3 shows that the natural limestone supporter (scaffolding nest) plays an important role in *Walet* nest development [10]. Other natural scaffolding also was found in limestone caves, but in different form, conches and conch pockets (see Fig. 1). The tops of the apse flutes are often a semi-dome or else just the flat cap of a bedding surface [11].

There are several designs of scaffolding nest on the market, made from plastic, silicone, and rubber [8, 9]. Nevertheless, those designs were made in different forms and sizes. There is no standard or patent of the scaffolding nest that guided the scaffolding nests' manufacturer, therefore it affected the quality of the EBN. This aim of this study is to standardize the design of the scaffolding nest, including the size [12] and form [13] that fulfil the standard of EBN stated in the Malaysian Standard [6].

Fig. 1 Conch pockets (scaffolding nest) found in natural limestone caves



2 Research Methodology

The process of designing the scaffolding nest began with design studies [14–16], which were developed from the natural form and standard size of EBN to get accurate and equal sizes of scaffolding nests [6]. Figure 2 shows the basic design study methodology which was employed to determine that the original form was the best and appropriate.

2.1 Design Studies

Design study was required in order to determine the accurate size and form of the scaffolding nest. The development began with proposing the scaffolding nest design, referring to the natural form, standard size of EBN, and research of existing scaffolding nests on the market.

Fig. 2 Research methodology



Fig. 3 Limestone scaffolding nest



Natural form of EBN: The design was inspired and adapted from the natural scaffolding nest form found in limestone caves located in Si-Ha Island, Thailand. The scaffolding nests are in concave form and most of them in 90° angles [6]. The natural concave with supporter site are the most favourable sites that had been chosen by *Walet* [10]. Figure 3 shows that the natural limestone supporter (scaffolding nest) plays an important role in *Walet* nest development.

Standard size of EBN: Typical *Walet* produce a nest 6 to 10 cm wide and 2 to 5 cm long. The size of the nest's foot is 0.5–1 cm, and the nest's wall is 1–2 mm. The width of the scaffolding nest was measured based on the size of the *Walet*, which is 8–10 cm long with 14–35 g of weight [16]. Figure 4 illustrates the size of the nest's foot is bigger than the nest's lid in order to support the nest and *Walet* weight [7].

Existing design of scaffolding nest on the market: The existing design of the scaffolding nest has some technical problems, especially its size, form, and practicality. As shown in Fig. 5, the forms of the existing scaffolding nest are not standardized and have several sizes. It affected the quality of the EBN and created a problem in the EBN grading process. The various sizes of scaffolding nests will guide *Walets* in producing EBN in odd form and size. Consequently, the nest will

Fig. 4 Standard size of EBN in Malaysia

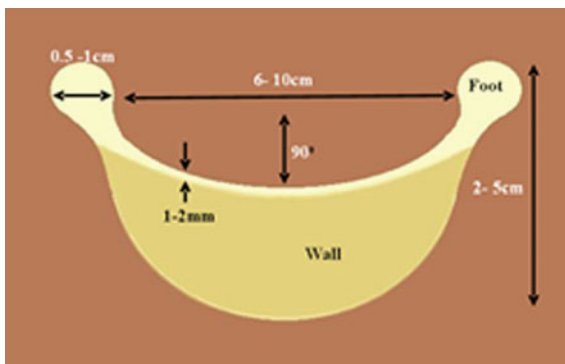




Fig. 5 Existing scaffolding nests on the market

not be in wholly concave form and it will break in small pieces hence the quality and the price of EBN will decrease.

As shown in Fig. 5, the hook designs of the existing scaffolding nests are not practical and efficient (easy lifting). Some of the designs used glue to attach the scaffolding nest against the wall. The function of glue is not practical and it will make *Walet* feel insecure and affect the breeding process of the *Walet*.

2.2 Design Development

The scaffolding nest design was developed based on the natural form of the *Walet* nest. As shown in Fig. 6, designs were developed from ‘V’ form to concave form with 90° angles [7]. The differences of the design are the concave form of the main body and the hook design of the scaffolding nest.

The basic form of the scaffolding nest was adapted as similar to the natural supporter (concave form) in a limestone cave. The existing scaffolding net designs

Fig. 6 Proposed designs of the scaffolding nest in concave form

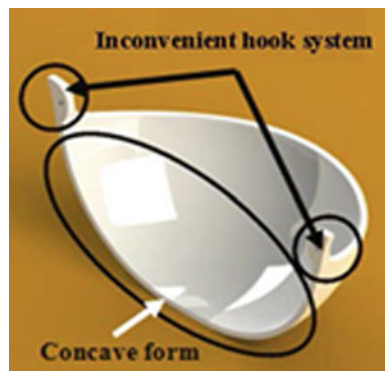


Fig. 7 Enhanced design of the scaffolding nest with convenient hook design

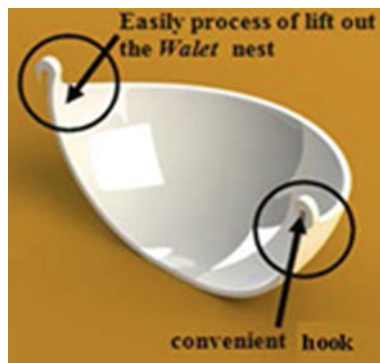
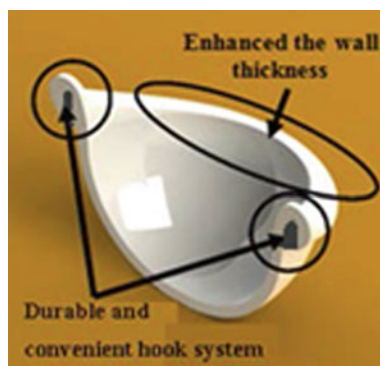


Fig. 8 Enhanced design of the scaffolding nest's hook and wall thickness



are not in standard size and have a variety of form and angle. As shown in Fig. 7, the existing hook design also was identified as not efficient for the harvesting process and not able to support the weight of the *Walet* and its eggs.

Figure 8 shows the enhanced scaffolding nest's hook design. The hook design was modified in 'V' shape in order to easy screw the lifting process of the *Walet* nest from the scaffolding nest (harvesting process).

At last, as shown in Fig. 8, the hook design was altered to show its strength and durability. The design also focused on the main structure of the scaffolding nest which is the wall thickness and it was designed purposely for *Walet* perching. The V shape of the proposed hook design of the ceramic scaffolding nest will ease the lifting process of EBN and save time in the harvesting process.

Fig. 9 Final design of scaffolding nest



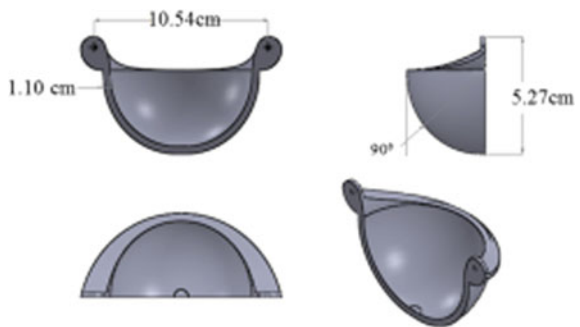
3 Result

After the studies and development of design, this study was chosen and the design of the scaffolding nest finalised. The final design included the technical drawing of the scaffolding nest that shows the details of size and form of the product.

3.1 Final Design

As shown in Fig. 9, the final design of the scaffolding nest was selected in concave shape, strength, and ergonomics of hook design.

Fig. 10 Technical drawing of scaffolding nest



3.2 Technical Drawing

The design process was continued with a technical drawing process that explained in detail about the design and dimension of the scaffolding nest. The dimension of the scaffolding nest was calculated 5.36 % bigger than the size of the *Walet* nest. Figure 10 shows the technical drawing of the scaffolding nest, designed by Solidwork 2012 software.

4 Conclusion

The summary and the objectives of this study show that the successful *Walet* scaffolding nest is in concave form, with a hook system and materials such as a stoneware body [17] and calcium carbonate [18] are close to the *Walet's* habitat, as well as its size and weight. It is hope that the *Walet* will be attracted to the ceramic scaffolding nest and hence increase the productivity and commercial value of EBN in Malaysia.

The ceramic scaffolding nests show a guided form for the *Walet* to build their nests in the most productive manner. *Walet* will build a high quality nest (concave form) thus the price and quality of EBN will increase.

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Innovation in Form Generation: Anthropomorphism for Contextual Collaboration in Car Styling

Wan Zaiyana Mohd Yusof, Muhammad Hasri
and Baharuddin Ujang

Abstract There are various methods of searching for a visual aesthetic, but which is the best method, however, depends on the designers. Recently, as a basic design strategy of intelligent products, anthropomorphism has been used. Analyzing the effect of human perception towards anthropomorphism in various domains, it can be said that anthropomorphism enriched the description of form function and created familiarity with products, especially those used in appearance and interaction design of products. The anthropomorphic method will be effective if similarity of an artifact to the human form is measured, and the fitness of the anthropomorphic design approach with the artifact is evaluated. Within the anthropomorphic design approach, a positive effect from anthropomorphism will be achieved in product appearance and interaction, if there is an appropriate level of humanness that fits the given primary task and role. So the main research question arising from this study is, “How can form follows function be adapted in generating innovation form?” This study thus looks at the application of anthropomorphics of Malay martial arts to car ontology to generate innovation form in car styling.

Keywords Anthropomorphism · Car ontology · Malay martial art

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1 Introduction

The transitions from two-dimensional drawing to a three-dimensional object for many designers remain a difficult and sometimes disappointing experience. A large degree of effort, skill, and experience need negotiation to ensure the success of the transitions [1]. The elements of the language of thought, to represent form of thinking in design normally use early design sketches [2]. Sketching activity comprises two elements: seeing and moving or the *see-move-see* cycle, as the name suggests [3]. Schön and Wiggins and Roemer et al. modeled shape generation itself as reiterating, moving the developing design idea back and forth between internal and external representations [2, 4] and all the while moving from the descriptive, abstract, and categorical to the depictive, concrete, and spatially specific [5].

Understanding and manipulating form remains at the heart of many design activities and was recognized by researchers from the earliest period of design research [6–8]. It is understood that how the centrality of three-dimensional form in design is created is still lacking and it may be due to a lack of understanding in design practice.

Tantamount to Simon, Alexander, and Steino's statement, during the outset of the design process the emergence in design especially the appearance of features, behaviors, or geometries were not stated or anticipated [9]. To avoid the uncertainty and ambiguity contained in designers' sketches and to emerge for the generation of designs, generative systems can also be described as important [10, 11].

Visual representations are also important as generative tools in which not only the emergence of shape, features, or behaviors through designers' perceptions in constructing the connotation of a design but in how they translate the denotation of the design. Soufi and Edmonds [12] use the evidence that stated creativity as a transformation of conceptual spaces to support of the role of emergence as an important source of creativity in design that coincides with one of Boden's general models of creativity.

As mentioned earlier, the best method adapted, however, depends on the designers' intent and goal of a project. Our intent has been the use of anthropomorphism as a generative tool to create innovation forms in car styling. The Malay martial art was used as a manner of expressing human movement and cultural values related to car styling and anthropomorphism provides the designer with a way to feel the emotion of the car form in relation to the human context.

2 Anthropomorphism

As we observe nowadays, every facet of art, cartoon product, and architecture, object, building, or animal is ascribed human characteristics. It is called anthropomorphism. The earliest functional product forms and behavior adopted

anthropomorphism. Even though design practices progressed remarkably, a matured human-like form still remained a common theme. The theme of household products, vehicles, and humanoid robots is evident of anthropomorphism [13]. Anthropomorphism is the act of attributing human-like qualities to nonhuman organisms or objects. To understand the uses of anthropomorphic form as a means to achieve a specific design goal, the researcher or designer should review the field of design and identify products to use as examples. In order to use or apply anthropomorphism in design, there are four primary guides: keeping things the same, explaining the unknown, reflecting product attributes, and projecting human values toward the design. Apart from that, a significant range of anthropomorphic product forms can be seen as the dials and tuner on an old radio where the form was composed of two eyes and a mouth. Sometimes the replication of joints of the human arm for adjustability in the desk lamp also can be seen [14].

Anthropomorphism is defined as the “attribution of human characteristics to nonhuman things or events” [15]. In design, it can be applied to the form of an artifact and also can be related to dynamic features such as movement. Therefore, it is necessary to find an anthropomorphic form for a product, not only in terms of how it looks, but from an entire set of experiences users acquire when they interact with products. To observe how the design of the products delivers experiences to users, it is necessary to first generalize the qualities of the form and then study the underlying qualities of anthropomorphic forms in the cognitive and social context of their use.

2.1 Adaptation of Anthropomorphism

There are many artifacts that have anthropomorphic form and appearance [15]. The usage of this form in design was manifested mostly in the appearance of artifacts in the past. It happened because the makers of these artifacts attempted to use the human form straightforwardly for religious purposes. It was approved when we observe the shapes of the vessel that have strong associations with the human body. Furthermore, humanlike forms also can be found in contemporary design as well. It can be seen on the front of an automobile which can be thought of as resembling a human face. The image of the automobile also evokes characteristics of humans.

In an example by Jeong and Kim, the front of an automobile can be thought of as resembling a human face. People commonly compare headlamps or tail lamps of an automobile with human eyes. Because eyes are one of the most significant visual features among all facial features with respect to forming facial expressions, automobile designers pay deliberate attention to the design of headlamps and tail lamps, which are interrelated with the overall characteristics of an automobile [15].

This association has a major impact on the impression the viewer has of the appearance of automobiles. The BMW GINA light visionary model concept wears a fabric “skin” comprised of a wire-mesh inner stabilizing layer and a water- and temperature-resistant outer layer. This concept is not just symbolizing human

features but directly borrowing them. Furthermore, the headlamps are hidden until the driver turns them on. Instead of popping up like the 1980s Pontiac Firebird, the skin smoothly opens to reveal lights as humans open their eyes.

3 Car Ontology

Understanding of car ontology was confirmed to have influenced the categories of information in the sketch to convey three-dimensional forms [16]. There are two different fields of ontology knowledge which are the aesthetic key lines (AKLs) and aesthetic properties (APs) [17]. The aesthetic context of a car design, taxonomy of the AKLs' candidate to elicit emotions, and their aesthetic properties have been incorporated in the ontology (Fig. 1), where the APs correspond to some terms used by designers for expressing a desired curved shape modification (Fig. 2).

The roof line, the windshield line, and the wheelbase line are the fundamental ones belonging to the profile of the AKLs. The roof line and the wheelbase both identify the packaging and start to suggest the style; the windshield line contributes to the definition of the aesthetics and aerodynamics of the vehicle. In order of

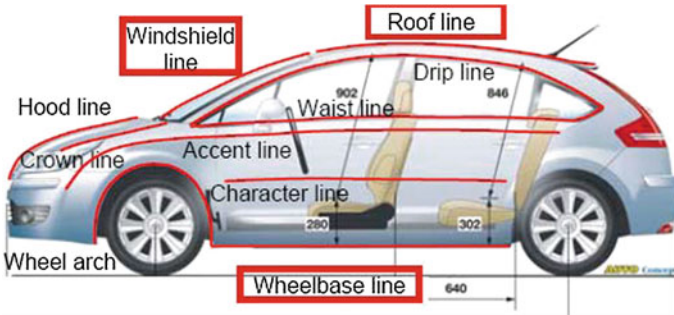
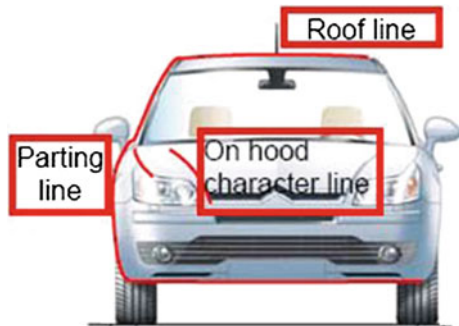


Fig. 1 Examples of car aesthetic key lines (AKLs)

Fig. 2 Examples of aesthetic properties (AP)



importance, the waist line and the accent line follow, and the drip line and the hood line usually enforce the aesthetic behavior of the roof line, whereas other character lines, both real and virtual curves, may be present to emphasize further the general style of the car.

Finally, the wheel arch has a strong impact on the stability and compactness feeling of the car. Once the taxonomy of the AKLs, the APs will be defined and they are naturally related to the geometry, but in a complex way, and reflect the aesthetics of the shape.

4 Methodology

This study aims to build basic knowledge of anthropomorphic design to inform both design studies and design practice. It can be said that this study is related to practice-based research, a research that leads primarily to new understandings about practice and an original investigation undertaken to gain new knowledge partly by means of practice and the outcomes of that practice [18].

Various Malay martial art movements especially the *Gayong* martial art were captured using a DSLR camera using iso-250, apacet 6.3, and shutter speed 10 s in order to capture the light flows of the martial art movements. Each of the lines captured has a different meaning and appears in a different form based on the martial art technique used. The visuals of movements achieved were separated into two elements, the symbol and meaning. From the visual analyses, the researcher then selected and applied the line to car ontology to generate several new shapes.

5 Results and Discussion

Tables 1, 2, 3, 4, 5, 6, 7 through 8 present visual results of the *Gayong* martial art movements involved in the study.

Based on the context of *Seni Bunga Tanjung* movement, it symbolized attention, attraction, and suavity.

Tumbuk Pintal Tali symbolized stability, fast, and drastic, which relate to aerodynamics.




The flow of *Tendang Batu* movement was simple, slow speed and vertical flow. It symbolized ever ready and stability into which will flow more energy and power.

The *Sepak Layang Balas Juring* movement reflected radical, energetic, and drastic.

Perrgerakan Senaman Anak Harimau (Golongan 21) symbolized attack and defense with dramatic, energetic, and dynamic flow.

Pergerakan Senaman Anak Harimau (Golongan 21 -Langkah 12-13) symbolizes attack and defense with dramatic energetic speed.

Table 1 Results of *Bunga Tanjung*

Movement		Symbol/Meaning
		<p>One of the opening acts to begin the ceremony of martial art</p>  













Car ontology		
Character line	Accent line	Waist line
		
Drip line	Crown line	Hood line
		
Windshield line	Roof line	Parting line
		

Table 2 Results of *Tumbuk Pintaltali*

Movement	Symbol/Meaning
	<p>A training step to punch fast.</p>  







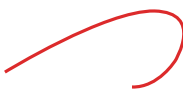





Car ontology		
Character line	Accent line	Waist line
		
Drip line	Crown line	Hood line
		
Windshield line	Roof line	Parting line
		

Table 3 Results of *Tendang Batu*

Movement	Symbol/Meaning
	<p>The technique of swinging and side kicking to the opponent's hand and head when they try to attack using a weapon.</p>  













Car ontology		
Character line	Accent line	Waist line
		
Drip line	Crown line	Hood line
		
Windshield Line	Roof line	Parting line
		

Table 4 Results of *Sepak Layang Balas Juring*

Movement	Symbol/Meaning
	<p>The front kicking technique with stable posture. The impact of the kick will be made more powerful by using the heel.</p>  













Car ontology		
Character line	Accent line	Waist line
		
Drip line	Crown line	Hood line
		
Windshield line	Roof line	Parting line
		

Table 5 Results of *Pergerakan Senaman Anak Harimau (Golongan 21-Langkah 11)*

Movement	Symbol/Meaning
	<p>Advanced step topple opponent in a second attack and defend</p>  




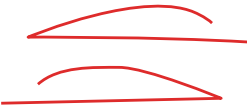







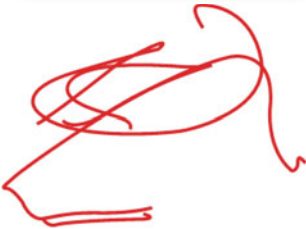
Car ontology		
Character line	Accent line	Waist line
		
Drip line	Crown line	Hood line
		
Windshield line	Roof line	Parting line
		

Table 6 Results of *Pergerakan Senaman Anak Harimau (Golongan 21-Langkah 12-13)*

Movement	Symbol/Meaning
	<p>Attacking towards the whole opponent's body; the effect will increase if the distance between the opponents is taken.</p>  














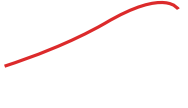




Car ontology		
Character line	Accent line	Waist line
		
Drip line	Crown line	Hood line
		
Windshield line	Roof line	Parting line
		

Table 7 Results of *Pergerakan Senaman Anak Harimau (Golongan 21-Langkah 14-17)*




Car ontology		
Character line	Accent line	Waist line
		
Drip line	Crown line	Hood line
		
Windshield line	Roof line	Parting line
		

The *Pergerakan Senaman Anak Harimau (Golongan 21-Langkah 14-17)* movement symbolized attack, defense, and shield.

Pergerakan Senaman Anak Harimau (Golongan 21-Langkah 18-21) also symbolized attack, defense, and shield which produced sleek, radical, speed, and drastic lines. From the findings above, it can be concluded that the use of the anthropomorphism approach was found useful in generating idea-sketching. The association of the Malay martial art's line movements and their application to the car ontology has a major impact on the impression of the appearance of car styling as shown in Figs. 3 and 4. The approach indeed has a strong precedent that emerges for using three categories to describe the cognitive response to product appearance: aesthetic impression, semantic interpretation, and symbolic association as mentioned by Crilly et al. [19]. Thus, although “styling is the ‘artistic’ part of product design [it must still be],” as stated by Baxter [20] as presumed by others, this study can be a discovery that very few of the scientific studies have led to generalizations that are useful for students or practitioners of design.

Anthropomorphism also may offer the opportunity to modify designs and closer align them with aesthetic preferences and also be beneficial as to how designers can incorporate visual references in their products.

Table 8 Results of *Pergerakan Senaman Anak Harimau (Golongan 21-Langkah 18-21)*

Movement	Symbol/Meaning
	<p>In steps 18–21, a combo technique is used to protect oneself from opponent attack and topple the opponents at once.</p>  










Car ontology		
Character line	Accent line	Waist line
		
Drip line	Crown line	Hood line
		
Windshield line	Roof line	Parting line
		



Fig. 3 Idea-sketching generated using lines produced by martial art

Fig. 4 Final model of the car body styling based on the selected martial art movements



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Moderating Effects of Stylized and Realistic Stimuli on the Relationship Between the Uncanny Valley Theory and Digital Characters' Features

Louis Laja Uggah and Azaini bin Abdul Manaf

Abstract The issue of the uncanny valley in animation is a very difficult one for animators and designers, and although much progress has been made in overcoming the uncanny valley there are always new techniques that are being designed to deal further with its effects. In 1970, Masahiro Mori recommended that roboticists avoid the uncanny valley by not even attempting to cross it.

Keywords Uncanny valley · Perceived humanness · Stylized animation · Moderation effects · Animation techniques

1 Introduction

Over the years, various studies have been conducted to determine the truth of Masahiro Mori's uncanny valley theory, and in order to identify the actual causes or facets that contribute to the uncanny valley [1]. When Mori postulated the existence of the uncanny valley, he was explaining his own intuition and belief about the issue. He was not explaining any empirical evidence that he had about it. Although the idea of the uncanny valley is doubtless logical and reasonable in terms of human reactions to artificial human-appearing beings, Mori left it up to subsequent researchers to find empirical evidence for the existence of the uncanny valley. The issue of the uncanny valley in animation is a very difficult one for animators and designers, and although much progress has been made in overcoming the uncanny valley there are always new techniques that are being designed to deal further with its effects [2]. In 1970, Masahiro Mori recommended that roboticists avoid the uncanny valley by not even attempting to cross it. For example, rather than attempting to make a lifelike prosthetic hand that would inevitably feel artificial

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when one shook it, the better choice would be an artistically designed wooden robotic hand that would make it obvious from the first that it was artificial. Following Mori's advice, many animators have chosen to avoid the uncanny valley altogether by rendering their animated characters cartoonish rather than photorealistic, even while other animators have focused on bridging the gap with varying levels of success [3]. The main objective of this research is to explore moderating variables (realistic and stylized) on the relationship between the stimuli's features such as facial expression, hair animation, rendering, motion, lip sync, and digital eyes and participants' perceived humanness and familiarity and identify which features are more sensitive towards the uncanny valley effects.

2 Literature Review

One of the key issues that needs to be addressed here is the lack of study of moving and talking of both realistic and stylized digital characters based on participants' attitudes. The uncanny valley effect has caused studios, designers, and animators to opt for stylized digital characters to avoid negative emotional responses from viewers. This might be caused by Masahiro's uncanny valley theory but there are inadequate empirical data to support and validate this hypothesis [4, 5]. Multiple research has been done with robots and still images of digital characters but the amount of research that focuses on moving and talking digital characters is currently limited. Negative responses from audiences towards realistic but emotionless and lifeless digital characters, for example, in *Final Fantasy*, *Beowulf*, and *Polar Express* have been an issue for production companies [5]. The assumption that audiences will find unrealistic characters less uncanny than photorealistic characters is still simply an assumption, though, and one with various levels of accuracy. There are, in fact, examples of films in which the characters were rendered unrealistically and were still uncanny, such as *The Polar Express* and the humans portrayed in *Toy Story*. Thus unrealistic animation is not remotely a guarantee that the character will avoid the uncanny valley. In order to determine the actual way that audiences feel about different rendering styles, including cartoonish and 2-D rendering, McDonnell et al. [3] conducted an experiment in which actors were recorded using motion capture technology and were rendered in 11 different ways, including photorealistically, cartoonish, and as a 2-D drawing. Another criticism of the uncanny valley theory that animators have expressed is the theoretical closeness between uncanny realism and pleasing realism. This criticism is based on the fact that many animators choose to make their animated characters deliberately stylized in order to convey to the audience that they are not attempting to create a character that looks lifelike, and thus, paradoxically, to create a character to which the audience can relate [2]. When an animation or a robot looks extremely lifelike, it becomes more jarring when it makes mistakes or otherwise shows itself not to be human after all. Conversely, when an animation or robot looks extremely stylized and does not attempt to imitate human appearance excessively, the expectation of

the robot or animation being lifelike is not formed and it is not jarring or uncanny when it is shown not to be human.

The concept of the uncanny valley generally focuses on the difference between realistic and artificial robots or animations, and the term “familiar” or “familiarity” is often used as the positive measurable object in contrast with “eerie” or “uncanny” in determining the existence or placement of the uncanny valley in studies. Although the focus is generally on natural versus artificial, one study on infants indicates that the more important topic may actually be familiarity versus nonfamiliarity. Both perceived humanness versus familiarity are of course extremely subjective and necessarily difficult to quantify or study objectively. Many researchers have respondents rank their impressions on a Likert scale to make quantification at least somewhat possible. A popular method of measuring animations and robots with regard to the uncanny valley is to use the Godspeed Index, which charts characters on the characteristics of anthropomorphism and likability (Ho and MacDorman, “Revisiting the Uncanny Valley Theory: Developing and Validating an Alternate to the Godspeed Indices,” 2010). The problem with both of these characteristics is that they are concepts that have not had empirical tests done to determine their validity and reliability [6]. Furthermore, as Ho and MacDorman [6] argue, although eeriness may be considered to be simply on the opposite end of the spectrum from likeability, eeriness is in fact a separate issue from nonlikability, and it would be helpful to have a measurement for eeriness itself, as it is eeriness that defines the uncanny valley.

3 Method

In order to measure the moderating effects of the uncanny valley on the participants’ attitude towards digital animated characters, this study investigates attitudes of participants towards realistic and stylized digital stimuli. Stylized stimuli were represented by Emily Project and Madison Paige of *Hard Rain* and stylized stimuli were represented by Elasti Girl of *The Incredibles* and Clementine of *The Walking Dead* game series. This study employed the quantitative approach based on a series of semantic differential questionnaires. This study was conducted at Yahoo Training Centre’s conference hall in Kuching Sarawak on the 7–14th of May, 2014. This venue was selected because it was the most convenient and cost effective for the organizer. It was conducted in five sessions; each session was divided into about 50 participants. The total number of participants who responded to our invitation was 261 out of 300.

The first phase of the data collection process was gathering suitable participants. Participants were invited through various methods such as Facebook, emails, phone calls, and word of mouth and were screened to determine their suitability [7]. Individuals who were keen to participate were invited to contact the organizer through email or phone calls. To encourage more participants, incentives such as shopping vouchers and cash were offered to participants who successfully

completed the whole survey. To make sure that the participants were actively involved instead of responding randomly in the survey, we included two items such as “Animal–Human” and “Alien–Human” randomly in the questionnaires. Respondents who were not attentive were excluded from the data analysis process. Out of 261 participants, 32 participants were not attentive during the survey and we decided not to include their results for the data analysis.

4 Exploratory Analysis

A pilot study was conducted to determine if our research design was effective, understandable by the participants, and to test for internal consistency. Welman and Krunger [8] stated the advantages of conducting the pilot test: (1) identify weaknesses of the measurement model, (2) test the questionnaires, and (3) get feedback from participants. The pilot study was conducted from December 5 to December 12, 2013, from 10.05 a.m. till 11.20 a.m. One of the key advantages of conducting a pilot study is that it allows researchers to check both analytical and statistical procedure and evaluate the effectiveness of the procedures of their data collection. The pilot test consisted of 25 participants, based on Hertzog [9] who recommended 10–15 % from the total amount of participants as the sample for the pilot test which is considered sufficient. Participants were invited through email and Facebook and consisted of postgraduate students from UNIMAS and Swinburne University of Technology. The pilot test was conducted at Yahos Training Centre’s computer lab. Participants were given a set of questionnaires and a brief explanation of the procedure and the objectives of the data collection. The initial instrument developed consisted of 10 semantic differential scales (from 1 to 10) based on the participants’ attitudes. The scales were based on Ho and Macdorman’s Humanness and Eeriness Indices (2010). Results were then keyed into SPSS. The scales were:

- Reassuring–Eerie
- Artificial–Natural
- Mechanical–Organic
- Inanimate–Living
- Human made–Humanlike

For the pilot test, participants were only asked to rate the stimuli’s facial expression and hair animation based on these scales. The initial measurement model was developed as a guideline before proceeding to the full-scale measurement model. Participants were asked to view each stimulus for 20 s and then rate the stimulus. After the data collection process was completed we gathered feedback from the participants regarding the procedures. Participants revealed that most of the items in the questionnaires were easy to understand except for Inanimate–Living which confused some of the participants. In order to test the validity of these items, an initial internal test was conducted. The tests revealed that some of the items had to be excluded from the measurement model as the items achieved a

Cronbach Alpha of below 0.7. Items that achieved a Cronbach Alpha of below 0.07 were excluded from the final experiment.

The construct reliability and validity of the measurement model of this study were calculated using SPSS software to check for its internal consistency. Principal component analysis was used because it helps to reduce the dimension of the dataset by reducing the data into their basic components. The Kaiser–Meyer–Olkin measure of sampling adequacy was 934 which is above the recommended value of 6 and within the range of superb value [10] whereas the Bartlett’s test of sphericity was significant $p < 0.05$). The communalities for all the indices were all above 0.3, which concluded that all the items shared some common variance with other items. The construct validity test, which is essential to the perceived overall validity of the measurements, is divided into two subtypes: convergent validity and discriminant validity. Convergent validity tests determine whether the factors that are expected to be related are actually related whereas the discriminant validity test determines whether the factors that are supposed to be unrelated are actually unrelated. To test the factors’ convergent validity, we referred to the pattern matrix extracted from the SPSS output. Each of the eight factors achieved an average loading of above 0.7, which indicated that the factors were related. For the discriminant validity tests, the pattern matrix indicated that there were no cross-loadings among the factors. The component correlation matrix revealed that none of the factors had a correlation greater than 0.7 which indicated that there were no correlations between the factors. These discriminant validity tests concluded that each factor was unrelated to another.

The final measurement model (Appendix A) for exogenous and endogenous was tested by assessing the fit indices. The CMIN/df for this model was 1.36 which indicated a model fit. The comparative fit index (CFI) was 0.991 and goodness of fit index (GFI) was 0.965. The adjusted goodness of fit index (AGFI) was 0.953. The mean square error of approximation (RMSEA) was 0.013. The CFI, GFI, AGFI, and RMSEA for this measurement model all met the criteria for a model fit [11]. We then analyzed the average variance of extracted (AVE) values for all items. All the items’ AVE ranged from 0.51 to 0.72 which is above the cut-off of 0.5. The CFA analysis confirmed that the data fit the hypothesized measurement model.

5 Results

5.1 Structural Equation Modeling

The structural model reveals the relationship between animation factors and participants’ perceived humanness and familiarity towards digital characters. Our structural model achieved a good fit with CMIN/df of 1.365, RMSEA was 0.013, CFI was 0.991, GFI was 0.965, and AGFI was 0.953. Based on Hu and Bentler [11], who recommended that RMSEA should be < 0.6 and CFI > 0.9 , and

Baumgartner and Hombur [12] who recommended that GFI and AGFI should be >0.9 meant that the structural model achieved a good fit. The structural model revealed empirical evidence that digital hair, eyes, and facial expression have a significant effect on participants’ perception of familiarity whereas lip sync, digital hair, physical movements, and facial expression have a significant effect on perceived humanness.

5.2 Moderating Effect Hypotheses

In order to test the moderating effects of the stylized and realistic stimuli, multi-group structural analysis was applied. The key objective of this analysis was to investigate whether stylized and realistic stimuli have moderating effects on the relationship of the participants’ perceived humanness and familiarity and digital characters’ facial expression, hair animation, motion movement, lighting and rendering, lip syncing, and digital eyes.

The groups are divided into stylized and realistic groups in AMOS. The stylized group was represented by Elasti Girl and Clementine, whereas the realistic group was represented by Digital Emily and Madison Paige.

According to Dabholkar and Bagozzi [13], significant differences between the chi-square of the constrained and unconstrained models reveal that moderation does exist. Based on Table 1, our unconstrained model chi-square was 524.4 and the constrained model was 709.1. Therefore we confirmed that the stimuli did have moderation effects on the animation factors and participants’ attitudes. The chi-square threshold was set at 527.84 with 95 % level of confidence. Paths that achieved the chi-square threshold of above 527.84 were significantly different between the groups. Based on Table 2, it was found that stimuli moderate the relationship between participants’ familiarity and renderings, familiarity and hair animations, familiarity and digital eyes, and between perceived humanness and hair animations. Other relationships such as familiarity and lip sync, familiarity and motion movements, familiarity and facial expressions, motion movements, and facial expressions were not moderated by the stimuli. Table 2 also showed us that the moderating effects of realistic stimuli had a stronger effect in familiarity and rendering relationship with realistic stimuli with $\beta = 0.2$ whereas stylized stimuli

Table 1 Model chi-square

Model	X^2	df	Chi-square	Significant
	Unconstrained		524.4	452
	Constrained		709.1	477
			527.84	$p < 0.05$

$p < 0.05$

Table 2 Moderating effects of realistic stimuli

Paths	Estimates	<i>p</i> -value	Estimates	<i>p</i> -value	<i>z</i> -score
Familiarity ← Lip syn	0.017	0.857	0.073	0.034	0.578
Familiarity ← Render	0.033	0.526	0.200	0.017	1.698*
Familiarity ← Hair	0.175	0.013	0.467	0.000	2.721***
Familiarity ← Eyes	0.233	0.002	0.046	0.404	-1.975**
Familiarity ← Rig	0.042	0.843	0.334	0.000	1.236
Familiarity ← Facial	-0.003	0.940	0.041	0.502	0.612
Humanness ← Lip syn	-0.016	0.816	0.066	0.100	1.032
Humanness ← Render	-0.177	0.000	-0.038	0.699	1.295
Humanness ← Hair	-0.248	0.000	0.397	0.000	5.813***
Humanness ← Eyes	-0.088	0.083	0.063	0.331	1.832*
Humanness ← Rig	0.43	0.022	0.545	0.000	0.516
Humanness ← Facial	0.066	0.402	0.172	0.018	1.001

p < 0.05**, *p* < 0.00***

achieved $\beta = 0.033$. The moderating effects of realistic stimuli were significantly stronger in familiarity and hair animation relationship with $\beta = 0.467$ and the stylized stimuli effect was only $\beta = 0.175$. The moderating effects of stylized stimuli were significantly stronger in familiarity and digital eyes relationship, with $\beta = 0.233$, whereas realistic stimuli achieved only $\beta = 0.002$. For the relationship between perceived humanness and digital hair animations, the moderating effects of realistic stimuli were significantly stronger with $\beta = 0.397$ and stylized stimuli achieved $\beta = 0.0248$. Finally, the moderating effects of realistic digital stimuli were stronger in the perceived humanness and digital eyes relationship with $\beta = 0.033$ whereas stylized stimuli achieved $\beta = 0.088$.

6 Conclusion

Our findings concluded that stylized and realistic animations moderated the path between animation techniques and the audience’s perception of humanness and familiarity. The unconstrained and constrained models revealed that the features of stylized and realistic digital characters were significantly different from each other. Multigroup path analysis revealed that stylized and realistic hair and eyes of digital characters had significantly different effects on an audience’s familiarity and perception of humanness. Participants revealed that the effects of lip sync, lighting, hair animation, motion, and facial expression were stronger in terms of familiarity in realistic digital characters compared to stylized digital characters, whereas stylized digital eyes had a stronger effect in familiarity compared to realistic digital characters. In terms of perceived humanness the effects of all the features of realistic digital characters were stronger than stylized digital characters. In summary,

audiences were more sensitive towards features of realistic digital characters than to those of stylized digital characters. This sensitivity has caused the uncanny valley effect to appear more significant in realistic digital characters than in stylized characters.

7 Significance of Research

Developing stylized and realistic digital characters requires different techniques because the characters are different from each other. Stylized characters are considered less realistic and more appealing to children and adults alike, whereas realistic digital characters are considered to be more human-like. No theory or research has yet examined the moderating effects of these types of stimuli between animation features and human attitudes such as familiarity and perceived humanness. Because our research has identified the most significant effects of the features of digital characters, such as hair animation, lighting, motion, lip sync, and facial expression on an audience's perception of humanness and familiarity, animators will be able to minimize uncanny valley effects on their digital characters.

8 Implications of Research

This study supports the previous findings of Geller [2], which suggest that stylized animations are less prone to the uncanny valley effect than realistic animations. Our findings suggest that stylized animation is less sensitive to the uncanny valley effect than realistic digital characters. For instance, when dealing with highly realistic characters, animators have to make sure features such as facial expressions, motion, digital eyes, and hair are executed in a way that will avoid the uncanny valley effect.

9 Future Research

Future researchers are recommended to develop techniques or software that overcomes the uncanny valley in realistic digital characters based on the audience's sensitivity to the digital characters' features towards the uncanny valley effect. Generally, current software and animation techniques are not specific enough to overcome the uncanny valley effect in realistic digital characters, and it is this that has caused animation studios to focus on stylized animations.

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Study of Photographic Images of the Perak State Tourism Campaign Billboards

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Abstract The objective of this research is to study the effectiveness of photographic images used on tourism campaign billboards in Perak. It will also gauge the extent of the respondent's perception and understanding of the importance of photographic images on the tourism billboards in Perak. In order to ensure the success and effectiveness of the method, a study was conducted to obtain feedback from the public regarding the images featured on the tourism advertisement billboards. It is hoped that findings from this research would be able to gain respondents' feedback in providing information to the researcher so that the effectiveness of photographic images used as one of the media on Perak's tourism advertisement billboards can be identified. Results from this study could serve as guidance to the relevant authority by producing suggestions of new and high-quality photographic images on the tourism advertisement billboards in Perak.

Keywords Photographic · Tourism · Billboard

1 Introduction

Perak is one of the states rich in various natural resources and historical remnants that have become major tourist attractions, from locals and abroad. With an area that spans 1000 km² and 9 jurisdictions or districts, Perak emerges as a well-known tourist destination. Various campaigns have been done by the state government in promoting attractive places by using a variety of advertisements to lure more tourists to visit Perak. Perak with an area of 21,000 km² is the second largest state in

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the peninsular Malaysia after Pahang. Based on this span of area, Perak has become one of the main tourist destinations in Malaysia. The Perak state government has been carrying out numerous campaigns to boost tourism in order to generate the state's income. Among the methods applied was the use of photographic images on Perak's tourism billboards. These could be viewed at several strategic places and locations such as the Persisiran Sayong tourism billboard.

Lester [1] stated that visual images are a significant component of an advertisement. Most billboards feature photographic images as an attractive factor in conveying information and promoting a certain service. Nevertheless, the researcher believes that there are still some weaknesses in the photographic images on Perak's tourism advertisement billboards. Some of the weaknesses regard the compositional role and photographic image attraction used on the tourism billboards. Other than that, studies also involved the aspect of photographic image selection and creativity. According to Warren [2], each time the photographic image is produced, the photographer must consider several factors that involve aspects such as technical choices, lighting, point of view, timing, and material. Each image produced must take into consideration its purpose and function. Bruce Warren added that visual attraction also contributes several interesting visuals and it guides the eyes to focus on the main subject more than others in an image. A creative process begins when a person imagines and is inspired by the ideas he sees and the problems that he faces. Visualization is using the imagination and memory to remember events that had taken place before, according to Preble and Preble [3]. Indirectly, this will provide an impact on the image on Perak's tourism billboards. In addition, according to Arens [4], there were nine advantages of using outdoor billboards: accessibility, access, frequency, geographic flexibility, demographics, flexibility, cost, effects, creative flexibility, and location.

Shimp [5] stated that even though there are many media of outdoor advertisements such as bus and taxi, advertisements on clothes adorned with logos and brands, and display of brands at business premises, the main outdoor advertisement is the one designed to be big and able to attract the public's attention. In producing attractive tourism photographic images, there are several aspects that must be taken into consideration to come out with an effective impact. Choosing precise images or visuals is a challenging creative task. For instance, what kind of visual advertisement is able to provide an effect in its communication? How many images or visuals are needed in an advertisement? The subject of the image or visual that needs to be used must also be determined. With a wide range of selections the use of suitable images or visuals is not an easy matter. Images or visuals produced must be matched with the thoughts where the latter will provide realistic perceptions that result from the connection between the eyes and thoughts.

The connection is able to provide an effect on a campaign or advertisement. Photographic images are visual communication material that conveys a story or messages and is persuasive in nature. Each image that is featured will narrate the photographer's ideas and expressions. Each picture produced has a story in which the photographer has complete control over the image that he or she wants to display. Selection of suitable photographic images in the Perak tourism campaign is

able to have an impact on the state's tourism sector. The role of the photographic image that can persuade and provide information about interesting places available in the state is hoped to be able to increase the total of tourist arrivals.

2 Aim and Objective

The objective of this research was to evaluate the effectiveness of photographic images used on tourism billboards and research on the aspect of the role of composition and visual attraction, selection of the subject, and creativity of photographic images on Perak tourism billboards.

3 Delimitation

The research focused on the Pesisiran Sayong tourism billboard at Kuala Kangsar, Perak (Fig. 1). This research also focused on the aspect of photographic images' effectiveness as they are used on Perak tourism billboards. Each of the aspects is the main characteristic in producing effective and high-quality photographic images.

4 Research Methodology

The research method used in this study was the survey through the use of questionnaires as the instrument. This study used findings from the case and field studies in order to analyze the respondents' perception towards photographic images used on the Perak tourism advertisement billboards. Respondents were given a choice of answers in the questionnaire that applied the Likert scale. All these data were analyzed using SPSS software.

Fig. 1 Pesisiran Sayong tourism billboard



5 Data Analysis Result

A total of 150 questionnaires were distributed to respondents within Ipoh, Kuala Kangsar, and Seri Iskandar, Perak. A total of 148 questionnaires were filled out and given back to the researcher. All the survey results were collected and the frequency from the results of the questionnaire is shown in Table 1.

According to Table 1, the highest results show that 64 (43.2 %) of respondents tended to agree, 40 (27.0 %) were neutral, 32 (21.6 %) strongly agreed, 8 (5.4 %) disagreed, and another 4 (2.7 %) of respondents strongly disagreed.

According to Table 2, 67 (45.3 %) respondents agreed, 54 (36.5 %) strongly agreed, 24 (16.2 %) were neutral, 2 (1.4 %) disagreed, and only 1 (0.7 %) strongly disagreed.

Table 3 demonstrated that 68 (45.9 %) respondents agreed whereas 61 (41.2 %) strongly agreed, 17 (11.5 %) were neutral, and only 1 (0.7 %) each disagreed and strongly disagreed.

Table 1 Role of composition and image attraction on tourism billboard

		Frequency	Percent	Valid percent	Cumulative percent
Valid	Strongly disagree	4	2.7	2.7	2.7
	Disagree	8	5.4	5.4	8.1
	Neutral	40	27.0	27.0	35.1
	Agree	64	43.2	43.2	78.4
	Strongly agree	32	21.6	21.6	100.0
	Total	148	100.0	100.0	

Table 2 Selection of visual (subject) is important in producing photographic images on tourism billboard

		Frequency	Percent	Valid percent	Cumulative percent
Valid	Strongly disagree	1	0.7	0.7	0.7
	Disagree	2	1.4	1.4	2.0
	Neutral	24	16.2	16.2	18.2
	Agree	67	45.3	45.3	63.5
	Strongly agree	54	36.5	36.5	100.0
	Total	148	100.0	100.0	

Table 3 Creativity of photography images can attract to certain displays on tourism billboard

		Frequency	Percent	Valid percent	Cumulative percent
Valid	Strongly disagree	1	0.7	0.7	0.7
	Disagree	1	0.7	0.7	1.4
	Neutral	17	11.5	11.5	12.8
	Agree	68	45.9	45.9	58.8
	Strongly agree	61	41.2	41.2	100.0
	Total	148	100.0	100.0	

6 Findings

Based on the findings from this research, photographic images were the main attraction in each Perak tourism campaign billboard. However, their effectiveness in disseminating information to the tourists and public must be enhanced. Based on the data gathered from the questionnaire and observations on Perak tourism advertisements, the researcher found that most of the photographic images on these billboards needed to be improved in terms of composition and visual attraction, visual choices, and the role of photography on the Perak tourism advertisement billboards.

6.1 *Aspect of Composition and Visual Attraction*

Based on the data from the survey on the aspects of composition and visual attraction, almost all respondents gave affirmative answers of agree and strongly agree that these aspects were important components for a tourism billboard. This could be found in Table 1, which listed some examples such as a case study on the Persisir Sayong tourism billboard: as many as 64 (43.2 %) respondents from 148 people stated that they agreed, 32 stated that they “strongly agree” (21.6 %), and 40 (27.0 %) respondents chose “neutral”. Findings from this research were in line with the views stated by Belt [6], that photographic images based on grammatical structure such as their relation with image content were able to convey information in a more meaningful way. Belt also indicated that composition or organization of an image was significant in determining an effective image display. Rosen and DeVries [7] stated that composition refers to the way visual detail is chosen and planned in a photographic image to convey meaning. It is able to provide an overview about a place or location by organizing in the form of the visual. The production of an attractive photographic image is the main component in an advertisement. Images that are able to grab the consumer’s or viewer’s attention are able to disseminate information and advertisement more effectively.

6.2 *Selection of Photography Subject*

Based on the survey data on the aspect of visual selection, almost all respondents provided the answer that they agreed with the statement that the visual selection aspect was significant in producing appealing photographic images on a tourism billboard. This can be seen in Table 2 where 67 subjects from 148 respondents agreed and 36.5 % respondents strongly agreed with the statement that the aspect of visual selection was crucial in the production of photographic images on a tourism billboard. In addition, almost all respondents agreed that appealing photographic

visuals were the main criteria in grabbing attention to the tourism advertisement board. Findings from this research supported the statement by Warren [2] that visual selection in terms of its communicative ability such as the aesthetic values, emotions, clear and precise expression, and conceptual provided effective impact to the image used. Thus, in producing photographic images on tourism advertisements that would have an effective impact, the visual selection factor was also the main factor. The visual selected is able to provide effects to the whole image being displayed.

6.3 Creativity of Visual

Based on the survey on the aspects of visual creativity, almost all respondents indicated that a creative photographic image was able to capture people's attention to the display on the tourism advertisement billboard. Other than that, all respondents believed that creative photographic images on the billboard were important elements. This could be referred to in Table 3 which reported that 68 of 148 respondents agreed and 61 strongly agreed that creative photographic images on the tourism advertisement board were a significant element. Therefore, this shows that visual creativity is also an important aspect in producing the photographic image on tourism advertisement billboards in conveying messages and information on a certain tourist destination to the public. Findings from this research advocate the opinion expressed by Belch and Belch [8] that the visual was a dominant part in any printed advertisement and played an important role in determining its effectiveness, because visuals or images used must be able to grab consumers' attention, convey ideas or overviews, and be related to the text in order to carry effective messages. Attention is focused on the creativity concept because many people view the challenges in the disseminating advertisement image messages creatively so that they could communicate in a precise and effective manner.

7 Conclusion

The conclusion for the study of photographic images on Perak tourism advertisement billboards is, overall, the aspect of composition and visual attraction (images), photographic visual selection (subject), and visual creativity (images) must be emphasized for each photographic image specifically so that they could attract the locals' and foreigners' attention. These images could also be used as the main information medium and be able to promote interesting places in Perak. Any attractive photographic image on the tourism advertisement billboards is able to provide an initial overview of the tourism destination featured on the billboards. An approach in producing tourism photographic images on the advertisement billboard must stress each aspect of the research with new ideas inasmuch as the public is

drawn more towards captivating and unique images about the tourist destination. Other than that, the relevant authority such as the State Tourism Department must be able to ensure the aspect of the photographic image used on the tourism advertisement billboard is capable of conveying information and promoting the tourism destinations effectively. Each creative image that combines aesthetical values will be more appreciated and messages will easily be well-accepted by the public. Other than that, the power of attraction of the image used must be able to portray suitable images that are appropriate to the messages that need to be conveyed.

8 Recommendation

The recommendation from the researcher goes to the ministry departments and state and local council. They must ensure that the image used in tourism advertisements on billboards must be able to provide positive values and be able to appeal to the locals and foreigners to come to the tourism destinations featured on the billboards. Other than that, the relevant authority is able to evaluate the image used so that it will be able to give a good perception of tourism destinations displayed on the tourism advertisement billboards, as the image will also be able to convey information to the public and tourists at large. This is important in order to ensure that all the relevant authorities will do more planning for the photographic image that will be used in Perak's tourism campaign.

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How Anthropomorphic Traits Facilitate Interaction and Build Relationships: Case Study of Four Malaysian Brands

Azahar Harun, Mohamed Razeef Abd Razak, Norsharina Samsuri, Ariff Ali, Anith Liyana Amin Nudin and Fatrisha Mohamed Yussof

Abstract This chapter discusses the role of anthropomorphic traits in Malaysian brands in relation to consumer behavior. To conduct this study, a mixed method approach was employed which encompasses a visual analysis and a consumer perception survey. In the first stage, four established Malaysian brands (logos) were sampled and analyzed formally. In the second stage, 102 respondents (university students and academicians) participated in the survey. The results of the visual analysis indicated that all four samples with anthropomorphic traits (categorized as literal, partial, abstract, and typographic) were able to accentuate meaning and evoke emotional responses. In regard to the survey, all of the samples showed a higher agreement rate (frequency) in terms of brand identity, anthropomorphic, gender appearance, communication, and quality. From the findings, we conclude that anthropomorphism is a unique perception that can offer a positive outcome particularly in strengthening a brand logo, facilitating interaction, and building a relationship with the consumer.

Keywords Anthropomorphic traits · Brand logo · Design · Marketing strategies

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1 Introduction

A brand logo can be defined as a communication tool used by marketers to distinguish, convince, disseminate messages, and reflect a company's good image. According to Henderson and Cote [1] a typical brand design, which normally contains graphic elements such as symbol, icon, typography, and images serves none other than to create identity that will prolong recognition and ultimately influence a consumer's buying decision. So how can a brand design promote itself? Scholar believes that it should all begin at the design stage. According to De Chernatony [2] the design of a brand should not be tactical but strategic. In other words the designer should carefully consider all kinds of options (color, fonts, shape, etc.) so that the final outcome will expose "the core essence of the nature of the brand" [2]. In relation, some Malaysian brands are already recognized in the global market, for instance, PETRONAS, Air Asia, Malaysia Airline, and Proton. In spite of this, there are quite a few Malaysian brands that fall short in terms of design and visual appeal.

2 Problem Statement

Theoretically speaking, any three-dimensional products that exhibit human traits (cars, robots, toys, furniture, etc.) are likely to be recognized and accepted by consumers regardless of age, cultural background, and beliefs. For example, a study by scholars shows that most people tend to have a social connection with a car [3, 4]. This social attachment can be described as the outcome of anthropomorphism. By definition, anthropomorphism is a tendency that allows viewers to perceive nonliving things as human [5]. Many researchers state that anthropomorphism can influence consumers to establish strong relationships with the subjects [3, 5].

In spite of the abundance of literature, surprisingly there is limited research that reviews the role of anthropomorphic traits in Malaysian brands and how consumers respond to them. In order to steer the study, therefore a hypothesis was proposed: a Malaysian brand that exhibits anthropomorphic traits will likely facilitate interaction and build a relationship with the audience [6].

3 Literature Reviews

The term anthropomorphism comes from two Greek words, *anthro* which means human and *morph* which means form or shape [7]. Initially used by theologian scholars to refer to representation objects of gods, deities, and spirits [7], anthropomorphism nowadays has been accepted in many disciplines especially in the arts

[5]. According to a scholar, anthropomorphism is a kind of perception that is naturally developed in humans since infancy, which allows viewers to perceive the human form and presence in nonliving things, inanimate objects, and animals [5, 8]. A study by scientists discovers that the human infant already has the ability to recognize and distinguish various kind of emotional expressions such as smile, sadness, and anger [9]. A three-year-old child would think (or believe) that anything is mindful (conscious). As the child grows, he or she will realize the difference between conscious and unconscious [10].

3.1 Anthropomorphism Theories

Scholar states that the ability to perceive anthropomorphism is a sophisticated mental process especially at the adulthood stage [11]. In this regard designers often exploit the anthropomorphic form to attract and arouse human instincts. A case study conducted by researchers [12] indicates that the iconic animated character Hello Kitty created by Sanrio is very successful in establishing a social connection with consumers. The study also identifies eight marketing strategies. They are simplicity, character licensing, third-party collaboration, capitalizing on nostalgia, product line extension, brand extension, sustaining consumer interest, and harnessing technology [12].

In order to understand how anthropomorphism performs, Guthrie [5] offers four theories, familiarity thesis, comfort thesis, best-bet thesis, and social thesis. The familiarity thesis is the basic concept in understanding anthropomorphism that offers this notion: when we try to explain about the unknown world (phenomenon), we would turn to ourselves as reference because, “these are the easiest or most reliable” source [5]. The second view of anthropomorphism perception is called the comfort thesis. According to Guthrie [5] the comfort thesis states, “Discovering humanity around us necessarily makes us feel better than not discovering humanity.” Design scholars also share this notion. DiSalvo and Gemperle [11] state that humans would feel comfortable only around the human race. The best-bet thesis refers to a cognitive approach of anthropomorphism. Barnes [13] believes that betting (guessing) is a natural instinct that can help people survive any potential threats. The social thesis refers to the act of attributing human characteristics to nonhumans (animals, objects, tools, etc.) in order to interact and behave towards them. For example, the Sony AIBO robot has a real-time communication feature that enables the user to engage socially with it [14].

3.2 Anthropomorphism in Consumerism

According to Aggarwal and McGill [3] marketers often exploit anthropomorphism to make the products look appealing. For example, character mascots “Mr. Peanut”,

“Tony the Tiger”, and “Michelin Man” are anthropomorphized (designed) to an extent that their appearance influences consumers to sense a human-like presence in them. According to Magadalinski [15], a character mascot is an advertising agent that is designed to “communicate essential qualities of a product to consumer.” A study by researchers [4] states that “When a user interacts with a human-like virtual agent, talking and moving in a vividly simulated audio-visual environment, more sensory cues will be involved and perceived by the users. Such an interaction will lead to a higher degree of telepresence than if no agents were present. Also, it is expected that a higher degree of social presence will be conveyed as the user interacts with an agent capable of both verbal and nonverbal cues.”

Realizing the advantage of anthropomorphism in visual communication is abundant; marketing scholars began to introduce it in brand design [16, 17]. Aaker describes brand personality as “The human characteristics associated with a brand” [16], and developed a scale to measure brand personality. Fournier investigated the relationships between consumers and brands, and discovered that the relationships with brands were “valid at the level of lived experience [of consumers]” [17]. According to scholars, due to anthropomorphic characteristics, consumers begin to build strong relationships with the brands and regard them as human [18].

4 Methods

In this case study, four established Malaysian brands were sampled. They are Julie’s (food product), Habib (jewelry), Karangraf (magazine publisher), and Happy (telecommunication). These brands were selected based on their formal quality that portrayed anthropomorphic traits categorized as literal, partial, abstract, and typographic. Literal means that the brand exhibits a full or almost complete figurative character. Partial means that the brand shows a certain part of the human form such as hands, head, eye, silhouette, and so on. Abstract means that the brand exhibits conceptual human form. Typographic means that the brand design contains a font that displays gesture or facial expression.

In order to conduct the study a mixed method was employed, which encompassed a visual analysis and a survey. The visual analysis method was conducted for the purpose of assessing Malaysian brand design in relation to anthropomorphism. This task involved looking at the visual elements namely form, line, and typography. For the survey method, 102 ($n = 102$) respondents (university students and academicians) answered a questionnaire distributed by email. Their responses were measured based on five conditions. Table 1 provides the description regarding the perception conditions.

Table 1 Perception conditions

Codes	Domain name
D1	Identity
D2	Anthropomorphism
D3	Gender appearance
D4	Communication
D5	Quality

5 Results and Discussion

5.1 Visual Analysis

Julie’s (Fig. 1) is a brand logo that we categorize as “literal” because it portrays a cartoon figure of a young girl. The logo design also incorporates typographic elements and geometrical shape. The cartoon figure is shown only on the upper body whereas the lower body is cropped by an oval frame. Her hair color is blonde (yellow) and tied with blue ribbon, thus suggesting foreign ethnicity. She is depicted wearing a blue shirt with a red vest. The design of Julie’s brand logo suggests that it is meant to meet the expectations of the global market. This is noticed by the image of the blonde girl and the name Julie, which is a typical western name. The use of foreign ethnicity (name, image, style) is commonly found in the local scene. One of the reasons is that local consumers tend to believe that foreign values are more appealing and reliable. The girl’s face lacks expression and her body posture is fixed. This implies that she is a fictional character and does not represent a real person.

Overall the concept of Julie’s brand logo manages to reflect the company’s personality and influence consumers on judgment and purchase intentions. The tagline “bake better biscuits” shows the company’s commitment to achieving customer satisfaction and building long-term consumer confidence and trust in its product.

Habib (Fig. 2) is a brand logo that we categorize as “partial” mainly because it portrays parts of human hands. Likewise the logo also incorporates typographic elements and geometrical shape. The dominant aspect of this brand logo is the diamond-shaped object placed in between the hands, which brings meaning to it. In

Fig. 1 Julie’s biscuits (literal)



Fig. 2 Habib (partial)**Fig. 3** Karang kraf (abstract)

this sense, the audience may perceive “Habib owning the precious jewelry.” The brand logo also promotes the desire for the audience to own the jewelry too. There are four crossed lines created inside the diamond to portray “shine”. The typeface appearance of clean, bold, and sharp angular lines complements the typeface selection that looks somewhat modern and edgy.

Karang kraf (Fig. 3) is a brand logo we categorize as “abstract” mainly because it portrays a conceptual figure form incorporated with typographic elements and geometrical shape. The conceptual figure form is composed in a circle frame, which is a similar approach as discussed in Julie’s brand logo. However, the detail such as face and body parts are not included. Having said this, the brand logo evokes the sense of simplicity and modernity.

The visual elements are being stylized to help audiences recognize the brand logo easily. This is based on a notion that a simple form is much easier to remember unlike a complex form. By combining two major elements in harmonizing the arrangement or symbol and letter of design elements, the brand logo manages to reflect the sense of quality and reliability.

“Happy” (Fig. 4) is a brand logo that we categorize as “typographic” mainly because it only uses typographic elements and has no conceptual figure component. To accentuate the notion of happiness, the brand logo is manipulated in a way that the tail of the letter “y” is extended and bent to form a smile. The counterform of the letters “a” and “p” also accentuate the expression of a happy face.

A good brand logo should be able to sink into the memory of the audience. The same can also be said about the Happy brand logo. The simplicity of the brand name is delivered by the appropriate typeface with minimal modification to show the meaning of happiness. It is also suitable to use a sans-serif typeface with

Fig. 4 Happy (typographic)

rounded edges to promote casualness and friendliness. Because it is simple and distinctive, this brand logo has high visibility to compete with its rivals in the eyes of viewers. With strong and bold color, the Happy brand logo demands attention. In the aspects of anthropomorphism, it clearly depicts a human face through the formation of the word mark in associating its clients or viewers with their brand promise. With regard to production purposes, this brand logo is easily applied onto various types of media because the form is not complex and is designed to survive with a single color. In consideration of these aspects, the Happy brand logo is successful in delivering its corporate philosophy and values through simple and distinctive design.

5.2 Consumer Perception Survey

With regard to the consumer perception survey, 102 ($n = 102$) respondents (university students and academicians) participated. Prior to that a five-point Likert Scale questionnaire was developed which focused on the anthropomorphic traits embedded in the selected Malaysian brand logos (Julie's, Habib, Karangkrak, and Happy). For the purpose of discussion, we created a simple graph format, which showed the frequency of agreement rate on four different variables (brand identity, anthropomorphic, communication, gender appearance, and quality).

The graph in Fig. 5 contains the result of "Brand Identity". It shows that the majority of respondents agree that the samples under study are recognizable. This is probably due to the extensive marketing strategy employed by the marketers to promote the brands. More importantly the result also shows the effect of the anthropomorphic traits on consumers' perception.

The graph in Fig. 6 contains the result regarding "Anthropomorphic". It shows that the majority of the respondents tended to believe that the anthropomorphic traits exhibited by the samples were apparent. This is due to the fact that each of the samples contained a familiar feature to which the respondents could relate. For example, sample 1 (Julie's), displays a figurative character of a foreign girl, which can easily be noticed by the character's hair color and hairstyle. Surprisingly the respondents can also sense anthropomorphic presence even if the brand design only has typographic elements as seen in sample 4 (Happy).

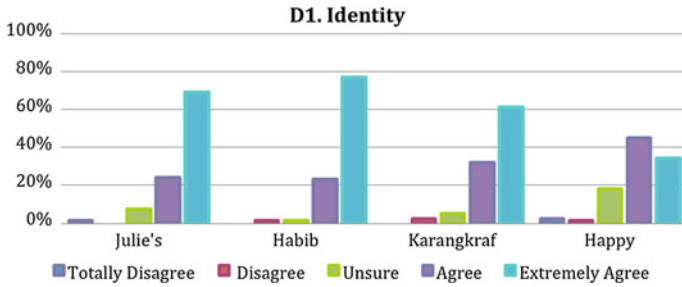


Fig. 5 Brand identity

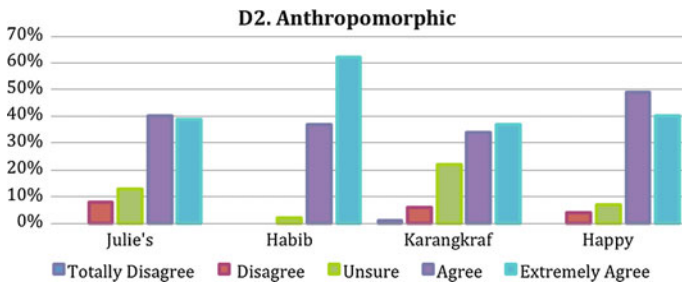


Fig. 6 Anthropomorphic

The graph in Fig. 7 contains the result regarding “Gender Appearance”. As shown here, there was a mixed response among the respondents. As expected, sample 1 (Julie’s) and sample 2 (Habib) scored a higher agreement rate in comparison to sample 3 (Karangkrak) and sample 4 (Happy). The reason why the respondents tended to perceive gender appearance in these samples is due to the quality of anthropomorphic traits. For instance, Julie’s brand logo depicted a cartoon figure of a young girl and the Habib brand logo featured feminine hands holding a diamond. These visual cues influence the audience’s mind to think that

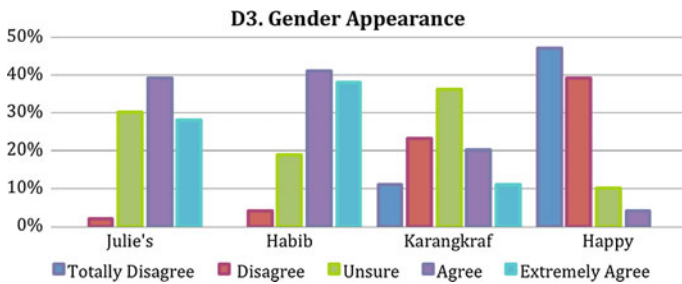


Fig. 7 Gender appearance

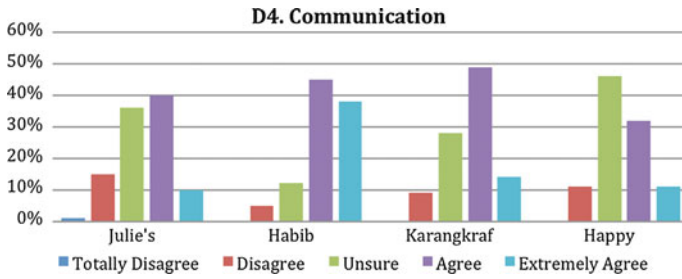


Fig. 8 Sample 4 (typographic)

the brand logos are actually female. On the other hand, sample 4 (Happy) shows a higher disagreement rate. This result is due to the fact that the smiley face expression is generic and does not represent any gender for that matter.

The graph in Fig. 8 contains the result regarding “Communication”. Overall it shows that majority of the respondents were able to interact with the samples through visual cues. For example, in sample 2 (Habib), the respondents tended to attribute the two hands holding a diamond as representing the notion of love and preciousness. In sample 4 (Happy), the respondents tended to perceive a smiley face even though there is no figurative character.

The graph in Fig. 9 contains the result regarding “Quality”. Overall it could be said that the majority of the respondents tended to believe that the samples were able to promote quality and assurance. In spite of this, the respondents rated sample 4 (Happy) lower in terms of quality. This response, in a way, showed that consumers are very much accustomed and emotionally connected to brand logos that feature recognizable anthropomorphic traits as opposed to the ones with typographic features (or without them).

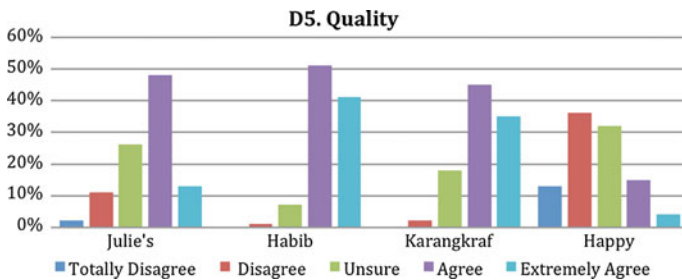


Fig. 9 Sample 4 (typographic)

6 Conclusion

A brand is a marketing agent that is mandatory in the commerce world. We believe that the communication aspect of a successful brand does not solely depend on visual appeal; rather it will also need a motivational factor known as anthropomorphism. In this study, we discovered four different types of anthropomorphic traits that are commonly found in the local scene. They are literal, partial, abstract, and typographic. Each of these traits has the potential to disseminate meaning and communicate value in terms of brand identity, anthropomorphism, gender appearance, and quality. Based on these notions, it showed that anthropomorphism is not only a natural instinct (or also known as “pathetic fallacy”) but has the psychological authority to influence purchasing decisions. Hence we recommend that Malaysian designers and marketers should take full advantage of anthropomorphism for the sake of strengthening a brand logo and establishing social connections with consumers.

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Approach Using Photographs as Part of the Therapeutic Process for the Mentally Ill: Case Study on Mental Illness Patients, Malaysia

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Abstract The research explores one approach using photographs as part of a therapeutic process for mental patients in Malaysia. The process described might be utilized in different ways by different actors. In that case, this could be classified as a phototherapy approach. Because the researcher is not a mental health professional and is therefore not qualified to judge the therapeutic value of a particular methodology, this research and its conclusions are confined to this second approach. The approach is as follows: five institutionalized, nonviolent patients were selected under the supervision of a doctor aware of the patients' mental health history. Patients were picked who often exhibited difficulty socializing or communicating or who had difficulty focusing on a particular subject. The researcher presented each patient with 200 photographs of near-random images, and the patient was asked to pick one. From that image, the patient produced his own artwork using colored pencils. A video recording was made of each patient, including an interview process designed to ascertain the patient's frame of mind

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before and after the drawing process. The medical professional responsible for the patient was presented with information the patient expressed in these interviews and was asked if this behavior was typical or atypical for each patient. The majority of patients who went through this process gave qualitative feedback that indicated perceived improvements in their general mental health state. The most significant observations were that patients appeared more sociable, more relaxed, more in control, and better able to reflect on experiences.

Keywords Photograph · Therapy · Mental patient

1 Introduction

In Malaysia, to date there are 27 clinics that provide mental treatment services [1]. The subjects used in this research were taken from one such facility in Perlis, Malaysia, and were authorized by the National Institute of Health of the Ministry of Health Malaysia. The study group was selected by the head of the department of psychiatry at a mental health facility. All of the patients interviewed were diagnosed with schizophrenia, a severe mental illness. To define: schizophrenia is a mental disorder that makes it difficult to distinguish between what is real and not real, think clearly, have normal emotional responses, and act normally in social situations [2]. It was not the intention of the researcher to restrict the patient sample to those diagnosed with schizophrenia. However, the researcher was only given access to patients with this condition. Therefore, without further study it would be difficult to say with certainty whether any results seen would extend to patients with a variety of mental illnesses or whether it would be confined to patients with schizophrenia. The research explored an approach using photographs as part of a therapeutic process for mental patients. The researcher attempted to determine whether there was a qualitative positive change in the patient's behavior as a result of the process [3]. If so, the patient may be in a state more receptive to therapy. It may well be the case that the process would be useful as one of the "phototherapy" techniques, but the researcher would need more direct involvement by mental health professionals in order to make such an assessment.

2 Methods

Five institutionalized, nonviolent patients were selected under the supervision of a doctor aware of the patients' mental health history. All of the patients selected were diagnosed with varying degrees of schizophrenia, and exhibited varying degrees of

difficulty socializing or communicating. The researcher (who, again, is not a mental health professional) presented each patient with 200 photographs of near-random images, and the patient was asked to pick one image as a representation and an optically formed reproduction of an object, such as one formed by a lens or mirror. From that image, the patient produced his own artwork using colored pencils. A video recording was made of each patient, including an interview process designed to ascertain the patient's frame of mind (e.g., happy, agitated, gregarious, reserved, and unresponsive) before and after the drawing process [4]; it is relevant to note that the medical professional responsible [5] for the patients was presented with information the patient expressed in these interviews and was asked if this behavior was typical or atypical for each patient.

3 Results and Discussion

Table 1 details the experiences with each of the patients in the study. Generally, the researcher's experience was as follows.

Part 1—Initial meeting, including discussion of what would be asked of the subject. Patients appeared either (1) uncommunicative and closed off or (2) unfocused in their communication, veering from subject to subject without clear reason.

Part 2—Patients began the task. They looked at the 200 photos, picked one, and then drew what they saw. There was some communication during this phase, but primarily the patients focused on the task given them.

Part 3—Patients discussed what they drew with the researcher, invariably veering off into discussions of other things that interested them. The researcher found that praising the patients' drawings was helpful in getting the patients to open up. Although levels of communication varied from patient to patient, all patients showed improvement in communication. In the two patients with more severe schizophrenia, the drawings bore little or no resemblance to the photos they chose, but this seemed irrelevant to the resulting increase in communication.

Part 4—Informal discussion with patient caregivers when possible, and describing the topics discussed by each patient. In a few cases, the caregivers expressed surprise that the patients were so forthcoming with the researcher. Twice the caregiver indicated that they learned something about the patient they had never been told during regular therapy sessions.

Table 1 Experiences with each patient

P	Patient background (all diagnosed with schizophrenia)	Observations of patient before drawing	Observations of patient after drawing	Topics discussed by the subject	Drawing similar to photo?
A	Female, outpatient; visits institution regularly for medication and/or therapy	Not very communicative; difficulty understanding task presented, needed a lot of explanation	Opened up with very personal information	– Personal stress – Problems interacting with local community	Yes
B	Female outpatient; visits institution regularly for medication and/or therapy	Patient was responsive to requests, but was otherwise quiet	Much more open, volunteered information about her life	– Financial problems – Inability to make or maintain friendships – Social/love problems	Yes
C	Female outpatient; visits institution regularly for medication and/or therapy	Patient was responsive to requests, but was otherwise quiet	Much more open, volunteered information about her life	– Concern about being unmarried; lack of emotional and financial support from the family – Unhappy about restricted freedom – Discussed very personal sexual issues	Yes
D	Male; institutionalized; more severe schizophrenia	– Unstable – Barrage of questions aimed at researcher	– More stable – Good communication – Very strong reaction to photos	– Financial problems – Paranoia regarding men	No
E	Male; institutionalized; more severe schizophrenia	Good understanding of task, but poor focus	– Began speaking during drawing process	– Depressed about being unable to maintain employment	No

4 Conclusion

It is hoped that utilizing this technique as a part of the therapeutic process might enhance the value of the existing psychotherapy and counseling sessions. The majority of patients who underwent this process gave qualitative feedback that indicated perceived improvements in their general mental health state. The most significant observations were that patients appeared:

- More sociable
- More relaxed
- More in control and focused
- Better able to reflect on experiences.

With the patient in a more relaxed, reflective state of mind, a therapist might find it far easier to work with the patient, thus improving therapeutic results while minimizing time necessary between therapist and patient (effectively reducing the cost of treatment). It is important to note that the interviewer need not be a mental health professional, thus minimizing additional costs that institutions might incur utilizing this approach. This notion of “priming” the patient for work with a therapist is perhaps the most promising aspect of this research. Initial results are encouraging, however, additional research would be necessary to measure the benefits of the therapeutic approach accurately.

Suggested areas for further study include:

- (1) Direct involvement of therapists in order to evaluate the process as potentially therapeutic
- (2) Extending to patients who suffer from mental illnesses other than schizophrenia
- (3) Increasing the number of patients in the study
- (4) Further study of gender in understanding images.

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Managing Stress Among Adolescents by Using Digital Visual Schedule

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Abstract Adolescents are commonly afflicted with the negative effects of stress. These groups of adolescents are students who are going through the transition of vast physical and mental changes during a specific period in their lives, and are failing to manage their time more wisely and effectively according to the different situations that occur. The purpose of this research is to examine the current situation of stress among adolescents and to investigate a suitable approach on using visuals in a digital visual schedule to handle stress. The sample comprised 50 university students from Universiti Teknologi MARA and Unisel Shah Alam from different faculties. Data were collected through structured questionnaires and an interview was conducted on student stress management and opinions on a digital visual schedule in order to obtain the research goal.

Keywords Stress · Adolescence · Digital visual schedule · Time management

1 Introduction

Stress has become an important subject in the academic environment as well as in our culture. Many researchers in the behavioral science field have carried out extensive research on stress and its consequences and have concluded that it needed more concentration. Stress on adolescents, if not well managed will inflict negative

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impacts on them. Thus, it is imperative for adolescents to learn and obtain the essential knowledge and skills for managing stress in order to make them contribute positively to their development and transition of entering adulthood.

1.1 Stress

Stress as defined in the Oxford Dictionary is a state of mental or emotional strain or tension resulting from adverse or demanding circumstances. Reference [1] defines stress as the opposing reaction people have to excessive pressure or other types of demands placed on them. Stress occurs when an individual is confronted by a situation that he or she perceives as overwhelming and cannot cope with it. Depression, nervous breakdowns, and heart disease are a few of the mental and physical illnesses if the intensity of this excessive pressure and chronic nature is not properly managed [2]. There are three levels of stress classified by psychologists, acute stress, episodic acute stress, and chronic stress. These types of stress are categorised according to the state of their respective stress level.

1.2 Adolescence

Adolescence is a stage of human development that occurs between childhood and adulthood. Although there are varying definitions of adolescence, adolescence is generally viewed as a stage where young people experience rapid growth of their body and mentality to full maturity during 12–15 years of age [3, 4]. In the education system, adolescents are those receiving education in primary schools, secondary schools, vocational schools, colleges, and universities. According to the Malaysia Education Blueprint 2013–2025's Preliminary Report [5], every child in Malaysia, regardless of wealth, ethnicity, or background, deserves equal access to quality education, hence the Malaysian education system aspires to ensure universal access and full enrollment of all children from preschool through to the upper secondary (Form Five) level, whether through the academic pathway or equivalent vocational and technical pathways. Soon after, they are given the choice to opt to pursue higher education levels.

1.3 Stress Amongst Adolescents

Reference [6] proposed that school is one of the main sources of stress among adolescents. The transition of students from the school environment to the university environment could cause a psychological, academic, and social shock to them, because these educational systems have huge differences: the student will

face new methods of teaching, new academic requirements, new types of relations between students and faculties, and even new relations among the students themselves [6]. Stress could be defined as one of the main aspects of our modern life, resulting from the rapid changes in human life, so this age is called the age of stress; students suffer from academic stress resulting from testing, homework, and other requirements that may exceed their abilities [6]. Consequently, the evidence of stress among these students has resulted in poor academic performance, as the high levels of stress would only produce negative impacts, rather than positive ones. Research conducted by the Unit Kerjaya dan Kaunseling Universiti Teknologi MARA (1991) found that the reasons for academic deterioration among university students is due to the workload that they have to complete: 32.9 % goes to course projects, 30 % on examinations, 13.5 % on essay writing, 12.0 % on practical work, and the remaining 10.7 % on other activities. The failures to accomplish these academic tasks are because the subjects taught might not be compatible, academic staff that is not fit to teach, no motivation to learn, and ineffective lesson plans. Students' time is a limited source. They are bombarded with countless responsibilities and tasks to complete, however, not all may be able to manage these due to several factors. According to Reference [7] up to 40 % of university students experience procrastination as a problem, whereas Reference [8] argued that procrastination often emerges as a means of distancing oneself from stressful activities. Dealing with the underlying stressful aspects can assist in reducing the extent of procrastination. Nevertheless, their ability on handling time often fails because of the idea of perfection and unrealistic expectations [9]. For instance, there are individuals who will not initiate a time management approach until it is their last resort in order to catch up with the assignment. Time management is crucial, as it is a vital step in avoiding and dealing with stress among these students.

It is believed that stress is experienced by students and the demographic factors affecting it. According to Reference [10], intended to recognise the factors of stress among university students, they concluded that stress could be caused by environmental factors, academic factors, monetary factors, physical factors, and psychological factors. Stress for an individual can be both positive and negative, depending on its level. For instance, the monetary factor correlates closely with family, as a portion would face complications such as money problems, paying monthly expenses, arranging childcare, and being obligated to repay loans. Some of the main causes blamed for student stress are the burden of coursework, debt, exam pressure, financial worries, and relationship problems. This is because students are enforced to adapt to a new environment differently from when they were in school. Other than that, research indicated that the separation from the family and the inevitability of surviving on their own are also causes of stress among these adolescents [10].

1.4 Digital Visual Schedule

A visual schedule is set of images or visuals that are occasionally accompanied with text and are used to communicate and arrange an order of events. A digital visual schedule, however, functions the same with the exception of it being available on digital media such as mobile phones, tablets, and computers rather than physical objects. The advent of a digital visual schedule as a system of delivering a simpler alternative provides individuals consistent cues to keep track of their daily activities. This schedule provides a structure that allows the user to anticipate what will happen next, reduce anxiety by providing the individual a vision of his day, and promote calmness between transitions. Digital visual schedules are easily accessible and are convenient as individuals would have the leisure to have it installed on devices thus having the flexibility to alter any configurations on the schedule, with no hassle. There are several types of visual schedules, which include visual sequencing of tasks, visual calendar, written schedules, and written or drawn notification of change. It is important for individuals who have a profile that includes difficulty understanding oral language and directions to own a visual schedule as subsequently it helps to develop a positive routine. It also provides motivation to work through a less favoured activity knowing a favoured activity is to follow. The objective of this research chapter is to examine the current extent of stress among adolescents in universities and to investigate a suitable approach to using visuals to manage stress in a digital visual schedule.

2 State of the Art

2.1 Stress Management

The lay public and mental health professionals have commonly used the term “stress management” for many years. Generally, approaches to reducing stress do not rule out the application of traditional or conventional treatment of strategies. Combining a generic stress management program with conventional treatment for remedial problems may be necessary to obtain information about the self or the environment, skill deficits, or conflict with others on whether those may cause the problem to arise. According to Reference [11], stress management comprises a wide range of approaches to help the individual better deal with stress and adversity. Stress management might include problem solving, prioritisation, and time management. The effectiveness time management is a good way to reduce stress among students. There are some strategies to increase academic performance and daily routine so all the activities run smoothly.

2.2 Time Management

Time management is the behavior to achieve an efficient use of time while performing particular goal-directed activities [12]. The importance of time management includes the ability to set achievable goals, identify priorities, monitor one's own progress, and to remain organised, and can lead to more effective time use and ultimately more positive individual outcomes in some settings [13]. Reference [14] identified the three components of time management, which are setting goals and priorities, making lists and scheduling, and preferences for organisation. In the other research studied, the use of mobile devices such as personal digital assistants (PDAs) also can act as a tool for students in managing their time. However, the finding on how effective the PDAs are in helping as a tool for students in managing their time wasn't that encouraging as the students found that the mobile digital calendar (refer to the PDAs) did not offer all they had hoped for [15, 16].

3 Research Methodology

This research chapter specifically emphasises adolescents who are university students. The study was conducted on the University Teknologi MARA (UiTM) campus in Puncak Alam Selangor and Unisel College in Shah Alam. Students enrolled in different courses were recruited for participation in the survey. The study consisted of 50 students, 25 of whom were from UiTM and the remaining 25 from Unisel. All participants were students at the time of the study, aging from 18–25 years old. The survey was administered to the students of the targeted group in the November 2014 semester. A set of questionnaires was structured and distributed, as the goal of this study was to find the most current factor that led to stress among them.

This study also aimed to obtain general background information of the participants [17]. The first section of the questionnaire outlined the respondent's demographic information, measured the degree of stress level based on several factors, and how well she coped with the stress exacted. The next section of the questionnaire was to examine respondents' previous experience using mobile technology such as applications, mobile digital calendar, or personal digital assistant (PDA) and their computer proficiency. Finally, the third division of the questionnaire questioned the respondents on their expectations regarding the idea of a digital visual schedule to help them handle their stress.

An interview session was also directed to an individual with expertise in this particular research. Despite the prior distribution of the questionnaire, interviews should be conducted, as it is best to get the nuances of personal expression and body language of an individual [18, 19]. A counselor from Universiti Teknologi MARA Shah Alam Campus, Madam Rokiah Mahmood was interviewed to acquire professional opinions and complementarities towards this research's

initial objectives, that is, to investigate a suitable approach on using visuals in helping to manage stress among adolescents. The session was conducted in the counselors' office itself with a structured script of questions prepared earlier before the interview session. The informal interview session was carried out for 30 min in duration of time.

4 Data Analysis

4.1 Level of Stress

The results indicated the level of stress that was caused by certain categories. The level of stress was the highest when it came to assignments, followed by the notion of not having enough time amongst these university students. Stress was regarded as average when it came to being with their roommate, moneywise, grades, exam papers, and the environment around them. Lastly, the categories that fell under the least stress intensities were the initiation of living away from home, being with family, playing sports, and being in a relationship. The results of these findings can be found in Table 1.

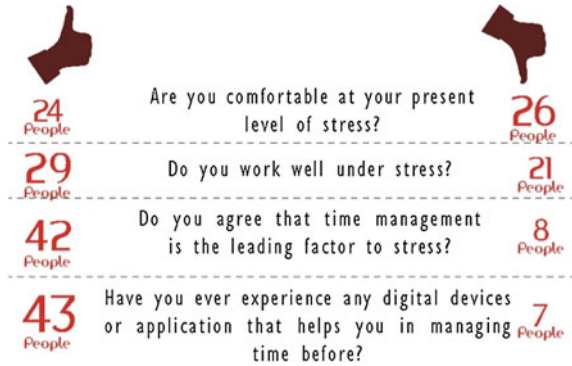
4.2 Managing Stress

The analysis of the students' stress management is represented in Fig. 1. Out of 50 students 26 were comfortable with the level of stress that they go underwent to this present day. Besides, 29 students found it problematic to work under stress. The findings also concluded 42 students agreed that time management was one factor

Table 1 Level of stress amongst university students

Categories	Quantity	Level of stress
Roommate	15	Average
Living away from home	16	Slight stress
Money	21	Average
Grades	22	Average
Assignment	16	Hardcore
Family	21	No stress
Friends	18	Slight stress
Sport	18	No stress
Test/Exam/Papers	18	Average
Relationship	19	No stress
Not enough time	19	Above average
Environment	12	Average

Fig. 1 Number of results on stress management



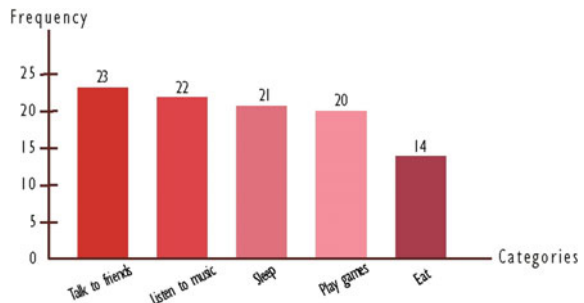
that led to stress among university students. Another 43 students identified their proficiency in using digital devices or applications as a method to manage time. Results of these data can be seen in Fig. 1.

5 Using the Template

There are various methods when it comes to dealing with stress. Results showed that these university students preferred to talk to friends as a channel to manage their stress with the tally of 23 counts, making it the category with the highest frequency. After that, listening to music had 22 counts. Moreover, the sleep category had 21 counts, making it third highest, along with playing games 20 counts and the eating category with 14 counts. Figure 2 shows the five highest categories taken from the questionnaire provided.

From the interview, however, deductions from the session were categorised in two divisions. Several questions on stress amongst university students and how they coped with it were asked primarily to have a clear understanding of the current situation occurring in the university environment.

Fig. 2 Frequency of categories that students chose to deal with stress



5.1 Students' Stress Management

Interview comments stated that the appearance of stress in an individual was unavoidable, particularly with university students. Nonetheless, the failure of managing their stress in this period of time left an antagonistic outcome not only to themselves, but to others as well. Students' habits and daily routines played an important role in determining their stress levels in a day. Also, the interviewees stressed that most of the students who came to seek counsel were stressed due to environmental behaviors around them and their failure to manage themselves. A statistic of 70–90 % of the students who scheduled for counseling appointments was due to stress. Albeit the abnormal percentage, the interviewees were assured not to be alarmed because they were not at a chronic level yet and stress was still controllable through proper guidance and practice. Consequences of this failure led to their decision to discontinue pursuing their studies and a few succumbed to physical illness.

5.2 Usage of Digital Visual Schedule

Time is the most critical factor when it comes to managing stress. Therefore, a schedule is exceedingly significant to a student to anticipate what comes next and eventually reduce stress levels. The usage of visuals in assisting to cope with stress was favored as the interviewee recommended that art therapy visuals should be implemented in this schedule. Using visuals as a medium to help deal with stress has been a method that is still not widely practiced in Malaysia, said the counselor, hence the encouragement of the idea of this research. Art therapy is a mental health profession in which the participants, facilitated by the art therapist, use art as the medium and experience the creating process of creating an artwork based on the feelings that help reconcile emotional conflicts, manage behaviors, and reduce anxiety as one of the many outcomes of this therapy technique. A digital visual schedule is an adequate combination that can be executed to help manage stress among university students especially in this current technology-driven generation.

6 Discussion

The findings of this research imply that many students are familiar with the effects of stress. Seeing it as the foremost problem, the main cause of stress among adolescents due to poor time management and demographic factors seems slightly contradictory to the results that were collected. These adolescents are still stressed due to inefficient time management, however, the results showed the highest level of stress nowadays is from assignments. The workload as a university student is

much more prominent as compared to school hence the prevalence of this particular category. Also, another outcome that seems opposite to previous research is the factor of being away from home. Adolescents in this present day do not find the impression of living away from their parents and family as a problem that leads to stress. Alas, university students today are still in control of the amount of stress that they go through. The type of stress that they deal with is still not at a chronic level. The results also indicate that students are fonder to talk to their friends while having or dealing with stress. A peer seems to be a comfortable person for them to share and release the tension and emotions. Spending time with people who bring these qualities can help keep an individual emotionally balanced. Listening to music is also becoming the alternative to coping with stress amongst students. It is stated that music could help with mind and body relaxation and adolescents would often have a collection of favorite tunes that they would listen to when they were feeling stressed out [20].

Participants are auspicious when a digital visual schedule is suggested as one of the media to manage stress. Their proficiency and familiarity in using digital media are just an advantage of the usability of implementing a digital visual schedule to assist them in managing their stress. Also, the execution of using visuals from art therapy sessions should also be taken into contemplation as that would simultaneously help these adolescents.

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Halal's Logo Design Application on Grocery Products in Malaysia

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and Sharifah Alwiah Syed Sahil

Abstract The 'halal' word stands for something permissible for Muslims according to the Islamic Law. The halal has been transformed into a standard of safety and hygiene for products consumed by Malaysian Muslims over the years. Therefore, the Muslims can only consume products that meet strict religious requirements, called Halal. There is an enormous positive global recognition of business in the Halal products. However, the Muslim consumers are also concerned with the products, whether the quality of the Halal used is following the standard and requirement. The objective of this project was to study the Halal logo design from several samples of grocery products that had been gathered from chosen hypermarkets in Malaysia. This study involved three hypermarkets that been chosen for this study including Tesco, Giant, and Kedai Rakyat 1 Malaysia in Malacca Town that contributed a huge income in the retail industry. This study also cooperated with a few that were involved with the issue of Halal certification in Malaysia namely JAKIM and JAIN. Site visits, which were followed with the visual documentation via photographic method captured selected several samples of the product from hypermarkets. The results through this study discuss certain aspects of the Halal logo within the context of packaging and labeling as an important aspect in their marketing for Muslim consumers.

Keywords Malaysia · Halal · Logo · Design · Grocery · Products

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1 Introduction

Halal products have now emerged as one of the fastest growing business sectors in the world. The global halal market is estimated to be worth more than USD 2.3 trillion and the value of the Halal food sector is reaching USD 700 billion annually as mentioned in *Halal Info*, 2013. Therefore in reality, the huge demand of Halal food products will lead and increase the supply for Halal certificates and logos. On the other hand, the great marketing expansion would require Halal products to meet the market large enough to meet these demands. Based on this favourable economic potential, the Malaysian government has been taking steps to become Malaysia's Halal hub in 2010. The halal logo plays an important role in ensuring the quality and the guarantee of Halal [1].

The logo of Halal that appears on any product will benefit the consumer to trust and be confident to buy or to use the product. Nowadays the consumer also consents whether the use of the Halal logo is from the authorized institution or is a fake logo. Therefore this scenario is still occurring and the issue still not resolved appropriately [2]. However, the significance of the Halal logo is actually assigned for food outlets that are permissible and patronaged by Muslims. The Halal logo provides an avenue for manufacturers to indicate to their target consumers that their products fulfil the Islamic standard. At the same time, the advantage to the particular manufacturers versus the other competitors is that which, the product is without the Halal certification [3].

In early January 2012 (see Fig. 1) the halal logo was seen scrutinized by the Malaysian Islamic Development Department (JAKIM), in how the Halal logo was used and recognized. The Minister of Domestic Trade, Cooperatives and Consumerism Minister, Datuk Seri Ismail Sabri Yaakob released an enforcement of the Trade Descriptions Act 2011 that was highlighted in Parliament. Later the Malaysia's halal logo status was highly competent and regarded, which was also recognized by the World Organization of Islamic Countries (OIC); the enforcement of the law should be stricter in order to control the use of the halal logo endorsement [4].



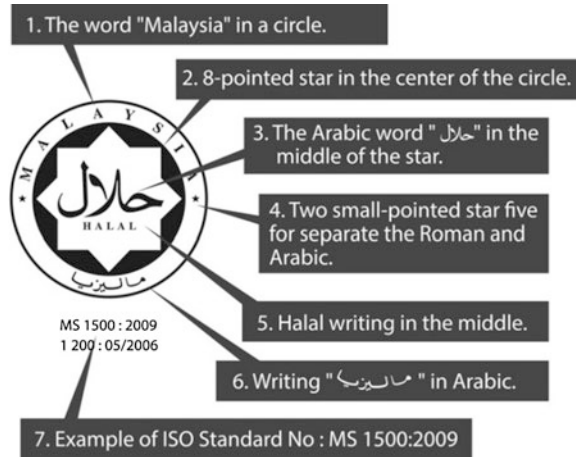
Fig. 1 The Halal logo provided by JAKIM. Retrieved April 10, 2015 from <https://www.facebook.com/SahabatHalalMalaysia>

2 Literature Review

The related study about Halal implementation for certain products and services in Malaysia was involved closely with industries as to fulfil Muslim consumers. In fact, the Halal principle was adapted as a universal concept. Besides, every consumer was not really exposed to the Halal certification and Halal brands [5]. In this country, almost 90 % of the food producers are non-Muslim. Awareness amongst non-Muslim manufacturers about the contents and process in their products is still rare in terms of their quality towards Halal requirements [6]. Therefore, the concern amongst the Muslims about the food that they consume, including the ingredients has led to a stimulus in demand for Halal food [7]. The challenge that is faced by the government is in how to enforce the lack of policy that was implemented in the Department of Islamic Development (JAKIM), then, in the monitoring about the usage of the certified Halal logo. Sometimes, it caused the consumer (public) always to request the validity on their products or services as to claiming that the product is Halal. In addition, with the advancement of technology, some employers are willing to misuse the Halal Certificate and Halal logo or JAIN/MAIN on their products. The community should be concerned about the Halal issue because every non-Halal food goes into the body and will become flesh and blood. Therefore, public awareness of Halal issues needs to be improved. The objectives of the research were to study the Halal logo design from several samples of grocery products that are available in Malaysia and to classify several samples of grocery products that were gathered from hypermarkets in Malaysia. In Malaysia, the legislation, policies, and standards set in question are based on the principle of Halal concept that is found in the Qur'an and Sunnah and according to Islamic scholars' view. Hussaini strictly mentioned that Muslims must eat Halal food. Halal is an Arabic term meaning 'permissible'. In the Arabic language, it refers to anything that's permissible under Islam [8].

The terms of Halal and Haram will be strictly used to describe food and beverage products, consumer goods, food premises, and slaughterhouses. The law prohibits the consumption of alcohol, pork, blood, and dead meat that has not been slaughtered according to Islamic rulings [1]. The non-Muslims were not unfamiliar with the Halal concept especially those who live in Muslim countries. A good example of consumers' awareness and understanding about the Halal concept was a food product that rapidly increased in annual sales in Halal stores throughout Moscow, Russia, from USD 45 million (2004) and USD 70 million (2006). It expected to continue to increase to USD 100 million (2008) as compared to Canadian Agri-Food Trade Service Report (2008), there is a strong demand for Halal products in a number of non-Muslim countries for both groups of consumers. In fact, Halal certification covers not only religious needs but are also commercially and community based as mentioned by Sharifah [9]. Nowadays, Muslim are making their presence felt socially and politically and are requesting Halal-certified food products [3, 10]. The Halal concept becomes important as users around the world begin to be aware about the Halal and Haram in the products they choose.

Fig. 2 The Halal logo provided by JAKIM and MAIN. Retrieved April 10, 2015 from www.halal.gov.my



The Halal logo should be on every product and premises must also contain elements like the diagram in Fig. 2.

The Malaysian Halal logo stands for the logo issued by the Department of Islamic Development Malaysia (JAKIM), Department of Islamic Affairs of State (JAIN), Islamic Religious Council of State (MAIN). The Halal logo can give insurance to consumers that the product is safe, clean, and healthy to consumers because it meets the standard [2]. The Halal Certification and logo not only guarantees Muslims or anyone what they consumed or use according to the Islamic laws but also encourages manufacturers to meet the Halal standards. Halal Certification is a document issued by the authorities of the Islamic organizations that endorses or of a product in accordance with the guidelines of Halal or Haram in Islam (Islamic Dietary Guideline) that has been stated by Riaz and Chaundry [10]. In Malaysia, Halal Certification means a Halal Certificate issued by JAKIM, the sole body recognized by the government of Malaysia, and the production of Halal Certification subject to the guidelines and standards.

The Muslim consumers have no other means of ensuring that the food they eat is truly Halal in terms of its 'halalness' [11]. Hence, conferring trust onto the factors in the Halal food chain, such as farmers and food manufacturers, as well as the trust in advertisements and Halal logos, enables consumers to compensate for the lack of knowledge and information they have about the cultivation and production process of Halal food that is strictly mentioned by Andersen [12]. The correct labeling on halal food is essential for consumers, because certain labels can often be misleading (HFA, 2002–2003). There are very few labels on food items in grocery stores that indicate whether the food product is Halal for Muslim consumption [10]. Table 1 is the data collection about the classification of the grocery product listed from the Tesco Hypermarket.

This study involved three hypermarkets that been chosen for this study including Tesco, Giant, and Kedai Rakyat 1 Malaysia in Malacca Town that contributed a

Table 1 Category of grocery products. Retrieved April 10, 2015 from <http://eshop.tesco.com.my>

Grocery products		
Biscuits and cakes	Canned food	Pasta and instant noodles
Dry condiments	Sauces and dressings	Chocolates and sweets
Cooking oil	Sugar and flour	Cooking ingredients
Snacks	Cereals	Rice
Baking	Jam, spreads, and honey	

huge outcome in the retail industry. This study also included the agencies directly involved in the issue of Halal certification in Malaysia namely JAKIM and JAIN. Site visits and collecting visuals with the photographic method were carried out to gather several samples of the products from the selected hypermarkets.

3 Analysis and Findings

The entire grocery items that were featured were chosen randomly. The samples taken for this study consisted of five categories of products such as cooking oil, snacks, biscuits and cakes, chocolate and sweets, cooking ingredients, and sauces and dressings. A total of 15 samples was taken from each category of items from the selected products. Elements of this analysis of the Halal logo include three important items: standard, color, and text (see Fig. 3).

There is a lot of variety of Halal logos that is currently being used in grocery products produced from the manufacturer. Here are some of the varieties of the Halal logo that are being used on the products being sold from the selected hypermarkets. The samples are illustrated in Fig. 4.

Fig. 3 Design element analysis

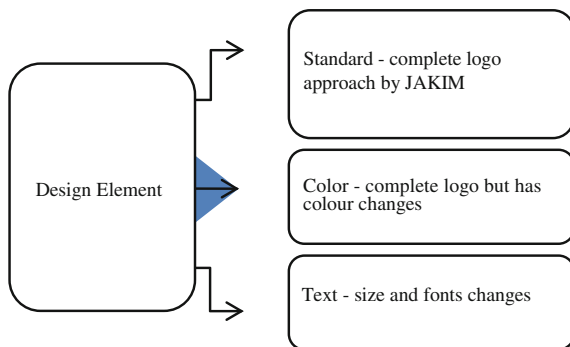




Fig. 4 Sample of Halal logo on the grocery product being used by the manufacturer

3.1 Cooking Oil Packaging Analysis

We use cooking oil almost every day in various types of our food. Just mention any kind of food, and the basic material is oil. The foods like fried, curry, dates, soup, sour and spicy sauce cooked used oil to cook them. There are many types of cooking oils including olive, corn, palm, sunflower, and others sold in the market. The total of 15 different brands of cooking oil samples was taken from the chosen market place. The cooking oil was then analysed according to the element being studied. Table 2 shows the percentage of the element of colour indicated on the product label. Most edible oil products have a recognized standard Halal logo (see Fig. 5).

Table 2 Values obtained from 15 samples on the label from selected cooking oil

Logo design elements	Percentage (%)
Standard	66.7
Color	33.3

Fig. 5 The orange colour is used on the Halal logo at the cooking oil packaging



3.2 Biscuits and Cakes Packaging Analysis

There are different types of biscuits and cakes including cakes and pies, cookies, savory crackers, and sweet biscuits on the market. A total of 15 different brands was taken and analysed as product samples (see Table 3 and Fig. 6). During the study, I found out that there are some biscuit products which do not have the Halal logo on their label. The user must be alert and needs to be aware about the Halal status of a product that being used.

3.3 Chocolates and Sweets Packaging Analysis

There are several types of categories of chocolate and sweets such as chocolates, jelly, and pudding, gums and mints, and sweets. The total of 15 different brands of chocolate and sweets samples was taken from the chosen marketplace (see Table 4 and Fig. 7).

Table 3 Value obtained from the biscuits label

Logo design elements	Percentage (%)
Standard	46.6
Color	33.3
Text	20

Fig. 6 Halal logo is complete but the size of the font of word “Malaysia” and “Halal” has been changed



Table 4 Value obtained from the chocolate label

Logo design elements	Percentage (%)
Standard	40
Color	46.7
Text	13.3

Fig. 7 Halal logo that used the word HALAL in Arabic and Roman font



3.4 Cooking Ingredients Packaging Analysis

There are various types of dry or wet food ingredients used by the user, among such kinds of cooking sauces, seasonings, spices, and stocks. Figure 8 shows the Alagappas Papadam product. The Halal logo featured on the product displays a variety of colors. Diversity Halal certification may result in confusion and manipulation of the stakeholders (see Table 5).

Fig. 8 Halal logo is complete but uses colourful color on the logo



Table 5 Value obtained from the cooking ingredients label

Logo design elements	Percentage (%)
Standard	46.7
Color	40
Text	20

3.5 Snacks Packaging Analysis

Generally, snack food is very popular especially among children and adolescents. There are various types such as canister snacks, chips, crisps, nuts and seeds, preserved snacks, ring and twisted snacks, and other snacks. Figure 9 was taken by collecting data (Table 6) that have been studied.

Fig. 9 Halal logo that uses the word HALAL in Arabic font

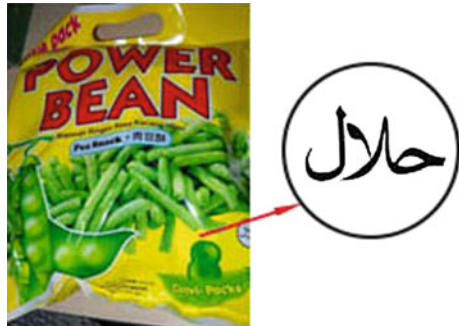


Table 6 Value obtained from the snack label

Logo design elements	Percentage (%)
Standard	66.6
Color	20
Text	13.4

4 Conclusion

The graphic design of the logo not only serves to inform about the Halal products but is also the important element to give certainty and confidence to customers. The importance of the Halalness of food products to the Muslim communities has to be highlighted to the non-Muslims so that they can understand and become more familiar with the strict requirements in preparing Halal food for Muslims. As a multiethnic nation with many different religious backgrounds, the implementation of Halal principles and concept on all food manufacturers and food providers is a win-win situation to both Muslim and non-Muslims in this country. This study shows three types of elements in the logo that will be manipulated in the local market. This study can help the JAKIM for the purpose of enhancing its role as the lead agency in the Halal certification in Malaysia. The results through this study discuss many aspects of the Halal logo in the context of the packaging label as an important aspect in their marketing for Muslim consumers.

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The Malay Cultural Symbol in Malaysian Modern Sculpture

Liza Marziana Mohammad Noh, Hamdzun Haron,
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Abstract Sculpture is one of the three-dimensional genres in visual arts. More specifically, sculpting as an art is embodied in the group of fine arts and becomes a single discipline in the branch of fine arts, which is primarily characterized as having two dimensions. In Malaysia, an early development of sculpture invited some negative perceptions among the locals. The society believed that sculpting carried an element of worshipping that was opposed to the values of Islam, causing sculpture to become unpopular and scarce. The formation of sculpture was transformed when sociocultural change left an impact on visual arts, causing the negative perception to further change as well. The sponsoring of the National Cultural Congress in 1971 had become the catalyst to such a surge of change. The values of the Malay culture have become the guidance to local sculptors following the issue of national identity that was sparked by the congress. Thus, to identify the Malay cultural symbols, our current work focuses on two local sculpture works produced by two well-established Malaysian sculptors. A qualitative approach such as the observation method, library research, and also interviews for the written data has been adopted to obtain information. It is hoped that the study outcome is able to elevate the status of the Malay culture as a new movement of arts in Malaysia. Seeing that today sculpture as works of art have exhibited art symbols that are rather universal, or scarce in the defense of Malay culture as the national heritage, a new generation of artists should expand the efforts further made by local sculptors in continuing the national heritage for years to come.

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Keywords Sculpture • Fine arts • Symbol • Malay culture and sculptor

1 Introduction

Sculpture is one of the visual arts genres that is three-dimensional. More specifically, it falls under the group of fine arts. It serves as a single discipline in the fine arts covering paintings, drawings, and prints that are two-dimensional. To determine the sculpture designs, knowledge and sensitivity towards the material and technique are integral. In relation to this, sculpture can be seen as a work of art that exists in the space of reality with the existent form that uses some tangible materials. The form of sculpture can be modified, whether the sculptors imitate real objects or they are modified through abstraction. As with other forms of art, sculpture also has its own evolution. This evolution revolves around the development of the form, meaning, and artistic movements that have become fundamental to sculpture.

Sculpture exists in space, as we do. The total experience of a sculpture is the sum of its surfaces and profiles. Even when touching is not permitted the perceived tactile quality is an important part of the way we experience sculpture [1].

The discovery of a figurative form believed to be associated with the spirit of fertility known as Venus Willendorf has proven that the evolution of sculpting had developed since the Paleolithic era. The figurative concept created in the prehistoric era is one way of channeling the concept of faith or belief, as explained by Ref. [2] where the organic form of the resemblance of a human figure was styled and magnified to illustrate the concept of fertility. In Europe and other countries, since the Classical Greek era, figurative forms had been created as epitomes of their gods, goddesses, or even sports athletes including myths and legends. Up to the fifteenth, sixteenth, and seventeenth centuries, Italy underwent the Renaissance era and baroque's figurative concept still remained the main subject of sculpting in delivering religious symbols, especially those of Christianity [2]. The relationship between sculptor and religion at the time was very close, as the era was very much enveloped by rich religious aspects. Sculptors including Michaelangelo, Donatello, and Bernini often became the points of reference to art historians and were regarded as the greatest classic sculptors of the classical era. The role of sculptor as a medium of religion can also be linked with other religions that have figurative concepts as their symbols of divinity. This is transparent in Hinduism and Buddhism, including the arts of the primitive, which use the subjects of humans and animals as the symbols of their faith and belief.

2 Sculptures in Malaysia

Referring to the development of sculpture in Malaysia, it is not a new form of art [3]. Sculpture was first introduced in the Hindu Buddhism era around 500 AD to 11 AD and this was verified by many art historians such as Syed Ahmad Jamal, Mulyadi Mahamood, and also Zakaria Ali [4]. According to Ref. [5], if we refer to archeologists such as Paul Wheatly [6], H. G. Quarteck Wales [7], Roland Braddel [8], and M. W. F. Twediee [9] they explained that the construction of figures made from stone was found in several areas in Malaya. From the discovery, one would be quick to highlight that there was the existence of sculpture that can be associated with the cultural religion of the Hindu Buddha era. The megalith stones discovered in Pengkalan Kempas were also classified as sculpture. Their symbolic form produced from the carvings of the word 'Allah' and abstract images portrays a channel of human deliverance in the past, about his religion and universe.

The next development of sculpture was detected through the sculptures of the tribe named Jah Hut and Mah Meri. Its form, characterized by figurines and masks, functioned as a ritualistic symbol of healing (diseases), and their remembrance of their ancestors had grabbed the attention of art lovers from Europe in 1960. Although the sculptors did not possess any formal education in the field of art, they had been able to produce shapes that resembled great European sculptors' works such as those of Brancusi or Henry Moore. The arrival of Europeans in Malaya, through occupation, has also become a factor in the development of sculpture. Malaya, which was occupied, by the Portuguese, Dutch, and British had slowly become home to these diverse nations who exerted their artistic influence on the local people. The role of the British towards the development of arts had influenced and introduced new forms of art more than the Portuguese and the Dutch. One of the sculpture activities that manifested through the figure carvings as colonial remnants, was shown by Francis Light and Queen Victoria, as well as Robert Sandiland Frowd Walker in Taiping. Sculptures of cultural religion and the colonials instilled a concept of understanding of shapes and formations based on the Western movement of thought. There was no artistic vision or ideas developed, except for colonialism at the time [5].

Sculpture that is very much connected with the figurative concept has caused the development of sculpture in Malaysia to move at a snail's pace and it has not been getting the attention it deserves from society. Reference [2] explained that the relationship between sculpture and religiosity justifies the negative perceptions of sculpture, in general. Other than that, the principles of the local community that firmly upheld Islam and the cultural traditions of carpentry have negated the iconographic images, which signify figures. This offers an explanation for the delay in sculpture development in Malaya. Nonetheless, the factor of education implemented in the 1960s had broadened the interpretation of sculpture in Malaya. The Malaysian Ministry of Education, upon realizing the importance of arts education and the shortage of arts teachers had sent a number of arts educators to further their

studies abroad [10]. They were Tay Hooi Keat, Syed Ahmad Jamal, and Anthony Lau, followed by Yeoh Jin Leng, Lee Joo For, Ibrahim Hussein, and Ida Tallala. Then they sent Grace Selvayanagam, Anthony Lau, and Ismail Zain dan Jolly Koh [5]. Their return home enabled the field of arts education to grow and prosper in a more systematic manner, and further spurred a new state of visual arts that was more active and healthier. They also introduced a Euro-American style, namely the streams of expressionism and abstract expressionism that had become the peak of the international style in Malaya, that at the time was clinging hard to these two great ideas. In effect, the negative perception of the Malaysians on sculpture had waned, as the artists slowly accepted the Euro-American style. Exposure to the style had permeated into various local sculpture through the works of Anthony Lau, full-time sculptors and painters including Syed Ahmad Jamal, Latif Mohidin, Cheong Lai Tong, Yeoh Jin Leng, and Tan Tuck Kan who chose creating sculpture as their side activity. Bearing this in mind, according to T. K. Sabapathy, the slow development of sculpture around the 1960s must be analyzed in terms of its relation to the modern arts tradition, which primarily revolves around paintings. Therefore, the contribution of painting artists in the field of sculptors must be seen as significant as the form and content have invited some new perceptions towards sculpture that previously leaned on figurative concepts.

3 Role of the 1971 National Cultural Congress

In the 1970s, we had to accept the various incidences that had happened to the local sculpture scenario. The very slow movement of sculpture had ignited various assumptions and debates through the writings of Redza Piyadasa and Sulaiman Esa in *Towards a Mystical Reality*. They stated:

In general, all this while, there was a non-existent involvement in the area of sculpture among our artists, clearly showing that they, for all this time, are not really interested in the multifarious dimensions of reality, unlike all those beautiful pictures hung on the walls [11].

Sculpture activities started to grow exponentially following the role played by sculptors enrolled in Arts and Design Studies, Mara Institute of Technology. The emergence of many sculptors from this institution has exposed more sculpture to the public due to their role in introducing new forms in sculpture. A lot of famous, highly potential sculptors have successfully raised the status of sculpture at a par with that of paintings. A lot of dynamic and prolific ideas have been given the limelight by these sculptors through attempts at various techniques and materials. They comprised Zakaria Awang, Ariffin Ismail, Mad Anuar Ismail, Wan Ahmad Wan Mohamood, Ham Rabeah Kamarun, Ramlan Abdullah, Tengku Sabri Tengku Ibrahim, Zulkifli Yusof Raja Shahriman, and Bayu Utomo. They have carved their names in the history of the local arts through their involvement in the visual arts competition organized by the National Visual Arts Gallery. Some of them have

even made sculpting their full-time career and are involved in sculpting in private galleries or for the public.

The growth of local sculpture has received an impact from the National Cultural Congress organized in August 1971 where it influences the views of the artists especially in terms of arts identity. The understanding on the resolution was achieved through the congress, which is that the Malaysian national culture has to be based on the original culture of the people of this region. Secondly, other cultural elements considered appropriate and necessary can be accepted as elements of national culture, and thirdly, Islam, which becomes the most important element in the formation of national culture has taken a great leap by being introduced by some of the modern artists in the search for the arts identity. The western factor that raged on the modern visual arts in Malaysia before and after Independence has created issues among artists with regard to the occurrence of the self-integrity crises. This spurred artists including local modern sculptors to approach the traditional culture, and subsequently Malay and Islamic values began to attract the attention of many in the 1970s up to the 1980s. Rooted from there, the creation of Malay cultural symbols had begun to expand.

4 Symbols of Malay Culture in Malaysian Modern Sculpture

A symbol is an instrument of thinking created by humans about something. The symbol can either be verbal or nonverbal as elaborated further by Ref. [12]:

A symbol is something that stands for, or represents, something else. In a spoken language, words are symbols. The word chair stands for a piece of furniture that has a seat, back, legs and sometimes arms. In the language of art, we use visual symbols to *communicate* ideas.

Symbols are different from sounds. Symbols have a unity of form and meaning backed by a certain culture [13]. Humans characterized as *animal symbolicum* by Earnst Cassirer have symbolic thinking and attitude, specifically ascribed to humans and this distinguishes them from other living creatures [14]. Based on human experience, there emerge cultural symbols interpreted by humans through their function and involvement in a society [15]. This can be detected through cultural symbols present around humans, created through the effects of sketching agreed by man, with the aim to deliver something. Thus, Frederick Antal has stated that arts do not exist in a vacuum but must be seen in aspects of history, society, and culture.

Talking about the symbols in the sculpture activities in Malaysia, the influence of the local culture was exerted after the National Cultural Congress, with a strong attachment to Malay cultural values, was held. Previously, artists following international arts doctrines introduced by artists and educators produced universal symbols when they returned home after studying abroad. Symbols from nature such as the natural environment, marine life, and social issues had become sources of

inspiration for sculptors and they were styled universally. This implies that the change in the socioculture taking place in the lives of fellow Malaysians had left an impact on the artistic symbols. Thus, in understanding a work of art, it is important to look into the context of culture, within which a work of art is created, as suggested by Antal and Winckleman.

In the 1970s, the symbols on the form of sculpture began to change when the National Cultural Congress affected the local visuals. Stemming from this event, the view of arts among sculptors had changed. The reality about the importance of pursuing an artistic identity had propelled them to approach Malay cultural values in their effort to create some new artistic symbols. Back in the 1980s and the 1990s, when non-Malay artists did not even broach the issues surrounding the congress, their Malay counterparts saw this as an indicator for a new era of artistry. There was some passion in the Malay artists to find the form and meaning which can raise a sense of awareness towards Malay society and culture [10]. References to traditional arts such as batik motifs, woodcarvings, songket, legends, and architecture, the khat, and Islamic geometric patterns had fascinated artists to a great extent in those decades [2]. In relation to this, sculptors who are consistent in continuing with their Malay-oriented visions up until today are Mad Anuar and Raja Shahrman Raja Aziddin.

5 Analysis of Malay Cultural Symbols in Modern Sculpture Works in Malaysia

In discussing the symbols of the Malay culture in the local sculpture scenario, the writer uses the arts analysis method by [16] by dividing it into four basic characteristics, namely the subject, form, content, and meaning. They explained that the component of subject (reference material), form, and content are complementary to the works of fine arts that refer to paintings, printing, and sculpture. Even [12] through the approach of critical arts it also recommends that an analysis of a visual artwork has to follow four procedures entailing the steps of describing the work, analyzing the image, interpreting the meaning, and assessing the work. According to Ref. [17], in the aspect of getting to know the subject, the viewer must identify and be able to make a simple description of the work covering issues such as the form of the work, the type of the work, the material made, subject, and image as well as the size of the work. He adds that in analyzing the work, the viewer should make a tacit or formal analysis and see how the work is produced. This also includes the arrangement or the positioning of the images displayed and how they can become an interesting work of art. The use of the visual elements including form, the line color, the weaving, and so on should be analyzed. The advantage of this approach as explained by Ref. [18] is that it is able to find the meaning that is hidden in the work of art. Important questions will be answered through a systematic process.

As you go through the step of description and analysis, you will collect facts and clues. When you get to the interpretation phase, you will make guesses about what message you think the artwork is communicating. Finally when making judgement, you will make your own decisions about the artistic works.

6 Artwork Analysis

The involvement of Mad Anuar in the arts of sculptor began since he furthered his studies in ITM. In the 1970s, he, together with other Malay artists, was very much affected by the Muslim Malay revivalist movement. His intention to retrieve his Malay roots had led him to producing sculpture with Malay symbols. The sculpture entitled *Pemain Rebab* (Rebab Player) was inspired by the rebab players who were still actively playing and performing in the palace as shown in Fig. 1. This work was produced in 1971 using woodcarving material and technique and measured 400 sm × 240 sm × 100 sm. In terms of the formalistic view, this work employs the element of lines in forming figurative elements, which explains the rebab players. The formation is structured using the latch and joint technique, without being nailed, arranged in a spiral that is able to clear the space. This sculpture was perfected in *mujarad* (abstraction) and realized through wood construction of various sizes, reinforced with high skill. The curve effect from the carving technique left a dynamic line texture on every form in pegs of various directions. As far as this is concerned, his work can be associated with constructivism. Mad Anuar using only the element of lines that appear to have a character successfully completed the structure of *Rebab Player*. By illusion, this sculptor displays some figurative elements showing as if the player were playing music. The figurative characteristic is made clear by the one-line element. Its vertical position and its contoured form show symbolic value. The long horizontal form at the front side of the figure grabs some attention and it explains that the rebab is being played. Mad Anuar has successfully adapted rebab playing through a modern formation of

Fig. 1 *Pemain Rebab* (Rebab player)



sculpture called *open form* as has been demonstrated by Brancusi and Henry Moore. Despite their introducing some modern characteristics, it has some primitive slur, as they contain some traditional resources in terms of the shape and meaning, including the wood material and the carving technique. The sculpting effects are prominent, although the wood surface is painted in dark colors.

Mad Anuar's observation on Malay culture had led him to study *Rebab Player* in more detail. The embodiment of an artistic symbol in the form of a human figure arranged in an *open form* shows the symbolic movements of a rebab player. The rebab as a traditional Malay two or three-stringed musical instrument is categorized as a kordofon (*chordophone*). This musical instrument is believed to have originated from the Middle East and was introduced in the Malay world harmoniously with the emergence of Islam. The rebab can be found in Malay states, especially in the north and the east coasts of the Malaysian Peninsula, and also in southern Thailand and the islands of Indonesia, but differs in terms of the shape and measurement. Rebab became widespread in the circle of the palace, made alive through the theatrical performances of Makyung, a traditional dance. Rebab players take the role as the head of the musicians in the performance of mak yung and lead special occasions such as the opening, and the symbolic performance of facing the rebab. It continued to spread in the folk tradition, when Makyung was played as a source of entertainment in villages which society comprised farmers and fishermen. As a sculptor, Mad Anuar tried to breathe new life to the Malay arts that have thrived as a national identity that has increasingly been abandoned by the younger generation. He created some artistic symbols with Malay elements and made them his media of deliverance through the three-dimensional approach. All in all, *Rebab Player* has successfully been modified symbolically by Mad Anuar. Although graced with a modern style, its traditional value is highlighted through the formation of a figure carved through wood material and the embedded meaning. Mad Anuar's wise move in integrating both characteristics—old and new—has rejuvenated the three-dimensional works of art in Malaysia.

7 Artwork Analysis

Raja Shahriman was born in 1967 in Kuala Kangsar Perak. He graduated in the field of sculpture, Fine Arts Department Universiti Teknologi MARA in 1990. Having finished his studies in 1990 he furthered his studies by delving into iron craftsmanship, which is the welding technique from kris craftsmen. He is a prolific sculptor and was always committed to the use of iron. Formalistically, the sculpture entitled *Gerak Tempur* or *Fighting* was produced in 1996. As shown in Fig. 2, it was formed using iron and the welding technique and measured 82 sm × 51 sm × 51 sm and 61.5 sm × 56.8 sm × 50 sm. This sculpture comprises two forms of figures acting in a fight. Both were formed in two different actions. One of them is depicted in an attempt to stab and another ready to counterattack. Other than figures, weapons such as the form of the kris and sword are reincarnated.

Fig. 2 *Gerak Tempur*
(fighting)



The form of a fight was modified in three dimensions using iron and a welding technique. The type of iron used comprised the machine iron component. The figures were composed facing one another as they are holding weapons to fight. Both exhibit characters that are in a fight. Raja Shahriraman used some basic elements and principles in his sculpture. The formation does not capture human figures but it sheds light on the structure of a human body with the skeletons seemingly contoured but concrete and strong. The use of lines and looks has been able to create figures in that fighting style. The form is presented anatomically and in an abstract form, and comparatively the shape of the figure is balanced and almost perfect. His selection of the iron component successfully builds the next figure depicting an aggressive, active, and brave figure appropriate with the concept of the war he introduces. The position and movement of the figures in fighting motion explain Raja Shahriraman's skills in scrutinizing the movements of fighting and it is translated into reality. This means that he really empathizes and feels the moment of the fight, as stressed in his deliverance. *Gerak Tempur* by this sculptor, Raja Shahriraman Raja Aziddin is a sculpture that relates to war. His interest towards the forms of weaponry had led to his associating war issues with his sculptures. *Gerak Tempur* is based on the concept of war, following the context of Malay traditional culture. Raja Shahriraman relates the story of the fight between the Malacca warriors popular in Malay society. This work reacts with the epic of a fight between two warriors, Hang Tuah and Hang Jebat, who were good friends. Due to loyalty and obedience to the King, it led to the battle between the two friends until one was killed. Hang Tuah as a King's man who obeyed the Royal command to kill Hang Jebat had been seen as the traitor. In the fight, Hang Jebat was killed. In the middle of the story, it narrates about the kris named *Taming Sari*, which was said to have changed hands between the two friends while they were fighting. Such a theme is used a lot in Malay poems and dramatic performances including the ones in films. This work can be interpreted as the work that concentrates on social criticisms. The fight that leans much on the Malay legendary story is seen as highlighting human figures that are strong and heroic. As a whole, this work produces a Malay cultural symbol by referring to the theme of Malay legend and Malay arts, as in the world of *silat*

popular among the Malay communities. The aspect of the shape sheds light on the symbol inspired by Malay culture, based on the fact that the characters are fighting as if they are doing the *silat*, have successfully been captured through iron.

8 Conclusion

The sponsorship of the National Cultural Congress in 1971 had left an impact on the development of visual arts in the country. One change in the views on arts by several local sculptors on sculpting is from using universal symbols to the Malay cultural symbols. The change is due to the raised awareness and the intention of the sculptors to search for an identity in the arts. In relation to this, artistic symbols with their roots deep-seated in Malay elements with reference to the Malay traditional arts can be created. Although the form has some modern characteristics, their origin is traditional, making the works more contemporary, out of this combination. Although it looks complex, its distinctiveness is conspicuous. Therefore, this work finds that the Malay cultural symbols on the local sculptors' work create an innovative work of art through three dimensions with Malay orientation. The innovation concentrates on a Malay-oriented stream easily proposed as the time when artistic works with Malay thoughts emerged between the 1970s and the 1990s. This decade can be attributed as the decade that witnessed the birth of works of art with Malay backgrounds. However, to see these works thrive as a new movement or artistic ideology in Malaysia, it necessitates in-depth and more detailed studies, in terms of studying the Malay ethos towards its arts. Rooted from there, the Malay stances in appreciating the beauty of an artwork can be recognized. This will enable the comparison between western aesthetics and eastern aesthetics especially through the eyes of the Malays. This work can also identify national identity from the perspective of the Malay culture by two Malay sculptors, namely Mad Anuar and Raja Shahrman who are back to finding their native roots and their national origin. Seeing that today, sculptors' works of art display universal artistic symbols which are very scarce, then the upholding of the national heritage of the Malay culture and the new generation of artists has to refer to the efforts made by the local sculptors in continuing the national heritage for the future.

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Art Appreciation: An Introduction to Artistic Creativity Contemporary Artists of Sabah

Chrisna Pindah, Mohd Zaki Fadil and Mohd Faizol Haini

Abstract The vibrant and dynamic nature of the modern Malaysian art scene has been documented in a number of critical and historical writings, which became a main reference of a large number of Malaysian artists' artworks. However, the documentation mainly focuses on the creative and artistic output of artists from Peninsular Malaysia, neglecting the existence of creative artists from East Malaysia, which is Sabah and Sarawak. Thus, this research aims to disclose the Sabahan artists, particularly, by exposing, publishing, and honoring them which Sabahan art truly deserves. Furthermore, we seek to expand and enrich the understanding of the role, contribution, and importance of Sabahan artists in the bigger story of contemporary Malaysian art by interpreting their works as the sociological model as employed by Arnold Hauser and Meyer Schapiro.

Keywords Art appreciation · Introduction · Artistic creativity · Sabah contemporary artists

1 Introduction

The modern Malaysian art scene has been documented in the emergence of a number of critical and historical writings, such as in the forum of art catalogues, monographs, and books, which became a main reference of a large number of Malaysian artists' artworks. For example, *Modern Artists Of Malaysia and Vision and Ideas*, written by scholars Redza Piyadasa, T. K. Sabapathy, Zabas, and Krishin Jit. They are among the authoritative writers on modern Malaysian artists and their

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work can be considered as a main reference for the public and art students who are interested in modern Malaysian art. However, their documentation mainly focuses on the creative and artistic output of artists from Peninsular Malaysia, neglecting the existence of creative artists from East Malaysia, which is Sabah and Sarawak. By focusing on Sabah today, there are a number of nationally and internationally recognized artists who have produced high-value artistic output such as Dato Yaman Ahmad Mus, Awang Damit Ahmad, Bayu Utomo Radjikin, Mohd. Fuad Arif, and Yee I-Lan. They are among the artists who deserve appreciation and acknowledgment on par with other major Malaysian artists such as Syed Ahmad Jamal, Latiff Mohiddin, and Ibrahim Hussein.

2 Method

Muliyadi Mahmood [1], stated that the contemporary artist's works in Peninsular Malaysia, are the result of a combination of history and surrounding cultures. However, the Saruk Kinabalu exhibition catalogue at the National Art Gallery (National Visual Art) in 2005 shows that artists from Sabah presented artwork based on Sabahan culture, including images of Mount Kinabalu, community activities, local natural scenes, and cultural activities. Generally, the Sabahan artist is quite literal and the art realist approach dominates. The style always became the main issue in the presentations, and was often repeated in every edition of the catalogue of the annual Karya Pilihan Tahunan Negeri Sabah since 1984, and up until the year 2011 (Sabah Art Gallery, KPTNS 2005–2011). Thus, this raises the question: are there not enough resources for contemporary Sabah artists to bring a change and deliverance of Sabah artworks themselves? But some of the contemporary artists of Sabah that dwell in Peninsular Malaysia such as Awang Damit are more on abstract images which becomes a variance in Sabah's art scene [7]. Yee I-Lan and Mohd. Fuad Arif are very critical of the society issue, with representation of optional techniques, ideas, concepts, and a selection of images.

The sociological method was employed in this research to prove that the artistic creativity of Sabah artists has connection to local societies and culture affected through the development of modern Malaysian style in parallel in artwork. This sociology method [2, 3] and the National Culture Congress formations in 1971 are the main essence of the idea to highlight a style and values of the indigenous people. The series of Damit's "Alun-alun ke Marista" exhibition is a reflection of his personal background as a Sabah person [4]. Observed from *The Iraga* artwork, formalistic elements such as color and composition can be attributed to his local personal society, namely *Dusun Tatana* of Kuala Penyu Sarawak.

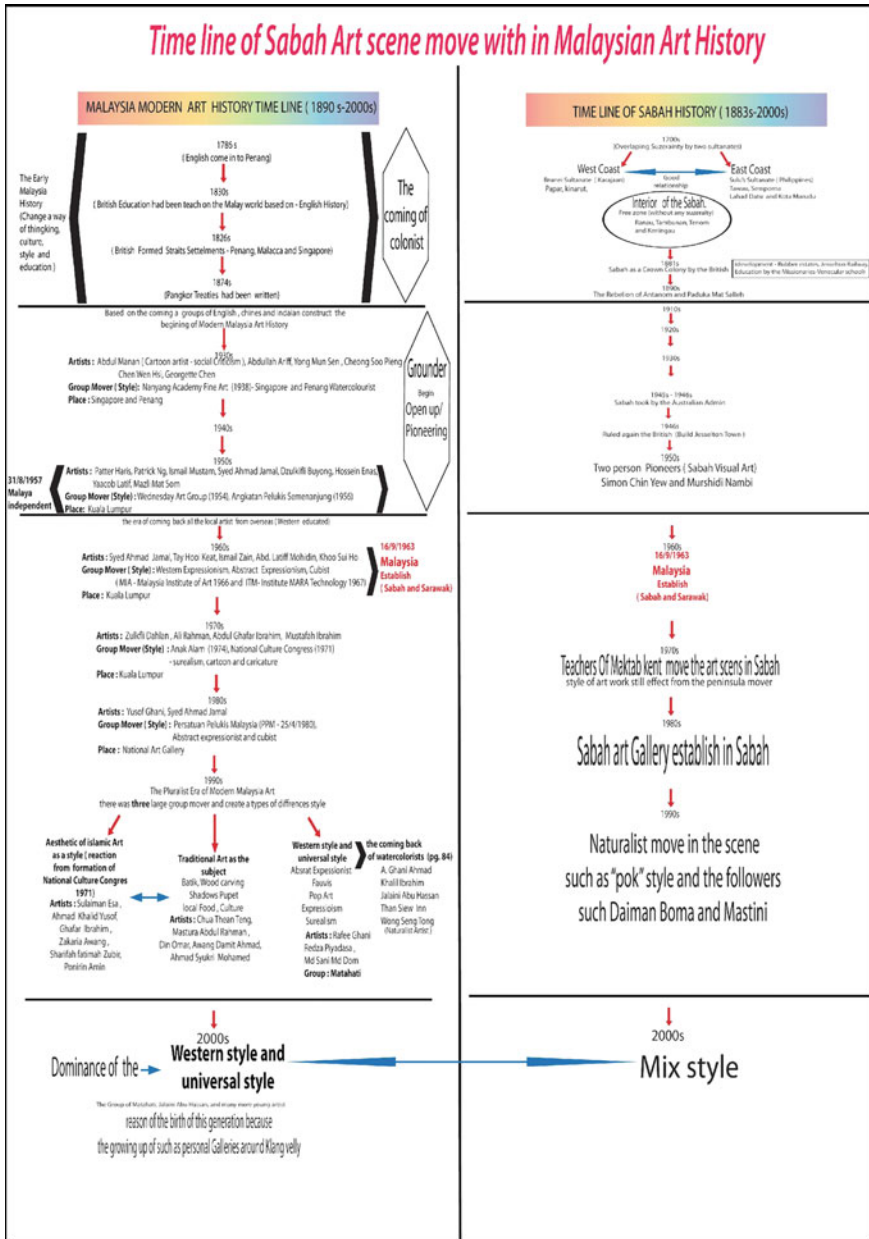


Fig. 1 Sabah’s art timeline in parallel with the Malaysian art scene (Mulyadi Mahmood 2004 and Catalogue of Saruk Kinabalu 2005)

3 Result of Discussion

The result of this research had provided an introductory art-historical timeline based on interpretation and evaluation of the works of some of the major artists of Sabah. Based on this timeline chart, we can see the visibility of Sabahan artists even though it changed in the late 1950s (Fig. 1).

The contributions of Simon Chin Yew and Murshidi Nambi in the development of artistic creativity in Sabah are shifting Sabah art history development. Each of these people was educated in China and Peninsular Malaysia teacher institutions [5, 6]. However, most of the artistic creativity in Sabah is still an expression of ideas from the artists' local social background. Also, this timeline shows that at the end of the 1990s and early 2000s the artists of Sabah style are parallel with Peninsular Malaysia. The changing of sociology people of Sabah also has contributed to the Malaysia Art Contemporary development particularly in education, economy, politics, and many more [7].

In addition, this chart concludes that the Sabahan artists are fully emerging from the sociological development of Sabah. Especially on the educational background of the artists themselves, such as Mohd Yaman Ahmad Mus, Awang Damit Ahmad, Yee-I Lann, and Mohd. Fuad Arif. Most of them were educated abroad and from there changed their sociological view of the aesthetic of art. Although they are not being chosen yet as the typical icon of Sabah their artistic creativity is varied, including abstract art, social comment, conceptual art, and many others [8–11].

4 Conclusion

This research was an attempt to explore, study, and develop a history of Sabah art development for educating future generations. The result of this research will provide Sabahan artists with exposure, publicity, and honors which they truly deserve. Furthermore, this research will also culturally and intellectually enrich Malaysian artists, the general public, and art students on the development and achievement of contemporary Sabah artists, particularly concerning the role, contribution, and importance of the Sabahan artist in the bigger story of contemporary Malaysia Art.

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Characteristics of Multifunction Malaysian Art Galleries

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Abstract Art galleries are known as places that exhibit both art and artworks such as paintings or sculpture. However, an art gallery is supposed to be a platform to enhance not only the quality of fine art but also as the introduction of new art and design products. Based on this notion, this study aimed to redefine the role of the art gallery in order to enhance the development of the art and design industry which not only includes exhibiting fine art artwork but also in terms of promoting and introducing new art and design products. In this research, the researchers first adopted an observation approach to collect data. Secondly, the researchers interviewed the gallery curators. Both government and private galleries were sampled. Structured questions were used in designing the questionnaire which focused on the role of the art gallery as an art centre as well as the function of the existing art galleries. Findings from this study focused on how art galleries in Malaysia did not have knowledge about the real function of art galleries and why they held to their strategies of making profits only from exhibiting fine art. This study should help to expand the functions of art galleries by promoting and exhibiting all types of art and design works. Also, public programming or activities such as art competitions and art seminars can be held in the art galleries as well.

Keywords Characteristic · Multifunction · Malaysian art gallery

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1 Introduction

This research focused on understanding the social impact of the art gallery in our economy and in our society. The most important thing in developing arts into a high level is through the participation and the involvement of an audience. The word ‘involvement’ exists in art, sports, or recreation and by involving in this kind of activity, it will assist an improvement in an economy based on major enhancement of knowledge through impressive innovations [1]. Especially in the arts, ‘involvement’ is more to the commitment from the audience in terms of being part of the exhibition. This explains very well how important the art gallery can be to the development of art and design.

The history of the art gallery begins in the nineteenth century and the role of the art gallery at that moment was as an educational establishment [1]. History actually explains how the art gallery was treated as a centre to spread education amongst people at that period of time. However, even as a centre of education, art galleries at that moment tended to focus only on informal learning and from that time the role of an art gallery has developed into a bigger prospect. Nowadays, art galleries are only focusing on promoting fine art’s artwork instead of promoting other fields of art such as industrial design, interior, or even automobile design. If we refer to our Malaysian National Visual Art Gallery, it obviously states that their vision is to become the centre for the development and focusing on the collection of visual arts and to be the trustee for the national art heritage [2]. Their vision has highlighted the words ‘visual art’.

‘Art’ itself is very subjective and everybody has his or her own concept of art. As per the definition, in addition to being flexible, art is all about a term or idea that makes people observe and critically think about some kind of activity or things that other people make and deliver creatively [3]. This term refers to other fields of art too and not exclusively to fine art.

The basic function of the art gallery includes exhibiting an artwork, organizing art talks or art discussions, and organising events related to art such as art competitions or seminars.

In organising an exhibition, an artist will come with a proposal regarding exhibiting an artwork, and after the proposal been processed and has been approved, the exhibition will be set up accordingly. The most important thing in organising an exhibition is to set the date, the venue, and to gather an audience [4]. After that, it depends on the marketing strategy of the gallery where the curator will play an important role to promote the artwork that is exhibited. This is where the goals of the gallery take place.

In Fig. 1, Magnus Bruno Frederik Resch in his writing has explained the main goals of art galleries which consist of three important elements. The elements include goals in terms of academics, goals in terms of artistic values, and goals in terms of socioethical concepts. These three elements explain some of the concepts which help gallery management to reach their goals. A thing that needs to be highlighted is their goals in terms of economic value. As stated in Fig. 1, their goal

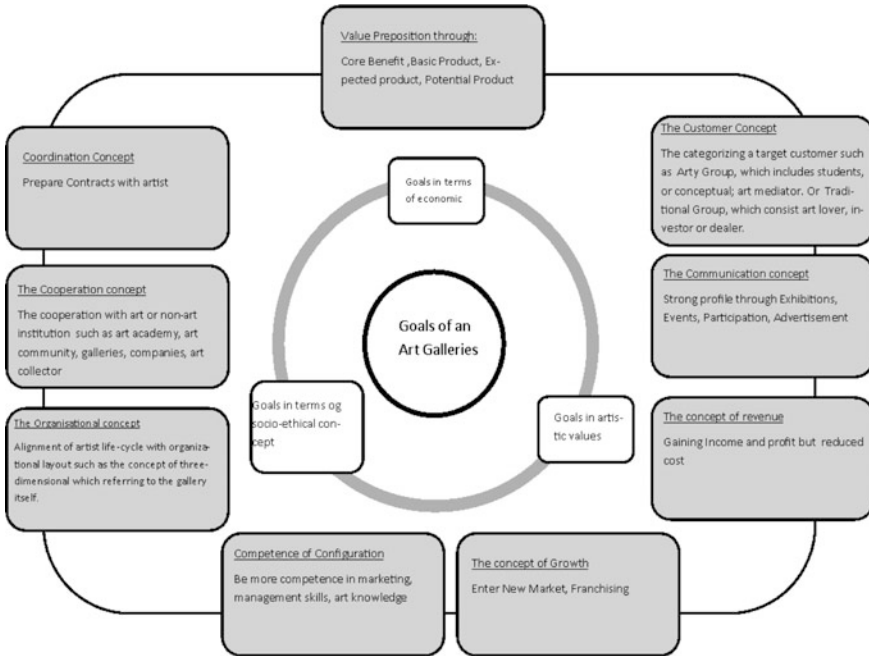


Fig. 1 New art gallery business model by Resch [5]

in economic value is more to value proposition through core benefits of the basic product referring to the expected product and potential product. However, as discussed with art gallery curators and experts not in the field of fine arts, the art gallery usually focuses on potential products in fine art artwork.

When referring to art activities, usually an art gallery will organise a discussion about problems that occur in the art industry and also referring to the fine art world.

1.1 Statement of the Problem

In Malaysia, there are many potential art galleries. In fact, there are more than 50 art galleries in Kuala Lumpur which are actively involved in the art industry, locally or internationally. However, most art and design products especially product design have been introduced through other institutions rather than the art gallery itself. This is because art galleries currently focus only in exhibiting fine art artworks.

The impact when exhibiting an artwork in an art gallery can boost a designer's level of confidence. It creates the opportunities for the designers to be well known in art industries while at the same time being able to expand their creativity. An art exhibition is an event where the designer or the artist, the artwork, and the audience interact with each other.



Fig. 2 Some Malaysian art exhibition catalogues from selected art gallery websites, years 2013 and 2014

Figure 2 shows a sample of art exhibition catalogues featuring Malaysian artists and their fine art artwork. This is evidence which explains the importance of redefining the role of the art gallery. Is it exclusively for fine art artwork?

Although we understand that the art gallery plays an important role to provide a platform for artists to present their artworks such as paintings and sculpture, what of the designers who are not majoring in the field of fine arts including industrial designers and graphic designers? Can they produce creative products and promote these products through art galleries? Yes, they can, but the problem lies in the fact that

little promotion has been done regarding the multifunctions of the art galleries. Thus, their new ideas of furniture design, or an innovative automobile design, or even a new invention of machine technology are not being promoted effectively. The economic opportunity to develop or commercialise these new concepts further is minimised.

Art which consists of product design, machine technology and design, or interior design has not been recognised as part of an artwork. It seems there is less exposure about product design through the gallery rather than fine art artwork, and this is where the function of the art gallery as an education center has been questioned. The main function of an art gallery is to promote and develop the art and design industry [5]. It doesn't matter if it's from the fine art industry, machine and technology industry, or even industrial design industry. As long as it is under 'Art and Design' any product has the right to be promoted in art galleries.

1.2 Objectives

The objectives of this study were to understand the knowledge of art galleries among art curators so that in future there will be no hesitation to other designers in terms of proposing their piece of art, even though the artwork is not under the concept of fine art. This is important to focus on the art gallery's strategies and future plan in the development of the art and design industry.

2 Literature Review

Resch [5] stated that nowadays the commercial art galleries tend to be a part of a city's cultural life and they play an important role in the development of the art market. It explains how an artwork can contribute to the growth of a country's economy. However, according to him, referring to the situation of the art scene nowadays, in terms of market reality some art galleries are just only gaining small profits to continue surviving in the art industry. He has suggested if art galleries want to succeed in the art industry, they need to collaborate with other industries and reorganise their business strategies in terms of business practices.

Resch [5] also stated that his research has gathered data which became evidence that most art galleries nowadays have neglected the power of innovation in their business model. He explained how art galleries nowadays are focusing more on artistic exhibition rather than efforts to increase their profits.

This statement actually gives a lot of ideas on how art galleries can be more multifunctional in terms of developing art and design industries to a much higher level in terms of focusing on the art of machinery, digital art technology, the art of jewellery, or even the innovation of product design.

Corsane [6], in his writing, explains how gallery professionals are facing a few challenges in order to boost the image of the art gallery. For an example, he claimed

gallery professionals need to be able to attract special interest groups, referring to an audience who at the end of the day might bring in a profit to the art gallery. Through the multifunction concept, the art gallery will be fully defined as a center of education, and maybe in future will not only focus on art, but other industries as well.

Fopp [7] claims that the generation of people nowadays attends museums (galleries) to be 'educated'. In other words, art galleries and museums are treated as places where knowledge can be gathered and audiences choose to visit art galleries to see things that are unavailable elsewhere, and to be told things that they could not find out anywhere else.

When we look at the role of art exhibitions, Cline [8] claims that art exhibitions act as a centre of art and ideas for the audience. She explains how an art exhibition is like a mirror to the public where it reflects the interest of art while at the same time challenges the ideologies.

The statement from Cline obviously shows the importance of art exhibitions in terms of developing the art scene in our society. Imagine if art exhibitions not only focused on fine art's artwork but also other fields of art; the function of the art gallery as a centre of education could be expanded. It could be an art gallery, an art museum, or even a showroom for any art field.

However, in order to make an art exhibition a success, sometimes it depends on the knowledge of curatorial experts. According to Love [4], contemporary curators play an important role in creating and contributing to the audience about ideas and art strategies while at the same time creating opportunities for artists in terms of exposing art ideologies. Karen also explains how curators can also gather intellectual and creative contributions from other fields of art or from other areas in society.

This is one of the ideas of how art gallery management should be more flexible in curating an art exhibition. I believe if creative contributions from other fields were given the same opportunities as fine artists, the Malaysian art scene would be more variable and the mission in terms of making an art gallery a centre of education would be successfully achieved.

When understanding the role of an art gallery is exposed, it can create a new perception about how to present the new artistic element to society. Not only focusing on the fine art industry, the art gallery will approach other dimensions of creative design such as interior design, industrial design, or machine technology design. Every creative industry involved in design specification has its own artistic element that should be introduced to the audience. It should be every art gallery's vision to introduce and develop the art and design industry.

3 Research Methodology

This research methodology was developed by referring to the qualitative method through interviews and surveys. To answer the researchers' first and second objective, an interview was conducted in order to understand the knowledge of art

galleries among art curators. As mentioned earlier, art curators play an important role in any art exhibition. Because of that, in this research methodology, the interview involved five art curators from different backgrounds and from different galleries. After that, the researchers focused on art gallery strategies and their future plans in terms of developing the potential of art and design into a higher level.

Surveys were conducted among art gallery audiences to analyse the role and function of the art gallery through their perspectives. Most of the questions asked focused on how well art galleries have been organised in terms of exhibiting an artwork and what kind of artwork has usually been exhibited in an art exhibition.

All the results from the interview and the survey were gathered in order to identify knowledge about the function of the art gallery and the strategies so that it could be a reference for other art galleries in Malaysia and other designers. This methodology would accidentally create a comparison and similarities between each selected gallery as to their contributions and efforts in the development of art and design.

4 Analysis

Data were gathered through an interview conducted earlier. Five Malaysian art galleries were selected for the interview session. These galleries were the most established and popular galleries in Malaysia all of which were located around Kuala Lumpur. Table 1 shows some of the interview content which was developed into a table template.

From the data analysis, questions 1, 3, 4, and 5 were structured to answer the researchers' first objective and questions 2, 6, 7, and 8 were structured to answer the researchers' second objective.

For the first question, the question is to acknowledge how many years the curator has served the gallery. This is to determine the level of the curator's knowledge of managing an art gallery.

The second question is all about investigating what type of artwork has been selected to join an art exhibition. This question acknowledges the concept that the gallery uses in terms of selecting an artwork that can contribute in making profits.

The third question focused on the gallery's objectives rather than organising an exhibition. This question was important because the curator's answer will lead to the strategy that the gallery implements in terms of the development of the art industry.

The fourth question regards the art gallery's contribution to the growth of the Malaysian economy. The answer to this question proves how selling an artwork can benefit the artist, society, and the economy.

The fifth question was structured to the art curator about why the art gallery tended to focus more on fine art and how about other artwork which is not in the fine art field. This question investigated why other artwork such as product design

Table 1 Data analysis from an interview, 2013

Question	Gallery A	Gallery B	Gallery C	Gallery D	Gallery E
(1) How long has you been working as a curator/assistant curator?	5 years	1 years 3 months	8 years	3 years	3 years
(2) Usually, what kind of artwork that has been chosen to be exhibit in this gallery?	Artwork that has aesthetic, cultural education, non-provocative and not about any sensitive issue Cultural education	Depend on the artwork exhibition's theme	Painting, sculpture and installation art	Depend on the artwork exhibition's theme	Contemporary artwork
(3) What is the objectives of this gallery instead of organizing an artwork exhibition?	Cultural education	Make an exhibition for Uitm's alumni, provide a place for alumni to do an exhibition	As a platform for young artist to produce artwork	Hold an art event, promoting artwork, and help young artist by providing a residencies	Promote young and emerging artist
(4) How does art gallery contributes in Malaysian economic development?	Emphasize the art history through the value of artwork and the successful of the artist	Selling artwork	From artwork selling	By making people visit gallery	Gain profit from selling artwork, usually by using the money exchange system because most of the collectors are from abroad
(5) Usually, art gallery tend to focus on artwork which is more to fine art, but how about product design?	Providing another gallery for product design which has been named "Galeri Inovasi"	Once exhibiting product design such as furniture design	Once exhibiting interior design in 1997	The intension only focussing in fine art's artwork	Product design is not an artwork that has the aesthetic value

(continued)

Table 1 (continued)

Question	Gallery A	Gallery B	Gallery C	Gallery D	Gallery E
(6) Why art gallery did not try to promote product design?	There is no proposal from the designers	Need someone who can monitor the marketing of the product design's artwork	A bit complicated in terms of the audience and less proposal from designer	Product design industry already has their own platform to promote their product	Product design industry already has their place to exhibit their creative works such as showroom. Art gallery is not suitable to exhibit product design's artwork
(7) Is there any application from the designer out there to exhibit their product design?	Do receive application from product design to exhibit their artwork	Less application because the rules and regulation is the artist need to be one of Uitm's alumni	Once had in year 1997 (the interior exhibition)	Not so of the designers come and propose to do their product design exhibition	Not yet, so far
(8) If there is an application from product designer to exhibit their artwork, is there any procedure that they have to go through?	Just send a proposal to the gallery	Send a proposal	There is no specific form, just send a formal letter including the designer's proposal	The product need to have the combination between fine art and product design	The product design need to stand as an artwork, not as a product. This is to treat the product design as an asset like other fine art's artwork

had not been exhibited in the gallery even though an art gallery is all about a centre of education and the term 'art' itself is very subjective to be judged.

The sixth question questioned the effort an art gallery took in terms of promoting other art products besides fine art's artwork. It clearly explained the problem statement of this study.

The seventh question confirmed whether there is a proposal from other designers who are not in the field of fine art proposing their artwork to be exhibited in the art gallery. This is important to identify whether there is any demand from other designers in terms of exhibiting their product.

The last question is about the art gallery's reaction if there are exact rules and regulations that designers have to follow if they wish to propose conducting an exhibition whereby the artwork is not related to fine art's artwork.

These questions are related in terms of explaining the characteristics of a multifunction art gallery. This is important to investigate how well Malaysian art galleries manage their vision and mission in the development of art and design.

Through the interview and the observation, obviously art galleries need to implement the concept of multifunction in order to provide a space to other art fields unrelated to the fine art world but still carrying the 'art' term in their design or product.

5 Findings

Through a critical analysis from the interview and surveys, the result of the data analysis explained that obviously art galleries usually contribute to the growth of the economy by selling artwork to the art collector. Some of the art galleries even take advantage in terms of selling artwork to foreign collectors so that the gallery gains profits through money exchanged.

In terms of art products, the art gallery usually focuses on fine art artwork due to the lack of application from product designers to exhibit their product designs. However, even though art galleries in Malaysia tend to focus more on fine art artwork, some of the galleries are still taking their chances to market some of the product designs such as furniture, ceramic, or even fashion design. Some of the curators even stated that as long as the product design had the essence or the combination of fine art, they were willing to promote and exhibit the artwork.

After completing this research, the researchers found that overall, most art curators who were interviewed has less knowledge about defining what actually is an art gallery and what the basic function of an art gallery is. Through analysis and some observation, art curators did not focus on the 'art and design' as general but they specified the term of 'art and design' only in the fine art field.

This finding has strengthened the problem statement of this study that the management of art galleries can be developed in many other ways. Instead of organising an art gallery to be more functional, in terms of collaborating with other industries which implemented an essence of design, it can also contribute a lot in

terms of gaining big profits to the development of our country, especially if the art exhibition involves potential investors from abroad. An art gallery is like a platform to expose the aesthetics of art and design. The word ‘design’ refers not only to the aesthetic in fine art artwork, but also includes other fields of design.

6 Conclusion and Recommendation

Overall, this research was all about understanding the role of an art gallery and finding a way to make it multifunctional for the sake of the Malaysian art and design industry so that in future there will be no hesitation by other designers in terms of proposing their piece of art, even though the artwork is not under the concept of fine art. This is important to focus on the art galleries’ strategies and their future plans in the development of the art and design industry in Malaysia.

Nowadays, an art gallery’s main intention is giving an opportunity to young artists to conduct their own exhibitions so that they can improve their skills in artwork making or presentation. By conducting exhibitions, providing seminars, and art workshops, their main intention is to capture public attention and market the product or artwork. More collectors will bring more profits to the gallery institution.

This is where the multifunction concept plays an important role. The art gallery is not only a place to exhibit art, but also acts as a contributor to the economic industry. By using several marketing strategies such as advertising and promotion, art galleries also gather people from all over the world and connect them through art.

In future there should be a place for other artwork to be exhibited besides fine art artwork in the art galleries. Yes, we are aware that there is a special space for the products of industrial design, interior design, or machine and technology to be promoted. However, the place that has been provided is not enough in terms of exposing the creativity of product making in the beginning of the sketching process. I am sure that most of the people out there sometimes feel curious about how a product is created from A–Z, from sketches to analytical drawing and the final product. This is the initiative that should be taken seriously by the responsible person, especially the person who is in charge of the development of the art gallery so that the art gallery will be participated in by fine art artists or students but also can gather people who are interested in art from every angle.

Art exhibitions are supposed to be the best opportunities for the designers to expose their new inventions and designs, not only referring to the traditional method of making an artwork, but focusing on the definition of ‘art’ itself. In future, designers should be able to express art in their artwork even though the outcome of the artwork will be in product design.

However, in completing this research, the researchers realise the weakness that still has room for improvement. This is referring to the number of participants. The number of participants is important in terms of strengthening the data analysis and the research objective. Other than that, the scope of this research is too minimal as

the case study only focused on Malaysian art galleries. It is hoped that in future this research will expand into a broader scope with a strong data analysis provided.

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Investigation of Meaningful Ornaments on Terengganu Boats

Nur Irda Suriani Zainal Abiddin and Norwani Md. Nawawi

Abstract Historically, Terengganu boats are one of the best creations for Terengganu arts and traditions. Terengganu is surrounded by the water either from the lake, rivers, or sea. The community living in the area of rivers or along the beach use boats as their main transportation. They use boats for trading activities, fishing, or to move from one village to another village. The study aimed to explore and identify the application of traditional woodcarvings and decorated elements on a boat especially in Terengganu. Traditional wood carving is one of the classic traditions of Terengganu and it is a part of the Malay culture. The objectives are to identify the types of traditional wood carving and decorated elements on boats that have the symbolic interpretation and the philosophy of the motifs on its wood carving. The most important purpose is to collect samples and leftover treasures and tradition particularly in the collection of motifs and the implicit message behind each artwork. Traditional boats were observed through a significant change; especially in terms of design where wood carvings no longer apply. The collected motifs were shown to be an effective way of documenting the national treasure of wood carving in each creation of art before its extinction. There was a variety of wood carving that carried their own identity either in terms of design, motif, themes, functions, or making process. The knowledge of wood carving as ornaments on Terengganu boats should be preserved to educate future generations.

Keywords Wood carving · Traditional boat · Ornaments · Boats

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1 Introduction

Wood carving is one of the most popular arts and an important culture for Malays. The Malay community has demonstrated expertise in the field of handicraft since prehistoric times. The Malay community believed that wood carving was not only a piece of art but also represented their culture, beliefs, and values. According to Ref. [1], “Culture provides links between the past, present and future; cultural information can bring communities together as well as promote among a culture and society.” Malay carvers portray their philosophy and beliefs through the creation of carvings. They carved not only to produce exquisite objects but most important to express their feelings in every aspect of a work of art. Their highly creative abilities thus induced them to understand the environment created by God the Almighty [2]. The uniqueness of wood carving art is portrayed from the selected patterns, arrangements, and motifs in a variety of shapes and interpretations. From the artifacts discovered in traditional Malay wood carving, there was an interest in art among the people of that period. Their understanding towards nature and the universe influenced their artwork. Thus, the skills of the early Malays must be considered to be part of our invaluable heritage and will preserve the historical and cultural importance.

2 Background of the Study

In this study, the art of wood carving in Terengganu boats is explored. Wood carving is referred to as decorated ornaments on the boats as decorated elements. It carries beautiful and symbolic meaning in every creation. During the early transitional period, Malay society was not influenced by any culture. There were some forms of art that existed but they were difficult to ascertain. According to Ref. [2], “The beginning point of this art was during the transitional period from the prehistoric to the historical era.”

The art of wood carving underwent some changes with the acceptance of the Hindu culture between the first and the fourteenth century. It is known as the Hindu period. With the acceptance of Hinduism, certain elements changed such as language, religion, beliefs, shamanism, spiritual practice, customs, architecture, handicrafts, tapestry, and weaving and had penetrated into the indigenous Malay culture [2]. The Hindu influence on carving was extended to palaces, houses of chieftains and members of the nobility, places of worship, arches, and others. After the Hindu influence, again traditional Malay wood carving underwent changes with the coming of Islam. In the fourteenth century the arrival of Islam to the country was recorded. The stone found in Sungai Teresat, Terengganu shows that Islam was accepted by Malay society in the early fourteenth century. The art of carving was given new attention. The motif elements which were unsuitable and contradictory to the teaching of Islam were gradually discarded.

This research investigated the meaningful ornaments on Terengganu boats. Traditional wood carving as decorated parts on boats can be found in *Bangau*, *Okok*, *Caping*, *Koyang*, *Cagak*, bow (*Haluan Kapal*), and stern (*Ekor Kapal*) of the boat as an ornamental embellishment of traditional boats [2]. The *Bangau*, *Okok*, and *Caping* are the most frequently decorated parts on traditional boats. The body of the parts is made of wood in various shapes. These parts play important roles on the boat. Terengganu boats are carved with a various selection of motifs. The exploration of motifs portrayed the Malay carver's talent that sparked the creative works in conveying an amazing pattern in wood carving. The wood carving design is built based on the carver's individual interpretation. Motifs used in wood carving as boat decorations are mainly inspired from nature such as plants or other living things. In wood carving design, the motifs are carved with the motifs that represent the symbolic meaning behind each design. Sometime the carver used the motifs to appreciate the plants that benefit human life or represent certain stories or memories of special occasions that happened in life. Other than plants, the usage of living things as motifs in wood carving design is often held as having symbolic significance [3]. Usually in the selection of motifs, they are based on the characteristics of the animals.

3 Literature Review

The use of boats in Malay society during ancient times was very important especially in the East Coast area. Terengganu's civilization began in the coastline and river estuaries and developed early culture for the local community. The most popular water transportation in Terengganu is the boats. Nusantara developed a number of busy trading ports. Terengganu has become an international harbor and is well known among traders from the whole world. The development of economics in Terengganu was also affected by the expansion of the boat industry especially *Perahu Besar* [4]. The first water transportation was when early people used wooden sticks and sat on them while using the leg as the paddle. Also, they used to lie on the wooden sticks and use the hand as a paddle [5]. After they used the wooden sticks, the ancient people started to use the raft (*Rakit*) as a transport. According to Ref. [6], "It's all started when early community in Terengganu learn to tie up some sticks together and turn into shapes such as the floor. They then learn to tie three or four sticks with the 'ijuk' rope, rattan or fern root." They usually use bamboo to make a raft (*Rakit*). When the primitives learned how to use fire and tools they start making water transport in the form of dragged wood. The tools were either made of bones, stones, metal, or woods. The *Jalur* boat is the evolution of the wooden stick used as water transportation. There was a huge development of boats in Terengganu. Traditional boats are one of the unique elements in Terengganu. According to Ref. [7], "Water transportations that are used by our local people (Terengganu) can be classified by the purpose of the boats. It was for private use, fisheries activities, as transportations and for trading." Anyhow, Ref. [8] has stated

Table 1 Types of traditional boats in Terengganu

Types of boats	Small boats (<i>Perahu Kecil</i>)	Big boats (<i>Perahu Besar</i>)
	<i>Jalur</i> <i>Setak</i> <i>Kajangan</i> <i>Kolek</i> <ul style="list-style-type: none"> • <i>Kolek Lincang</i> • <i>Kolek Pengail</i> • <i>Kolek Kuel</i> <i>Payang</i> <i>Buatan Darat</i> <i>Jalur</i> <i>Haluan Katup</i> <i>Sekoci</i>	<i>Bedar</i> <i>Dogol</i> <i>Pinis Dogol</i> <i>Pinis Gobel</i> <i>Anak Bedar</i> <i>Belakang Potong</i>

that “The traditional boat in Terengganu can be classified by the size of boat which is a dinghy or small boat and big boat.” Table 1 shows the types of traditional boats in Terengganu.

4 Motifs and Symbols of Wood Carving on Traditional Boats

In this chapter, the investigation of meaningful ornaments by looking at wood carving design on boats is covered. It is a study of the arrangement of motifs that form the pattern in wood carving design. The selection of motifs usually carried symbolic meaning. The form and motifs of Malay wood carving have always been closely associated with the Malay way of life which represents their culture, values, and beliefs. Most of the traditional motifs had symbolic meanings.

Before the coming of Islam, the Malays were influenced by animism, Buddhism, and Hinduism. Before the advent of Islam, the selections of motifs not only relied on aesthetic value but also another less tangible purpose. It was believed to be the place where the spirit of the boat resided and the spirit would assist the catch and protect the fishermen from the vagaries of the sea or sea demons. The most popular motifs were flora, fauna especially birds, and shadow puppet characters.

The motifs of plants usually referred to the beauty, texture, shapes, and smell of the flowers. Plant elements were favored by carvers because of their softness and ease to be formed especially for the carvers to take them as inspirations in their carving artwork. The complete form covers the entire tree where it started from the root, trunk, branch, leaf, fruit, bud, and its basal shoot (Fig. 1).

Traditional Malay motifs featured a number of living creatures that often held symbolic significance. Terengganu and Kelantan are two state places where traditional boats used living creatures as motifs for boat decorations. Usually, the selection of fauna as motifs referred to the characteristic of the animal. For example,

Fig. 1 The head of the traditional boats used motifs of flora to decorate the boats

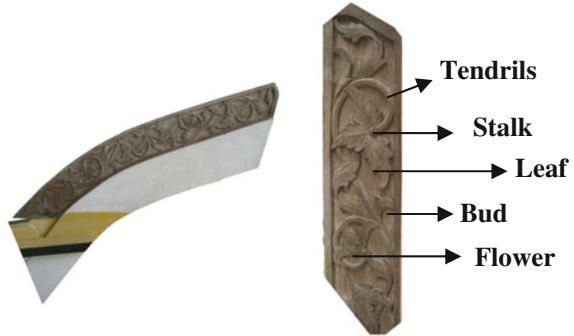


Fig. 2 Jentayu is one of the fauna motifs used in decorating the traditional boats



a parrot is credited with wisdom due to its ability to reproduce human sound. The goose is associated with wisdom and it appears mainly as the rudder post which is *Koyang* and eagle represents strength and acute sight.

The hornbill in its external appearance could also be an egret. Symbolically, fishermen put up the hornbill, egret, and also the vulture. This is to represent the quality of acute eyesight and cleverness in hunting. Motifs of *Naga*, *Garuda* (dragon), *Burung Petala Wati*, *Burung Petala Indera*, *Gagak Sura* (mystical bird), and *Makara* (sea monster) are some of the other popular examples of living creature motifs. On certain boats such as Big Boat (*Perahu Besar*), the *Perahu Pinis Gobel* is engraved on the front path in the shape of beaks. As shown in Fig. 2, the use of the bird motif has given a unique character to the *Perahu Pinis Gobel*.

5 Wood Carving as Ornaments on Terengganu Boats

In this study the use of wood carving as ornaments on boats is analyzed according to motifs used on seven parts on traditional boats. There are *Bangau*, *Okok*, *Caping*, *Koyang*, *Cagak*, head, and tail of the boat (Fig. 3). There was a variety of motifs and patterns used in wood carving, therefore this study is conducted to investigate and understand the symbolic meaning behind the selection of motifs in the wood

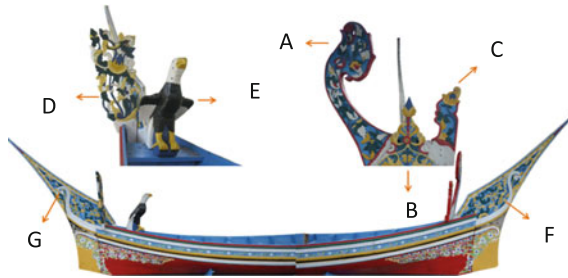


Fig. 3 a Bangau, b Caping, c Okok, d Cagak, e Koyang, f Bow (*Haluan Kapal*) and g Stern (*Ekor Kapal*)

carving in Terengganu boats. The *Bangau*, *Okok*, and *Caping* are the most frequently decorated parts on traditional boats. The body of the parts is made of wood in various shapes. These parts play an important role on the boat.

(1) *Bangau*

The *Bangau* (Fig. 4) is the most frequently decorated part. Different from other places especially compared to *Bangau* from Kelantan boats, the *Bangau* on boats in Terengganu is simpler. According to Ref. [7], “The most important item and the one that is always found are called bangau.” *Bangau* is a piece of wood in a hooked shape. The function of the *Bangau* is to hold the mast and prevent it from falling overboard into the sea when not in use. The *Bangau* is situated on the left of the port side of the boat. The *Bangau* is decorated and carved deeply in the wood, usually using a bas-relief carved technique.

The *Bangau* is decorated with wood carving where the motifs are inspired by a plant source such as the leaf, stalk, flower, fruit, and tendrils (Fig. 5).

The piece of wood called *Bangau* on the boats is equivalent to the Malay word for *bangau*, a small bird with white feathers also known as the cattle egret (*Bubulcus ibis*). The S-shaped neck of the cattle egret is used as a shape for the *Bangau* on traditional boats (Fig. 6). There are several types of *Bangau* usually used on traditional boats of Terengganu. One of the most popular is the *Bangau* with the leaf design, also known as *Bangau Daun* (Fig. 7). Certain *Bangau* are not only carved in the shape of an egret but also in the form of shadow puppet characters. But they called them *Bangau*. A century ago many *Bangau* represented the

Fig. 4 The *Bangau*

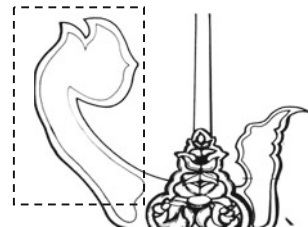


Fig. 5 Floral motif used in decorating the *Bangau*

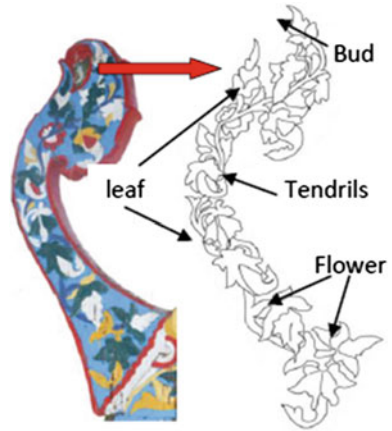


Fig. 6 Cattle egret and *Bangau*

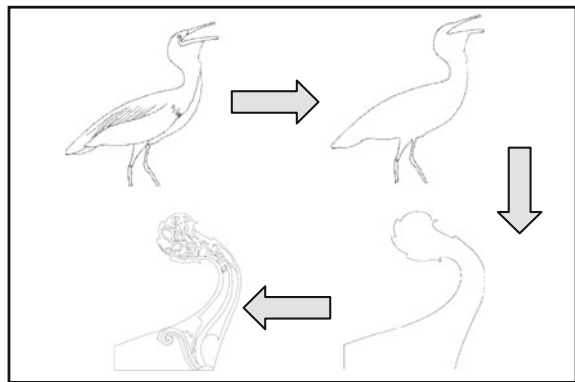


Fig. 7 *Bangau* with floral motifs



head of figures from the Javanese shadow play or puppet characters (Fig. 8). There is a major influence of the shadow play “*Wayang Kulit*” among Malay communities in the Peninsula.

Fig. 8 *Bangau* with the shadow play motif

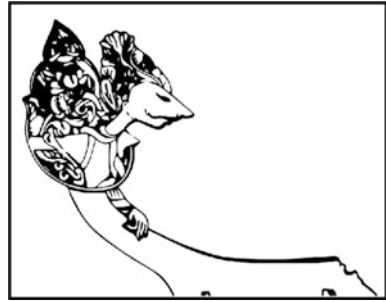
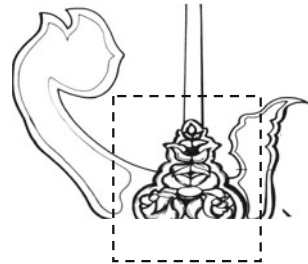


Fig. 9 *Caping* on traditional boats



(2) *Caping*

Caping is located between *Bangau* and *Okok* acting as a counterbalance to the *Bangau* (Fig. 9). It is an ornament in the shape of a betel leaf (*Sireh*) or a heart shape with the tip downward (Fig. 10).

Previously, the fishermen hung offerings of *pinang* (areca nuts), *limau nipis* (lime), and flowers on the *Caping* as they used it as a sort of altar. *Caping* is also a heart-shaped modesty disc worn by young girls and boys to cover the genitalia (Fig. 11). The *Caping* is hung from the waist by a chain or thread. The fishermen tend to classify their boats as male or female. They believe that the male boats will make a harsh sound whereas female boats will have a sweet fragrance pervading the sticky brine odor. It tends to feminize the boats.

The majority of the *Caping* are decorated with floral motifs (Fig. 12). There were also *Caping* with the motifs of fauna and abstract forms (Fig. 13).

Fig. 10 *Caping*



Fig. 11 *Caping***Fig. 12** *Caping* with floral motifs**Fig. 13** *Caping* with abstract motifs

(3) *Okok*

Okok and *Bangau* are usually made from a single piece of wood and *Okok* is smaller than the *Bangau* as shown in Fig. 14. The shorter *Okok* is attached to the keel and holds the anchor; like *Bangau*, *Okok* is also decorated on both sides and the wood carved in a bas-relief technique. There was a connection between *Bangau* and *Okok*. *Bangau* and *Okok* can face one another or both look in the same direction. Anyhow there are also *Bangau* and *Okok* facing back to back (Fig. 15).

Okok is mostly found in several shapes and the motifs consist of flowers, fauna, and abstract patterns. This wood carving design depicts a young flower bud or shoot, which appears behind or below the main branch of the leaf, and signifies that the young should give the elders priority or precedence (Fig. 16).

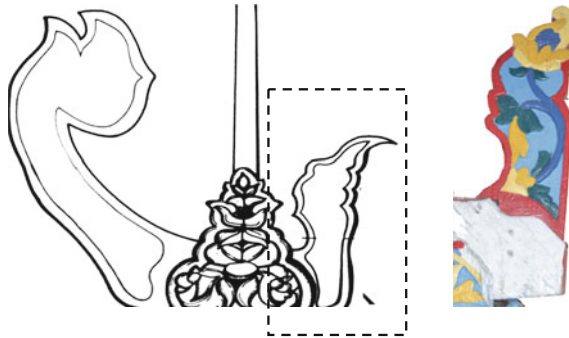


Fig. 14 The *Okok*

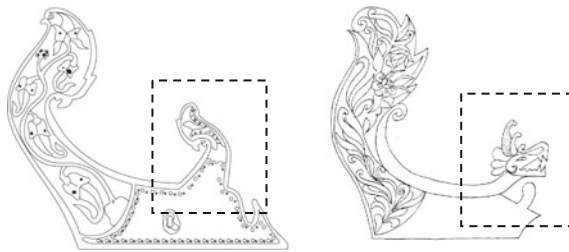
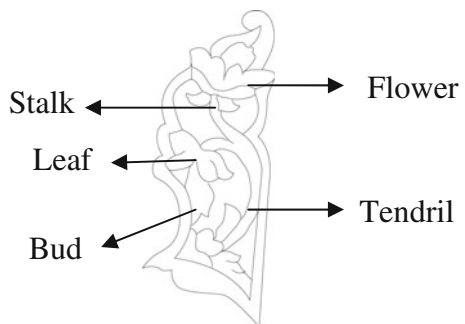


Fig. 15 *Okok* with a motifs of flora and fauna. The *Bangau* and *Okok* facing each other (*left*) and looking in the same direction (*right*)

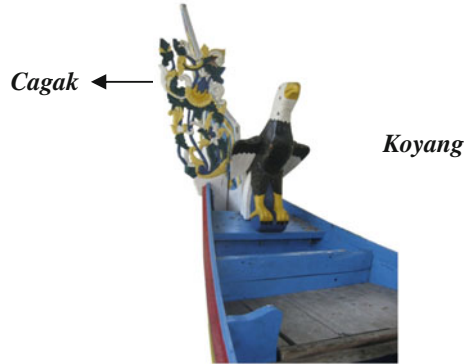
Fig. 16 *Okok* decorated with floral motifs



(4) *Cagak* and *Koyang*

Koyang is the holder for the boat rudder. It is shaped like a stick in a tilted position (Fig. 17). *Koyang* is placed in the middle of the rear parts. A long oar is a rudder that is tied with a rope. The *Koyang* is also solely found in *Kolek Buatan Darat* boats.

Fig. 17 *Okok* decorated with floral motifs



The other part is *Cagak* which means forked stick. It is a piece of wood at the rear on the left side of traditional boats. The use of *Cagak* is to rest the rudder oar. *Cagak* is not commonly found in our boats in Malay land but mostly found in Southern Thailand. Figure 18 is rarely found on *Kolek Buatan Darat* which is one of the traditional boats in Terengganu and Kelantan. *Kolek Buatan Darat* refers to the boat made by *Darat* which means people from Southern Thailand.

(5) The Bow (*Haluan kapal*) and Stern (*Ekor kapal*)

Wood carvings also can be found and some motifs were painted with attractive and artistic motifs on the bow (*haluan kapal*) and stern (*ekor kapal*) and are usually decorated with motifs of flora, fauna, and calligraphy in the form of Quran. The *Kolek Buatan Darat* is mostly found decorated with wood carvings on certain parts

Fig. 18 *Cagak* with the motif of flora

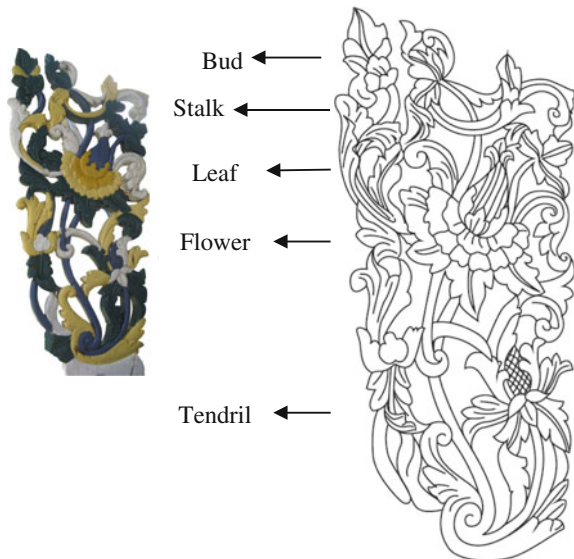


Fig. 19 The head and tail of traditional boats



and boats were painted with special motifs such as floral and figurative decorations. The use of bright color and meandering clouds (*awan larat*) is very popular in decorating the boats (Fig. 19).

6 Conclusion

In conclusion, the application of wood carving on certain parts of traditional boats plays important roles in Malay civilizations. As meaningful ornaments, there were seven parts shown in the implementation of wood carving: *Bangau*, *Caping*, *Okok*, *Cagak*, *Kayang*, head, and tail of the boats. Each has its own purpose and also an important role on the boats. In addition, beautiful and meaningful motifs were used to decorate the parts using a variety of motifs and arranged in harmony. The selection of motifs used in wood carving shows the Malay wood carvers have a deep understanding in choosing and interpreting the natural motifs to relate to real life. The motifs used in decorated ornaments are flora, fauna, and characters, especially the shadow puppets in *Wayang Kulit*.

Before the advent of Islam, most of the motifs were living creatures and also the spirit of God. The most commonly used were dragons, monkeys, seahorses, and birds. The motifs of birds usually used were the egret, eagle, parrot, chicken, phoenix, heron, hornbill, and duck. Other than that, the use of shadow puppet characters such as Ramayana, Hanuman, Arjuna, and Jentayu were also popular among previous woodcarvers. After the advent of Islam, there were huge changes in the selection of motifs. Motifs based on animal or human forms were generally avoided and appeared in stylized or abstract form. *Bangau*, for example, was added with plats and used as a motif called *Bangau Daun*. The use of calligraphy in the form of Quran verse was also developed as a major design element. The aims of this research were to investigate the meaningful ornaments on Terengganu boats and to collect samples of motifs used in wood carving. It was found that the selection of the motifs was related to the beliefs, culture, and civilizations. Most of the motifs used were forms taken from nature. Animals and plants were stylized or presented in abstract forms in the most sophisticated depictions. More motifs and patterns can

be analyzed in future research. Results of the findings on wood carving on decorated boats can be classified and documented to provide a wide range of databases for the use of other researchers, historians, designers, and students in future research. Therefore, this research should be continued and preserved for our heritage.

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Malaysian Product Design Identity: Issues, Transformation, and Challenges

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Abstract This chapter discusses the issues, transformation, and challenges of creating a national product design identity in the context of a multiethnic country. Generally, there is no evidence that the characteristics of product design identity can be generalized based on the agreement of multiethnic decision making. In the context of Malaysia, the main issue is about the identification of a national identity for local product design. This led to the question of whether we can establish Malaysian product design identity using multiethnic preferences. By looking at the mutual agreement between all ethnic preferences before the formation of Malaysia, it is plausible to use a single dominant of culture and heritage influence from Malay ethnics because the privilege was clearly written in the Social Contract, Reid Commission, and Malaysia's Constitution. The transformation should be in line with the sectors of education, research, industry, and government agency. The challenges of today and the future were to take a stand about uniformity of Malaysian product design identity and it should be acceptable for other ethnic

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groups in Malaysia. In conclusion, we propose that more studies about Malay ethnic culture and heritage should be given in the perspective of semantic and syntactic interpretations.

Keywords Agreement • Culture and heritage • Ethnic • Identity • Product design

1 Introduction

Malaysia was known as a multiethnic country after independence since 1957. There are three major ethnic groups living in peace and harmony such as Malay, Chinese, and Indian. The inclusion of Sabah and Sarawak in 1963 has brought more variety of ethnicity and culture in the country. Several attempts have been made by Malaysian designers in creating a Malaysian product design identity. However, the main challenges are how to merge the characteristics of culture and heritage into a single product design that can be generalized representing all ethnicities in Malaysia, or can Malaysian designers use Malay ethnic culture and heritage as an influence to represent Malaysian product design identity.

This chapter seeks the answers to the above questions. Because the ingredients of this argumentative chapter are based on the existing literature reviews, the statements revealed within this context should be regarded as for academic purposes and should be perceived with an open mind.

2 Issues of Malaysian Product Design Identity

2.1 *Malay Identity as a Malaysian Identity*

Malay is a main ethnic group in Malaysia. According to the Population and Housing Census of Malaysia in 2010 issued by the Department of Statistics Malaysia [1], Malaysia's population was 28.3 million, with the Malays as the largest number of 14.2 million people comprising 50.1 % of the total population. Next were Chinese (22.6 %), Indian (6.7 %), Bumiputera (11.7 %), foreigners (8.2 %), and others (0.7 %).

Previously, there were several Malay product designs existing in Malaysia such as Keris, Wau, Gasing, and so on. Among the common products that represent Malay identity is a Kukur Kelapa (coconut grater; see Fig. 1). All of them have been classified by the government of Malaysia as a traditional product design.

Until now, the government of Malaysia has had a dilemma in identifying brand identity that represents Malaysian product design identity. However, by looking at the history of the formation of Malaysia, it is plausible (reasonable) to justify why we should use Malay identity as a Malaysian identity by referring to a mutual

Fig. 1 Kukur Kelapa

agreement of all ethnics through the Social Contract (before Independence), Reid Commission (1956), and Malaysia's Constitution (1957).

2.2 Social Contract (Before Independence)

The leaders of the three parties such as United Malays National Organization (UMNO), Malaysian Chinese Association (MCA), and Malaysian Indian Congress (MIC) have discussed and reached an agreement in relation to the three ethnics' demands upon the independence of Malaya (now known as Malaysia). This has been written clearly in the Social Contract that in return, one million citizenships were given to non-Malays, and non-Malays must recognize the special position of the Malays as the "indigenous people." Some provisions of the law such as the position of Islam as the official religion, the preservation of Malay reserve land, the position of the Malay rulers and Malay customs, and the distribution of government are also included in this understanding. On the question of the national language, *Bahasa Melayu* (Malay language) has been agreed to be used as the national language. English is a second language. The Chinese and Indians can continue to use their own languages but not in official communications. The national language is to be learned by everyone so that Malayan citizens can communicate with each other anywhere. Islam is the official religion but other religions may be practiced by their adherents without any obstruction [2].

2.3 Reid Commission (1956)

The Reid Commission was briefed on the agreement and understanding so that they would be included in the Constitution to be drafted. All three parties approved the Constitution after several amendments were made. The effect of this Constitution comprises a binding contract of the three ethnics in the Federation of Malaya upon attaining independence in 1957. The Reid Commission, which provides the framework of the Constitution, states in its report that Article 153, the backbone of the social contract, is temporary, and recommended that it be reviewed 15 years after Independence. The Commission also states that it and its provisions are only required to avoid a sudden unfavorable to the Malays in competition with members of the Malaysian society to another, and the privileges given to the Malays but the matter should be gradually reduced and eventually eliminated [2].

2.4 *Malaysia's Constitution (1957)*

Article 153 of the Malaysian Constitution gives the responsibility of the Yang di-Pertuan Agong (the King) to keep the position of the Malays and natives of Malaysia, a group referred to as the “indigenous people.” The Article specified how the federal government will protect the interests of these groups by establishing quota entry into public service, scholarships, and public education. It is also generally considered to be part of the social contract, and is usually described as a legal defense for Malay supremacy [2].

2.5 *Identity Conflicts in the Design of a Multiethnic Country*

Most cases on merging product design identity of multiethnics into items of design failed due to several reasons. In this section, we provide two examples of a multiethnic country. The first example is the United States of America (USA). The United States was known as a multiethnic country. However, until now, there is no single product in the United States which can be generalized as representing the multiethnic characteristics in their product design identity. In USA design history, the uniqueness of a product depends upon the technology and knowledge of their citizens. One of the examples, American streamlined design, has become iconic in the United States (see Fig. 2). The twentieth century's fast cars, trains, and planes promised to conquer space and time; their aerodynamic styling and metallic bodies embodied a new and modern beauty that enchanted American designers from the late 1920s to the 1950s [3]. Streamlining became popular for everything, including toy scooters, typewriters, power tools, tea kettles, Coca-Cola bottles, Lucky Strike packaging, Fiestaware pitchers, Studebaker cars, Greyhound buses, and the twentieth Century Limited train. Among the vanguard designers for American streamlined design from the 1930s to the present are Raymond Loewy, Donald Deskey, Henri Dreyfuss, Russel Wright, and Norman Bel Geddes. Furthermore, Raymond

Fig. 2 American streamlined design (designer unknown; mixall jr. portable electric mixer, 1945–55)



Fig. 3 Singaporean universal design (orca design)



Loewy introduced the principle Most Advanced Yet Acceptable (MAYA) into the design. According to the Raymond Loewy estate’s website he believed that, “...The adult public’s taste is not necessarily ready to accept the logical solutions to their requirements if the solution implies too vast a departure from what they have been conditioned into accepting as the norm [4].” For example, Apple products are derived from this principle.

The second example is Singapore. Singapore is also known as a multiethnic country. It consists of Chinese, Malay, Indian, and other ethnics. A design produced in Singapore is based on a vision-driven strategic design. At the core of each task is a clear project vision crafted and aligned based on a mixture of empathetic research, business strategy, and informed intuition. This guides and inspires Singaporean designers on creative exploration, while assuring that the designs deliver results that are resonant both to the system and the end-users [5]. Realizing that product development is an array of divergent tensions, clients from diverse fields have leveraged on Singaporean designers’ astute sensibility, proven competency, and extensive experience to make creative leaps that materialize as compelling and desirable purposes. For them, innovative design solutions towards the Singaporean universal design standard are the ultimate target in designing a product (see Fig. 3).

3 Transformation of Malaysian Product Design Identity

3.1 Education

3.1.1 Design Subject at School Level

In Malaysia, the design subject is one of the elective subjects in high school that emphasizes the technology and creativity of students. Invention is drafted with the intention of shaping the minds of creative, innovative, and inventiveness in

preparation for the workforce to be informed and competent in facing the global challenges of development and technology in the new millennium. The challenge lies with the education system to produce more progressive and scientific scholars. This is important to develop a research program to produce new technology and not just consumers. In line with the education reform, the subject invention, first introduced in all schools in Malaysia, is one of the long-term plans to achieve the goal of producing a generation of Malaysians who are creative, inventive, and innovative [6]. Royo and Mahmood [6] in their studies about the design subject in three schools in Johor showed that the factors of students' interest (mean = 2.69), students' attitudes (mean = 2.84), teachers (mean = 2.92), and invention subject amenity at school (mean = 2.74) are at a moderate level.

3.1.2 Industrial Design Program at the Higher Institution or Universities

Many universities in Malaysia offer students an educational environment that nurtures creativity, innovation, and critical thinking. Within the design (in this context industrial design) curriculum, it can be art-based (i.e., Universiti Teknologi MARA), science-based (i.e., Universiti Teknologi Malaysia), and a combination of art- and science-based in the education (i.e., International Islamic University Malaysia). In Malaysia, the course mainly focuses on methods of analyzing problems, methods of ideation and creativity, and methods of visualization, presentation, and communication. Students will be exposed to problem-solving techniques and critical thinking, manual dexterity, technical drawing skills, self-discipline, conceptual vision, understanding and knowledge of engineering principles, human factors/ergonomics, aesthetics, industrial materials and processes, and digital computer-aided design. The curriculum focuses on three learning domains such as cognitive, affective, and psychomotor [7]. The cognitive domain revolves around knowledge, comprehension, and critical thinking on a particular topic. The affective domain describes the way people react emotionally and their ability to feel other living things' pain or joy. The psychomotor domain describes the ability physically to manipulate a tool or instrument such as a hand or a hammer. In relation to that particular learning domain, outcome-based education (OBE) has been introduced in Malaysia design education systems. Methods of OBE are student-centered learning methods that concentrate on empirically measuring student performance (the "outcome") [8]. OBE contrasts with traditional education, which primarily concentrates on the resources that are usable to the student, which are called inputs. OBE implementations often incorporate a host of many progressive pedagogical models and ideas, such as reform mathematics, block scheduling, project-based learning, and whole language reading. Moreover, for the understanding of diversity in design strategy from structured thought to arise by itself, the strategies have been included in the design education curriculum through problem-solving, normative, synthesis-analysis, reflective, and hermeneutics [9].

3.2 Research

3.2.1 Implicit

In Malaysia, research on semantic studies of product design has contributed to an implicit (not stated, but understood in what is expressed) contribution to the body of knowledge. Semantics is a study of the meanings [10] and in the design world it is normally associated with “semiotics.” Semiotics is the study of signs and sign systems, their structure, properties, and role in sociocultural behavior [11]. The term “semantics” is closely related to the study of the meaning of signs (or semiotics, which is a more general term). In other words, semiotics considers how forms communicate meanings through signs, such as when a coffeemaker communicates that it belongs to the world of kitchenware through its general form and color. According to Krippendorff [12], meaning is a cognitively constructed relationship. It selectively connects features of an object and features of its (real environment or imagined) context into a coherent unity. The reasons for such a relationship are numerous [13].

3.2.2 Explicit

Meanwhile, research on syntactic studies of product design has contributed to explicit (expressing all details in a clear and obvious way, leaving no doubt as to the intended meaning) contribution to the body of knowledge. Syntactics deals with the structure and composition of visual elements [14]. Broadly, it involves the analysis of a product’s technical construction as well as the analysis of visual details such as joints, openings, holes, crossing forms, texture, graphics, and so on [15]. In the design world, the uses of this terminology refer to the visual form aspect of a product. The existing model of design syntactics consists of two basic concepts, namely form elements and form entities [14]. Form elements can be related to material-physical and configuration issues, whereas form entities deliver syntactic and semantic functionality to the product form [13].

3.2.3 Example of Topics for Product Design Research

There are three examples of topics that have recently become popular for product design research in Malaysia. The first topic is about brand image and identity. Visual recognition of brands and products has become a central competitive factor within various product categories. Most companies develop products with designs that not only appear attractive but also carry distinctive references to the “character” of the brand, manifest in defining core values. Such “value-based” design features involve explicit or implicit references, and depending on the brand’s strategic approach, can be consistently or flexibly used over the product portfolio. In order to

be better prepared to face the challenges of design practice, design for visual brand recognition is a theme that needs to be embraced by new approaches also in design education [16]. The second topic is about product design identity in relation to DNA investigation. The basic element of *deoxyribonucleic acid* or DNA is the genome. In design, a genome is the “life form” whole set of genes of DNA [17]. In terms of definition, it is one haploid set of chromosomes with the genes they contain, broadly, the genetic material of an organism. In the perspective of genetic terminology, the terms refer to a full set of chromosomes as well as all the inheritable traits of an organism. It contains all of the chromosomes in rank required to build and maintain that life form. Most of the design research on genomes explores the sequences, maps, chromosomes, assemblies, and annotations. Even new car styling DNA shows potential disappearance from the current model and has the potential to bring us closer towards a design aim. Because design is subjective in nature there is a question about how designers can establish the character traits of styling DNA for car design. The third topic is about user perceptions of local products. For this particular topic, the study is a way to describe how products communicate with users [11, 18].

3.3 Industry

3.3.1 Product (Royal Selangor)

Royal Selangor Company has introduced traditional Malay carving motifs as culture and heritage influences that represent Malaysian product design identity. Traditional Malay carving motifs can be categorized into decorative motifs or patterns that have been inspired by early or ancient Malay motifs such as the design pattern with floral motifs, stalks of leaves, and tendrils (*Awan Larat* which literally means indirect clouds) which are set up in the environment in Malay society as well as motifs inspired by the imagery of early carvers [19] (see Fig. 4).



Fig. 4 Traditional Malay woodcarving motifs adorn the sides and lid of this elegant trinket box



Fig. 5 Quirky wood

3.3.2 Furniture (Ideation Sdn Bhd)

Ideation Sdn Bhd has used quirky wood as one source of material to represent Malaysian furniture design identity. Quirky wood is to create beautifully finished and polished timber features and furniture by cutting into and shaping the wood to reveal the remarkable patterns in the grain left over the course of the tree's life span. Some of the trees have succumbed to infections which leave their own patterns as they spread through the timber (see Fig. 5).

3.3.3 Automotive (Perusahaan Otomobil Nasional Sdn Bhd)

Perusahaan Otomobil Nasional Sdn Bhd (Proton) has produced Malaysia's first car, the Proton Saga which was originally conceived as an idea of a Malaysian car. Proton is realizing its goal of being an internationally successful Malaysian automotive manufacturer. It is accomplishing this by being customer-oriented and by producing competitively priced and innovative products. Hence, it is contributing to Malaysia's attainment of Vision 2020 [20]. Currently, in the development of the new Proton Prevé, if we look at the popular choices among Proton designers, the item that represents local identity through nature resources by using the Malayan tiger metaphor seems to give promising properties/attributes to the characteristics of the car design (see Fig. 6). The Malayan tiger (*Panthera Tigris jacksoni*) is a tiger subspecies that inhabits the southern and central sections of the Malaysian Peninsula.



Fig. 6 The Malayan tiger as an influence

3.4 Government

3.4.1 Malaysia Design Council

The Malaysia Design Council (MRM) role is to pave a future of innovation and design for Malaysia. It leads design programs in the country to boost the industry's design expertise, capabilities, and standards [21]. MRM has strived to advance the effective function of design and thinking in business, education, and government. Nevertheless, it goes on with its attempts to elevate designing methods and to catapult creativity among manufacturers. With the direction and recommendations from MRM, Malaysian companies are at once able to go forward and invent a bigger adherence with their consumers through their increased expertise in creating eye-catching products. The function of MRM is (1) to educate industries on the importance of quality and effective design management, in product manufacturing, to compete in the open market; (2) to organize activities for locally designed products to be promoted internationally; (3) to be a repository of information and reference on design so as to assist local industries in developing their design capabilities; (4) to coordinate advisory services to the industries; (5) to promote programs in improving product designs among local industries; and (6) to promote greater public awareness of quality design.

3.4.2 Ministry of Science, Technology, and Innovation

The Ministry of Science, Technology, and Innovation (MOSTI) task is harnessing science, technology, and innovation (STI) and human capital to value-add the agricultural and industrial sectors and to modernize the new economy, especially through information and communications technology (ICT) and biotechnology [22]. The Second National Science and Technology Policy provides a framework

for improved operation and long-term growth of the Malaysian economy. It also supports product design by efforts to: (1) increase the national capability and capacity for research and development (R&D), technology development, and acquisition; (2) encourage partnerships between public-funded organizations and industry as well as between local and foreign companies for the codevelopment of technologies with a view to increasing indigenous technology capability; (3) enhance the transformation of knowledge into products, processes, services, or solutions that add value across every industry for maximum socioeconomic benefit; (4) position Malaysia as a technology provider in the key strategic knowledge industries; (5) foster societal values and attitudes that recognize science and technology (S&T) as critical to future prosperity, including the need for lifelong learning; (6) ensure that the utilization of S&T accords emphasis towards approaches that are in conformity with sustainable developmental goals including alignment with societal norms and ethics; and (7) develop new knowledge-based industries.

3.4.3 Ministry of Education

The Ministry of Education (MOE) in the Interim Strategic Plan 2011–2020 at the Chapter of Innovation and Creativity [23], has the goal to produce innovative and creative students with the latest skills and knowledge. The objective is to create a culture of innovation and creativity in educational institutions. The outcome is (1) students have the critical thinking, creative, and innovative skills with the latest knowledge; and (2) enhanced innovation and creativity educators. Malaysia Deputy Prime Minister, Muhyiddin Mohd Yassin [23] states

...Our goal is to make quality education as the foundation for nurturing a creative, innovative and highly skilled in tandem with the government to improve the country's competitiveness by improving the quality of human capital that is born of our education system. The success of the new economic model for human capital capacity to innovate and explore new areas to generate national wealth is a critical factor, which will determine the future progress and prosperity of the country.

Among policy that has been paid as a privilege for Malay ethnicity in relation to education is to grow and ensure that books in *Bahasa Melayu* are available in its role as an efficient instrument in the evolution of thought, social clubs, and culture which is in line with the dreams and needs of the nation.

4 Challenges of Malaysian Product Design Identity

4.1 As for Today

Most of Malaysian product design exists for the purpose of meeting user and technology expectations. Designers should explore more local items' design context

and should use them as a basis of influence in designing a product. They should be unique by their own identity. The attempts made by local companies such as Royal Selangor, Ideation Sdn Bhd, and Proton have changed the paradigm. The use of a single ethnic culture and heritage such as Malay is plausible because the agreement was made by three main ethnics through the Social Contract, Reid Commission (1956), and Malaysia's Constitution (1957). Malaysian product design identity can be established if all ethnics agree to use Malay culture and heritage influences for designing. This will make products designed by Malaysian designers towards Malaysian product design identity more reliable. The challenges in the education sector are to equip students with the proper knowledge and skill for designing a product. At the university level, incentives such as grants and sponsorships might help researchers to explore, establish, and develop useful guidelines that can be used as a reference in designing Malaysian product design identity. The findings are novel and can be contributed to the body of knowledge. Industries in Malaysia should take the challenge to create businesses that are state of the art in promoting Malaysian product design identity throughout the world.

4.2 Future

The initiative should be taken by Malaysian designers to promote Malaysian product design identity. Research on brand image and identity, design in relation to DNA investigation, and user perceptions of local products should be carried out at the largest setting. This should be supported by education, research, industry, and government in terms of opportunities, recognition, and financing. The future challenges in Malaysian product design identity will be on reliability, verification, and validation. Reliability is the quality or state of being and the extent to which an experiment, test, or measuring procedure yields the same results on repeated trials. Verification of research results is concerned with establishing the truth or accuracy and the predictive and explanatory power of proposed theories, methods, and models. Verification can be looked into the concept of logical verification and verification by acceptance. Validation of research results is concerned with establishing the relevance and meaningfulness of theories, methods, and models.

5 Concluding Remarks

In this chapter the issues, transformation, and challenges for Malaysian product design identity have been presented. Looking at issues in a Malaysian design context, by referring to the mutual agreement during the formation of Malaysia between all ethnic preferences, it is plausible to use Malay ethnic culture and heritage influences in products as references. The failures of America to create one USA product as well as Singapore are evidence that it is hard to merge all ethnic

influences into one single product design identity. The transformation in education, research, industry, and government should place emphasis on the Malaysia design policies towards innovation and creativity. The challenges should be looked at as of today and future design perspectives and how to make the national identity of Malay ethnic culture and heritage embedded in Malaysian product design appear consistently in every product through semantic and syntactic interpretations.

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Rhetorical Comparison of the Promotional Strategies Used in Performing Arts and Visual Arts Research Articles

Ina Suryani, Salleh Abd Rashid, Kamaruddin Hussin, Aizan Yaacob and Noor Hashima

Abstract Articles on innovative research development and discussions on sustainable issues in art and design education research are welcomed by editors and publishers for the reason that sharing of knowledge would encourage beneficial development and advancement of arts and design education and research. Simultaneously, writers of journal articles in the other disciplines are putting vigorous effort into publishing their articles to the extent that promotional strategies are used to appeal to the interest of the readers, and editors in turn increase the possibility of publication and citation. Although studies found promotional strategies have permeated into the journal articles in science and technologies disciplines, not much has been discussed on whether the arts and design academicians promote their work in their journal article writing. Motivated that the understanding of the utilization of the promotional strategy in journal article writing would benefit the art and design writers in publishing their work, this chapter investigated the use of promotional strategies in art and design research articles. Putting the findings side by side, it was found that the visual arts articles utilized more recommended strategies in their writing compared to the performing arts articles. Compared to the performing art articles, the visual arts articles were found using more strategies that indicated the research gap and strategies that stated the value of their work. Although the finding cannot be generalized to all journal articles in performing arts and visual arts articles due to the small sampling, the understanding from this study is useful for arts and design writers particularly in writing their articles for publication.

Keywords Performing art · Visual art · Research article · Writing

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1 Introduction

Sustainable issues pertaining to art and design are often discussed academically to ensure that the direction of the knowledge in this area remains relevant and progresses reasonably. Innovative research development and discussions on sustainable issues in art and design education research are welcomed by editors and publishers for the reason that sharing of knowledge encourages beneficial development and advancement of arts and design education and research. Often such academic discussions are in the form of research articles published in journals and conference proceedings. Simultaneously, academicians are making vigorous efforts to publish their articles to the extent that writers were found to promote their research at a more visible level in their writing to increase the likelihood of being published. The utilization of a promotional strategy is meant to appeal to the interest of the readers and editors and hence increase the possibility of publication and citation.

Although studies found promotional strategies have permeated into research articles in the science and technologies disciplines, not much has been discussed on whether the arts and design academicians promote their work in their writing. To motivate that understanding of the utilization of promotional strategies and benefit art and design writers in publishing their work, this chapter investigated the use of such strategies in art and design research articles.

The articles from the *Journal of Arts Discourse* also known as *Wacana Seni*, published in 2014, and research articles on visual arts were investigated using the CARS model [1] move analysis. Comparing the findings it was found that the visual arts articles utilized more recommended rhetorical strategies in their writing compared to the performing arts articles. Compared to the performing arts articles, the visual arts articles were found to use more strategies that indicated the research gap and stated the value of their work. Although the finding cannot be generalized to all research articles in performing arts and visual arts articles due to the small sampling, the understanding from this study is useful for arts and design writers particularly in writing their articles for publication.

2 Promotional Strategies

2.1 Rhetorical Strategy

Rhetorical literacy skill refers to the skill to understand, analyze, evaluate, and employ various writing strategies based on their comprehension by the audience, purpose, writing situations, research methods, genre, style and delivery techniques, and media. Rather than having fixed practices in writing, rhetorical literacy provides the writers with the rhetoric tools to create and shape meaning within the contexts

of audience, purpose, and writing situations. Rhetorical study can be dated back to Plato and Aristotle, however, rhetoric has not been given much emphasis in Malaysian academic writing [2].

2.2 Promotional Strategies in Academic Writing

Promotional strategies in journal article writing refer to the act of rhetorical persuasions that are realized by employing situation appropriately, stylizing language artfully, and generating speaker—audience commonality [3]. Although studies have shown that promotional strategies have been utilized in journal article writings in many disciplines [2, 4], the utilization of promotional strategies among arts and design journal writers needs more investigation, particularly when studies have shown how such rhetorical analysis understanding can help the writers produce better journal articles [5]. In the context of the arts and design discipline, the competition to publish is getting higher especially when the academicians in arts and design are expected to publish for assessment purposes, for career development, and also for grants. These purposes give strong drive to the arts and design academicians to publish, however, the act of writing is still a cumbersome task to many academicians. The writing must not only be presentable for the arts and design community but also impress and appear worthy enough to the editors and reviewers. With all the purposes to write and audience to consider, it is worth investigating if the arts and design writers have employed the situation appropriately, stylized language artfully, and generated commonality between speakers and their audiences in their effort to publish their work.

Promotional strategy in journal article writing can be accomplished in a number of ways particularly by using “announcement of principal finding” and “stating value addition” as in Swales model [1, 6]. Native writers have been reported to utilize the promotional strategy as part of their journal article writing, whereas lesser accounts have been described in relation to research articles written by nonnative writers. A broader account of the practice among Malaysian writers is necessary to enhance the teaching of this strategy in the writing of Malaysian writers particularly in the arts and design discipline.

2.3 Methodology

This study used move analysis as proposed by Swales and Shehzad [1, 6]. They emphasized the need for the announcement of principal findings in the introduction section of the research articles mainly because by highlighting the major findings and the value of the research, the readers’ interest can be captured as early as possible rather than delaying to the end and risking losing the reader. This is

especially true when editors, reviewers, and researchers have to be selective given the vast availability of materials. Scientific writers highlight the major findings of the research to establish the research contribution as early as possible [6].

2.4 Analysis Method

The investigation was conducted on the articles from the *Journal of Arts Discourse* also known as *Wacana Seni* published in 2014, and four research articles on visual arts written by Malaysian writers. The total of articles was eight. This study employed the move analysis method to investigate the realization of three moves which were “Announcing the principal finding,” “Stating the value of the present research,” and “Indicating a gap.” These moves were part of the CARS model [1]. The definition of a “move” is from the definition by Swales [1], that is, a “rhetorical unit” that performs “a communicative function.” A move fulfills its linguistic realization function through a clause, several sentences, or several paragraphs [1]. To start the investigation the articles were compiled and each of the sentences in the article was read and analyzed by identifying the sentences to the moves. The identified moves were cut and pasted into tables.

3 Findings

The analyses on the three moves were done on the articles and were grouped as visual arts article or performative arts articles. Articles 1–4 are from visual arts and Articles 5–8 are from the performative arts discipline. Comparing the findings of the move analysis conducted on the articles in this study indicated that the visual arts and performative arts articles have some similarities and differences in the choice of rhetorical strategies used. A similar strategy between the two is in the fulfillment of “indicating a gap” move.

Move analysis on Article 1 [7], found that the article conformed to the norm suggested by Swales whereby the research gap was indicated early in the statement of “One explanation for why Design driven Innovation has largely remained unexplored is that its processes are hard to detect when one applies the typical methods of scientific investigation in product development.” The announcement of the principal outcomes was delayed in the findings section which was on the eighth page. The statement on the value of the research was also delayed to the discussion and conclusion section that was on the twelfth page. On the other hand, Article 2 [8] entitled “Significance of Japanese Tea Ceremony Values with Ceramic Art Interpretation” indicated the research in the Abstract but none in the Introduction. The announcement of the principal finding was also delayed to the Result and Discussion section. Similarly, the value of the present research was also delayed to the Result and Discussion section as in “the researcher hopes to convey to the other

society thus that they will gain knowledge and understand about the value that is not essential to other society but is important to the Japanese culture.”

Article 3 [9] entitled “A Behaviour Study on Ablution Ritual among Muslim in Malaysia” also delayed the indication on the research gap in the Method and Result section by highlighting “accestive [sic] consumption of water during ablutions” and “need a system or tool to control their behavior before their preformed [sic] the ablution ritual.” However, the announcement of the principal finding conforms to the suggestion by Swales and was stated in the introductory section as “... in this work we reported about the Muslim understanding towards their knowledge on ablution and propose a tool to control the behaviors of Malay society on ablution ritual to minimize usage of water.” Similarly, the value of the present research was also achieved early in the introduction section as “... in this work we reported about the Muslim understanding towards their knowledge on ablution and propose a tool to control the behaviors of Malay society on ablution ritual to minimize usage of water.”

Article 4 [10] on “Innovation of Blackening Labu Sayong” was also found successfully to indicate the research gap in statements of “The innovative blackening technique of Labu Sayong introduces methods and process which is [sic] different from the techniques practiced by the existing entrepreneurs.” The research gap is further highlighted in another statement: “From observation of the technique, a room for improvement is found to increase the efficiency of the blackening of Labu Sayong.” Another statement reinforcing the research gap of the study was “Among the noted areas for improvement are the lengthy [sic] of time during transferring the clay pitcher to the paddy husks, excessive labors, the uneven blackened effect of clay pitcher, fuel wastage and unavoidable damage during the transferring process.” On top of assertiveness in indicating the research gap, the article also accomplished announcing the principal finding early in the introduction section: “... Produce the blackened effect to the clay pitcher is by adding the paddy husks into the kiln without removing the clay pitcher from the kiln.” In addition, the article also conformed to the Swales model by stating the value of the present research early in the introduction section in the statement of “The method saves labor, time, and fuel and reduces the damages of the clay pitchers.”

Articles 5–8 are from the performative arts discipline and move analysis on Article 5 [11] entitled “In Conversation: Dain Said on Bunohan, Creative Film making and the Malaysian Film Industry.” The article did indicate the research gap, however, the manner was less straightforward compared to the visual arts article studied earlier. The gap can be implied from the statement of “With such eventful and colourful achievements, Dain Said is now seen as a respectable and an important Malaysian contemporary filmmaker. Therefore, it is significant to listen to his discourse about film and filmmaking as it mirrors his contemporary critical view of this country and region and statement. Indeed, it is crucial to know the influence of his work on the Malaysian film industry.” Similarly, the announcement of the research finding and the value of the present research was also less direct and needed to be implied as in “The interview reveals a few crucial matters related to the creative process of filmmaking,” and “The creative process, according to Dain

Said, continues without the need to conform to Sergei Eisenstein's idea of locating the audience at the heart of filmmaking."

Likewise, Article 6 [12] entitled "Revitalisation of the Performing Arts in the Ancestral Homeland" also indicated the research gap in a manner that demands implying skills from the reader as in "A second more underlying challenge that the governor faces is a redefining of Lampung identity due to the province's minority indigenous population." Correspondingly, the announcement of the principal finding and the value of the present research was also less direct as in "I describe several male and female forms of Saibatin theatre and dance presented at sakura festivals (pesta sakura)..." and in the statements of "I examine the function of the theatre of sakura and the artistic modifications..." and "I discuss the introduction of new female dances and their links..."

Table 1 shows the findings for Article 7 [13] and Article 8 [14].

All of the articles have successfully stated the research gap in relation to the niche of the intended study. Even though Article 2 [8] did not indicate the research gap in the introduction section, the research gap was clearly stated in the Abstract. However, the statements on indicating the research gap in performative arts, Article 5 [11] and Article 6 [12], were indirect and required the reader to imply the gap. Another difference in the usage of strategy between visual arts and performative arts is in the portrayal of "announcing the principal outcome" and "stating the value of the present research." These moves were found in the visual arts articles. Even though the findings and the value of the research were delayed and stated towards the middle and the end of the articles, these moves were made and accomplished clearly. On the other hand, the performative arts articles were more indirect and subtle in realizing these moves. The findings and values of the articles were present, however, the portrayals of these moves were not as explicit as those in the visual arts articles. Rather than stating the value of the article outright, the readers of the performative arts articles had to imply and deduce the value of the article. The findings were also implicit and required inferences from the reader.

4 Discussion and Conclusion

Academic articles in the arts and designs discipline in this study used unique rhetorical strategies that are unlike the science and technology articles [15–19]. The introductions of the arts articles were mostly longer and wordier compared to the science and technology articles [20–22]. With the exception of a few, most of the findings of the study were delayed or completely missing. The statements on the research gap, findings, and value of the performative arts articles were less direct and thus required the readers to imply and interpret the values themselves. The Introduction was focused on developing the literature review and understanding the general idea in the discussion rather than exploring the research problem.

The justification to these phenomena is in the culture of arts and design academic writing. Compared to the science and technology community, the culture of

Table 1 State of values of the present research

Title	Indicating the research gap	Announcing the principal finding	Stating the value of the present research
Article 7 [13] cross-gender attempts by Indonesian female impersonator dancer Didik Nini Thowok	“While Butler’s focus was mainly on the ‘social body’ that functions as the basis of reproduction or labour, in the study of performing art forms, we need to consider the body as the basis of performance or display”	“This article describes the effective use of costumes and masks in Didik’s works as the external elements of the human body, and considers his manner of “subversion” with regard to gender imagery” “... investigates the characteristic dance movements in Didik’s works and examines his discourses on gender expressions”	
Article 8 [14] responses to war and Tsunami Trauma through the musical arts in Aceh, 2005 2012	“The few scholarly publications that touch on music and trauma in a Southeast Asian context are limited to peripheral aspects of the study of wars in the region” “... very little has been written on their role in trauma therapy, despite the fact that religion and the religious-oriented performing arts have played an important role in societal recovery after the tsunami and the conflict”	The findings and the value of the article are indirectly stated “I shall now discuss some examples of arts therapy that NGOs engaged in as they tried to treat, relieve or heal the trauma of victims living in the displaced persons’ camps...” “I shall then discuss the private, local troupes of artists’ (sanggar) efforts to restore their music and dance activity and teaching...” “I shall discuss some newly created films about the tsunami and the trauma it caused. Finally, I shall comment on the government’s arts- and religion-led activities...”	

research writing for the arts and design community in Malaysia is relatively new and the focus of academic writing has been more on arts education and performance which emphasized issues exploration rather than solving a physical problem.

Although the Malaysian *Journal on Arts*, among the early ones, “Jernal perintis pendidikan senilukis dan senireka” [sic] started by ITM could be traced back to the 1970s, the academic writing culture for arts and design is less dynamic compared to the science and technology journals in Malaysia. The dynamism is lesser in terms of number of times published in a year, number of articles, indexing, and coverage.

Due to the local difference in dynamism and writing culture, the need to emphasize the research gap, findings, and value of the research are less prevalent.

However, plans for the arts and design academician are changing and academic writing has gained importance in obtaining career mileage, performance credits, and research grants. Taking heed from the merits of research writing, the Malaysian arts and design writers have changed some of their strategies in research writing by attending courses on article writing and also by observing the common writing practice of the key articles in the area. This is particularly important as the academicians are urged to publish in reputable indexed journals that call for competition with global writers.

In facing global competition for a place in publication, the writers must not only understand what the rhetorical strategies are but also must be able to use the strategies to elevate the value of their research to a level worthy of publication. Indicating the research gap and stating the findings and value of the research must be presented earlier particularly in the Introduction. Such a strategy is to captivate the interest of the reader earlier rather than risk the possibility of the reader to keep on reading up to the discussion and conclusion section in order to realize the value of the research.

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Investigation of Materials on Artificial Reefs by Using Sabak Bernam Local Clay

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Abstract The artificial reef is an alternative to marine life as a refuge and as a source of food. In addition, the artificial reef also functions as a place of breeding endangered marine life and helps as a shelter to small fish. Currently the artificial reef is growing around the world and in Malaysia has been produced in a wide range of materials such as tires, steel, concrete, and so on. Concrete is popular in the production materials of artificial reef products because it is easy to produce. However, the disadvantage of concrete materials is limited by processing the formation of an artificial reef with the use of these materials. The aim of this research was to investigate the production of artificial reefs that can be produced with the use of local clay and have no limitations during the formation process. Therefore, the methodology of this research included the selection of location, preparation of clay, and testing procedure.

Keywords Artificial reef · Materials · Local clay

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1 Introduction

The first artificial reef (AR) was introduced in 1975 based on several research findings on the coastal fisheries resource in Peninsular Malaysia [1]. Based on this research, the suitable species of marine life have been taken into account; now the artificial reef also has more blooms and various parties have contributed to the production of artificial reefs in Malaysia. Artificial reefs at present have changed in terms of materials and design. Production of artificial reefs popular today uses a concrete material as the basic material for the artificial reef formation. However, the disadvantage of using concrete materials is limited by processing the formation of the artificial reef [2]. Most of the sculpture artists abroad nowadays have many ventures in the production of their work in the sea as artificial sculpture such as Jason deCaires Taylor. He has produced artificial reef sculpture in the form of human design and placed them in the sea. In Malaysia, there are not many sculpture artists who produce their artwork in the sea as artificial reefs for marine life as well as to show the element and principle of design.

This research aims to investigate the production of artificial reefs that can be produced with the use of local clay material and have no limitations during the formation process. Clay is a practical material to use because it has no limitation when handling for a wide range of designs and it is also easy to set up according to the design required. Clay also has a high level of strength when it goes through some process and firing [3]. Also, the use of clay is close to nature compared with the use of concrete with a lot of chemicals to process this material.

2 Artificial Reef

The artificial reef is one of the alternative ways in the breeding of marine life. It can help the development of life, act as a breeding refuge, and as a place to find food. According to Suryawardani [4], they are making 'stek' with the size 3–5 cm as a coral colony on a platform filled with seawater. Each piece is then in artificial substrates as paste and corrective surgery can be performed with coral seed glue; tied-up corals do not fall damaged as a result of the waves or currents. Based on this research, the researcher made a coral reef joined with artificial substrates. This is one of the processes to help coral growth in seawater. The artificial reef helps small fish breed because it manages to prevent large fish entering the artificial reef that is small size as a protection for the small fish. This research can provide a good outcome for the country because it also works as a 'garden' in the seawater. Thus, it can attract more tourists to come to our country.

3 Material

Materials are the most important things before making any product or design [5], according to Ali as a senior research officer in SEAFDEC. He was one of those producers of the artificial reef in Malaysia and has much experience in the production of artificial and marine life. He also said that previously there were so many materials the artificial reef used before, such as tyres, fishing vessels, concrete, PVC, and others. Among the materials used, concrete is the best material and was used until now because it is easy to find and can be in the form of transition according to design. The ARs deployed by the DoFM using nearly a million tyres and thousand units of '*unjam unjam*' by the FDAM did not show any positive result in terms of increasing coastal fish resources. But after 1995, the use of tyres significantly dropped and then was totally forbidden, due to the claim by many parties that automobile tyres leached toxins into the marine environment. The most crucial is that arrangements of tyres, no matter how they were constructed, have proven highly unstable structures in the sea. They are inherently of low specific gravity, which gives them a propensity to shift under relatively slight conditions of water movement. In a large storm, tyre arrays can be moved considerable distances, eventually only to break apart [1]. Therefore, this study investigates using local ceramic clay. This clay is chosen because it is able to withstand longer time and is similar to natural materials.

This research wants to produce ceramic materials as replacement artificial reef materials. Ceramic materials have many classifications such as bone china, porcelain, stoneware, terracotta, red clay, and many more. Every ceramic material has a different strength [3]. Therefore, this research aims to use a stoneware clay because it is popular among the materials in the production of ceramic goods and also easy to find. Another reason to choose ceramic stoneware clay is because the material composition is suitable and close to the natural environment. Ceramic clay will be fired to get the strength feature of each body type. The stoneware body usually high fired is most favourable for the ceramist in artwork pieces because body strength is one of the main factors that ceramic artists focus on in their artwork production process [5].

4 Local Clay

In this research, local clay was selected according to the exact location, such as near the beach to facilitate the artificial reef process and save costs [6]. Mostly ceramic artists prefer to use stoneware clay for the production of their works or sculpture. Stoneware clay is a material which can be shaped when it is soft and hardened by a firing process, so that the shape remains permanent. Ceramics are now defined as manmade articles, shaped from natural earth, rock, and minerals, and transformed into a permanent hard state by heat [7]. Based on this study, clay can be formed in a

variety of designs and should be fired to strengthen the body [8, 9]. In this study, each sample of local clay was fired to get the body strength. The selection of local clay collected was studied and used as a sampling study for the artificial reef. Among the famous areas in the field of ceramics is the Kuala Kangsar, Perak. In this research, Sabak Bernam in Selangor was selected because the location is close to the beach and also the sea, as well as its proximity to the experimentation laboratory in UiTM Shah Alam, Selangor. Apart from that, this location was chosen to help in developing rural areas and upgrade the economy in the Sabak Bernam, Selangor area.

5 Methodology

In this method, the step of processing and lab testing had to be run to investigate the ability of the raw materials chosen. This method also discussed the clay location selection, clay process, and testing procedure using a step of location selection, clay process using modulus of rupture, shrinkage of testing, and testing procedure [6] as shown in Fig. 1.

5.1 Location Selection

Figure 2 shows the Sabak Bernam district area plans acquired from the Sabak Bernam District Office [10]. The Sabak Bernam district area has a number of areas which are Mukim Bagan Nakhoda Omar (BNO), Mukim Sabak, Mukim Panchang Bedena, Mukim Sungai long, and Mukim Pasir Panjang. Among the largest mukim in Sabak Bernam are Mukim Pasir Panjang and Mukim Sungai long. Based on the above plan, the smallest mukim in Sabak Bernam is Mukim Bagan Nakhoda Omar (BNO). Based on this map plan, the researcher chose the Mukim BNO site as an ideal place for the setting of the artificial reef as well as for carrying out the review. This site was also chosen as the source of clay material to be tested and experiments to produce the artificial reefs.

Once the researchers got the grid plan with the names of villages at each grid, they selected five villages in Mukim BNO, Bagan Nakhoda Omar. Among the names of the selected villages are Kg. Sekendi, Kg. Puncture Jawa, Kg. Telok Rhu, Kg. Sungai Apong, and Kg. Sungai Tengar near the hotel reservations. This location was chosen because Mukim Bagan Nakhoda Omar was found as the



Fig. 1 Process of the said project



Fig. 2 Grid map of Sabak Bernam, Selangor

largest area between the axes of the grid. This sample study was intended to determine whether the clay in each chosen location was suitable to be used as an artificial reef product for marine life. The process involved a method to access the location as excavating clay to get samples of clay.

5.2 Clay Process

5.2.1 Filtering Process

After the location was identified, land-digging works were started according to the places listed. While taking this raw clay, every sample of raw clay and other larger clay had to be in 3-ft depths at least. This was intended to facilitate carrying out the vetting process. This crushing process was done carefully and could absorb water quickly, then mixed and filtered before drying a few minutes.

5.2.2 Test Bar Process

The mould was produced by using plaster of Paris (P.O.P) because it is simple, easy to use, and absorbs water very quickly. A test bar was produced according to the correct dimension with sizes, length 10 cm \times width 2 cm and thickness of 1 cm. This is the standard size for test bar samples. The purpose of the test bar process was to identify the shrinkage testing in testing the bar.

5.2.3 Testing Procedure

In this study, the testing procedure used was the modulus of rupture and shrinkage of test bars.

5.2.4 MOR

Modulus of rupture (MOR) was examined in two nonimmersed and immersed conditions [5]. Based on this research, the data collection ceramic stoneware clay used MOR to identify the strength of the stoneware clay. The MOR test was important to categorize the strength of each body sample. The test bar was tested using a bending strength machine. The test bar was placed in the middle of the three points of the bending strength machine. This machine had three buttons: the start button, slowly button down, and slowly button up. The machine had a peak point meter reading indicating the reading and constructing the point of each sample of local clay as rates in Table 1.

Based on Table 1, data collection shows each sample has a peak point meter reading. This table also shows the strongest peak points mostly occur at temperatures 1200 °C. The sample of K.S.A 1, K.S.A 2, K.T.J 1, K.T.J 2, K.S 1, and S.G 2 showed the temperature at 1200 °C had a very strong strength body. However, it was different on the samples of K.S 2, K.R 1, K.R 2, and S.G 1 because the samples showed the strength of the body at a temperature of 1100 °C. All samples were raw clay collected at every location that had been set. The sample of S.G 2 showed the peak point reading meters were the highest of all the samples available. This meant that the sample of S.G 2 had the most dominant body strength among all the samples that were tested.

Table 1 Temperature of the firing test bar

Type of Sabak Bernam Clay	Temperature (°C)			
	900	1000	1100	1200
K.S.A 1	81.76	123.17	181.05	220.62
K.S.A 2	73.44	101.93	105.90	226.06
K.T.J 1	116.80	99.07	102.88	280.19
K.T.J 2	76.22	99.81	147.60	279.48
K.S 1	51.27	112.73	161.43	183.67
K.S 2	69.07	65.78	196.52	137.63
K.R 1	116.65	166.71	199.89	155.25
K.R 2	70.19	89.97	222.52	135.19
S.G 1	63.27	87.26	158.12	112.20
S.G 2	48.83	51.81	141.34	407.48

Table 2 Shrinkage of test bar

Type of Sabak Bernam Clay	Shrinkage (°C)			
	900	1000	1100	1200
K.S.A 1	0.06	0.07	0.13	0.13
K.S.A 2	0.06	0.07	0.12	0.17
K.T.J 1	0.07	0.09	0.11	0.21
K.T.J 2	0.06	0.09	0.16	0.23
K.S 1	0.06	0.07	0.13	0.19
K.S 2	0.05	0.06	0.11	0.14
K.R 1	0.04	0.08	0.12	0.14
K.R 2	0.04	0.07	0.12	0.13
S.G 1	0.03	0.07	0.13	0.19
S.G 2	0.04	0.07	0.16	0.19

5.2.5 Shrinkage of Test Bar

Shrinkage was another important thing as a consideration. It also aimed to find the shrinkage rates that occurred for each sample of clay in the experiments. Look at the microstructure of the fired body to see if the fines are shrinking away from the others [11]. Based on this research, each sample of the product must be taken on the measure of the size of the test bar, thickness, and weight of the samples when wet and dry before firing [5]. This could be started by recording the current shrink rate wet and dry before firing. In this study, the first technique was to identify shrinkage of each clay by making the test bar measurement of thickness 1 cm, length 10 cm free, and the width 2 cm [7], and after that, the sample was weighed to find the weight of water contained and the shrinkage of clay.

Table 2 shows the shrinkage of each test bar. This study was done by measuring the size before and after and also the weight before firing and after. In this table, all the samples showed shrinkage was going against the temperature 1200 °C. But, the sample of K.S.A 1 showed similarities to shrink temperature 1100 and 1200 °C. This means that the samples did not shrink at temperature 1200 °C. Among the samples, K.T.J 1 and K.T.J 2 showed the highest shrinkage and they occurred at temperatures 1200 °C.

6 Result

Based on this result, the three samples best to use were K.T.J 1, K.T.J 2, and S.G. Each of these samples showed a very strong strength of body. Among the three samples, the S.G 2 could be the best material to use for the production of artificial reefs because it had the highest strength and shrinkage that is lower than the K.T.J 1 and K.T.J 2. This means that raw clay from S.G 2 samples was more suitable to use in the production of the artificial reef product.

7 Conclusion

In this conclusion, the most suitable sample of raw clay was S.G 2. However, this does not mean the rest of the samples cannot be used at all. For further study, other researchers can expand all the samples by adding ceramic chemical materials to other samples to conduct other chemical and physical studies of these raw clays [12]. This study also wanted to develop artificial reefs for the future as a benefit for marine life and also to attract tourists to come to our country as a marine life park, aquarium, and the like. Other than that, they help serve our nation in the economic sectors. Artificial reefs in the world have been growing with a variety of methods such as type of design, materials, and methods of compilation [13, 14]. The great thing about artificial reefs abroad is they welcome ceramic artists and sculptors to produce a design [15, 16], idea, and their sculpture by using local clay to produce a quality product. In 2006, Taylor founded and created the first underwater sculpture park in the world. The coral reef attracted an array of marine life such as colourful fish, turtles, and sharks and also provided enclosed spaces for sea creatures to breed or take refuge [17]. Based on the literature, he is one of the sculpture artists to produce artificial reef sculpture. In conclusion, we hope ceramic artists in this country produce artificial reef sculpture as a marine park and also for marine life to grow.

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Visual Thinking Courseware: Enhancing Critical Thinking Skills Through Art Criticism

Harrinni Md Noor and Zarina Samsudin

Abstract Art criticism provides knowledge, skills, and understanding that enable students to have broad and rich experience with works of art by responding to and making judgments about the properties and qualities that exist in visual form. It requires higher-order thinking skills (HOTS) that integrate contents from the four disciplines of art (art aesthetics, art history, art production, and art criticism) that contribute to the creation, understanding, and appreciation of art. Findings from a survey conducted in three Malaysian public universities revealed that less than 30 % of the undergraduate art students are able to analyze works of art critically. This is an alarming state considering their involvement in art activities that require them critically to analyze and criticize works of art. For students undergoing teacher training courses the skill is very much needed as they will be going out to teach art subjects in schools. Because technology has taken a front seat in the teaching and learning of many art-related subjects in higher education courses in Malaysia, this research looked at how visual thinking courseware can aid in the teaching and learning of art criticism. In particular, this chapter looked at how the selection of visual images, Gagne's 9 events of instruction, the flow theory, and Feldman's art criticism model can be put together to design courseware that can help enhance the quality of learning about art criticism and increase students' critical thinking skills.

Keywords Critical thinking • Visual thinking • Courseware development • Art education • Art criticism

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1 Introduction

The world of technology has brought about many changes in our lives. We have seen technology being used in a multidisciplinary setting, more in the sciences and only recently in the arts curriculum. Technology has taken a front seat in the teaching and learning of many arts-related subjects from performance arts to the fine arts. In art education, a lot of research has been focused on the integration of technology in art education and the use of technology to teach this subject [1, 2]. Within the art curriculum, by using digital technology, children can develop the capability to express themselves visually in a wide range of situations through the learning that takes place [4]. The new digital art tools can also significantly improve children's artistic ability and creative activity [3]. Access of content and interactions within technological environments becomes transparent and advances students learning [5].

In Malaysia, the use of technology in education is still underutilized (Raman 2011), especially in art education. In general, Malaysian teachers mainly use ICT for searching educational resources, creating presentation/delivery materials, and preparing lesson plans [6].

2 Art Criticism at the Undergraduate Level

Art education courses at the undergraduate level provide knowledge and training for students who will later become art education teachers. Art education in Malaysia integrates contents from the four disciplines (art aesthetics, art history, art production, and art criticism) that contribute to the creation, understanding, and appreciation of art. This discipline-based art education (DBAE) is taught as a valued academic subject that focuses on art's discipline in the teaching process. It is important for students undergoing art education courses to have good knowledge and skills in art criticism. The study of art criticism introduces order, intelligence, and perhaps some logic into visual learning [7–9]. These processes do require HOTS. Therefore, it is important that students understand these processes to enable them to analyze, explain, and judge the works of art systematically. At the undergraduate level, students of art and design education are trained to become competent teachers of art education in school. As future teachers, these undergraduates will have to acquire good criticism skills themselves before they can teach the subject to their students.

A survey was carried out among 30 art and design lecturers from three public universities in Malaysia (Universiti Teknologi MARA, Universiti Putra Malaysia, and Universiti Kebangsaan Malaysia). Twenty art and design education undergraduates from the Faculty of Education, Universiti Teknologi MARA (UiTM) also participated in the survey. Based on the survey, 100 % of the students agreed that art criticism is important for the teaching and learning of art. Yet, based on the

survey, less than 30 % of the art students at the undergraduate level were able to critique the artwork. This is an alarming state considering that these students will be going out to teach art subjects in schools that require them to know about art criticism.

The findings from the survey also helped outline the major problems faced in the teaching and learning of art criticism and how technology can aid in the teaching and learning of the subject.

3 The Problems

The problems are classified into three major categories. It was learned from the study that:

3.1 No Systematic Approach Has Been Used to Teach Art Criticism

Based on the survey, art criticism was not taught systematically. The majority of lecturers (66.7 %) stated that art criticism was integrated in other courses and not taught as a course on its own. Art criticism sessions often took place at the end of art production or as part of class assessment during studio practices. Different lecturers have different styles and approaches in teaching the subject. Fifty percent of the lecturers allowed total freedom in the discussions of an artwork without any systematic approaches, whereas others followed some basic rules suggested in the textbooks. Some dealt with art criticism as part of an assignment. Barret [8] stated that any work of art can generate many meanings and students of art may find that artworks may not generate the meanings intended by the artists. The perception, which is a result of information received by sight, and processed with a series of processes, is different from what we see [10]. Therefore, we need to perceive them carefully and interpret them systematically.

3.2 Students Cannot Relate to the Visuals: Difficult to Analyze and Not Much to Criticize

Art criticism also deals with the higher-order thinking that requires skills to describe, analyze, interpret, and make judgments about a work of art. Very often students are not able to go through these processes. This is due to various reasons. Firstly, students cannot relate to the visuals because the selection of visuals could not extract much from the student's thinking. Visuals used are often not from local

artists and do not take into consideration cultural background, and thus are difficult to analyze. Furthermore, some of the artworks are also too abstract to enable students to criticize.

According to Yenawine [11] various forms of art are not equally accessible in terms of meaning; the ambiguity varies. Rhyne [12] pointed out that visual composition conveys its own meaningful messages and the perception of form and cognitive choices do interrelate in creating personal visual communications.

Therefore, the selection of visuals for the artwork plays an important role in determining the critical thinking process to enhance the student's critical thinking skills during art criticism activities.

3.3 Art Criticism Activities Are Not Fully Utilized Throughout the Course Duration

The survey also suggested that art criticism should be introduced to students at an earlier stage—the first year after they have been taught the elements and principles of art and design—and before they start producing artwork or teaching in schools. However, based on the survey, 77.8 % of the lecturers stated that the time allocated to teach art criticism in a semester is not adequate. This is because art criticism is not a subject on its own and other major courses such as art production and studio work take precedence. It is up to the lecturers to introduce the subject at any point of time. Twenty-two percent of lecturers allocated 14 weeks to teach art criticism, 16.7 % allocated 2 weeks, and the remainder allocated 3–8 weeks. This prompted the lecturers to deal with art criticism when and if they found it appropriate. The majority agreed that art criticism should be included at every stage of learning art and not just a theory subject taught in one particular course. Therefore, there is a need to develop courseware that would help students learn about art criticism even without the presence of their lecturer. Consequently, it can be introduced at any point of time during the course duration.

Based on the survey, 83.3 % of respondents agreed that technology can aid in the teaching and learning of this subject. Some of the problems mentioned by respondents in the survey pointed out that it is difficult to gain students' interest in the subject. The resources for the teaching and learning of the subject are also limited. Lecturers admitted that most of the time the art students either criticize their friend's or their own completed works. The majority also stated that technology can help gain students' attention, enhance the teaching and learning process, and a variety of artwork can be made available to students through the Internet and databases.

4 The Solution

This study looks at the teaching and learning of art criticism through the use of courseware by combining the three important elements in its design and development—a good art criticism teaching and learning model—good visual selections for HOTS, and the appropriate instructional design (ID) models.

4.1 Art Criticism Teaching and Learning Models

The art criticism model introduced by Feldman in 1971 using the four sequential steps of description, analysis, interpretation, and judgment has been used for art

Table 1 Process and words formulating questions according to Bloom’s taxonomy and Feldman

Category	Keyword	Process	Question words	Feldman
Knowledge	Remember	Repeating from memory	Who, what, when, where, list, name, define, recall identify, recognize, remember, locate	Description
Comprehension	Understand	Rephrasing, comparing information	Replace, compare, contrast, describe, explain, use your own words, translate	Description
Application	Solve	Problem solving in a new situation using appropriate principles, rules, concepts, etc.	Apply, solve, classify, choose, sort, imply, what is, report, record, list	Description Analysis
Analysis	Order	Identifying logical order of components	Analyze, conclude, decide, why, give reasons, identify, describe, support, how, relate, categorize, classify, survey	Analysis Interpretation
Synthesis	Create	Combining known components into a new idea, plan, etc.	Create, develop, design, synthesize, devise, improve upon, imagine, supposed, predict, what if, how, combine, estimate, hypothesize	Interpretation
Evaluation	Judge	Forming a judgment or opinion based on specified criteria	Judge, evaluate, assess, validate, decide, give opinion, debate, argue, discuss, choose, recommend	Evaluation

criticism purposes in many art education classes. Currently this model is considered a formal criticism method held in the highest esteem in the DBAE scheme [13]. This model guides students from concrete details to abstract concepts, from knowledge and comprehension to analysis to evaluation. This model has also been used to critique one's own creation in which the student exercises an opportunity to reach the pinnacle in the application of HOTS. Therefore, the art criticism model by Feldman has been chosen for the design and development of the courseware.

Questioning also plays a major role in the teaching and learning of art criticism. It is a means of developing the student's positive self-concept and personal artistic development. Hambleton [14] introduced a set of questioning strategies that was designed within the framework of Bloom's taxonomy that would offer a much needed specificity to current art criticism (Table 1). The key word indicates the term that is most descriptive of the category. The process identified for each category refers to the primary mental process involved when one is asked a question within a given category. The question words initiate a thinking process that can be ascertained by identifying the major descriptor of the process. These processes integrate well with Feldman's four-step sequential model.

5 Selecting Visuals for HOTS

Yenawine [11] suggested the following descriptions to aid the selection of images that can be used or avoided to prepare materials for museum visits or classroom teaching. These selections were chosen by the authors because they not only generate critical thinking processes but also allow students to engage in more meaningful discussions.

5.1 *Images to Choose*

- Pictures that include identifiable and reasonably familiar people, actions, interactions, settings, and emotions.
- Images that are selected with a particular audience in mind. Choices should be guided by what is likely to intrigue them.
- Images that allow viewers to look for stories in the artwork which are often found in genre scenes and images of family, play, and work.
- Art that is diverse in time and culture with a range of styles and themes. Image selection should be sensitive to gender, racial representation of artists, subjects, environment, and ethnicity of the viewers.
- Images whose logic corresponds to the "real world"—from naturalism and romanticism to expressionism—are often more appreciated than surrealism.
- Diversity of media (drawing, painting, photographs, digital prints, sculpture, etc.) should be used based on the viewer's age group.

- A range of subjects (landscapes, seascapes, town and city views, portraits, self-portraits, etc.) should be exposed to viewers for conscious awareness and appreciation of the works of art.
- Images that are presented from simpler (those that are clearer and have fewer possible meanings, fewer details, less density of content) to more complex (those with greater ambiguity of meaning).
- Images that are presented in series united by some visual element or theme that provides useful organizational logic.

5.2 *Images to Avoid*

- Illustrations because photojournalism, cartoons, and advertisements provide only one, or at best, too narrow a range of interpretations.
- Images depicting violence, political stances, specific religious imagery, nudity, overt sensuality and sexuality among others contain conflict of their own and may cause viewers difficulty in analyzing.
- Abstractions because viewers continue to look for stories and abstract images do not provide concrete and obvious stories.
- Still lives because most decorative arts and architecture are difficult for beginning viewers to appreciate.

5.3 *The ID Models*

Gagne's 9 events of instruction has been selected for the design and development of the courseware. As Kruse [15] pointed out applying Gagne's nine-step model to any training program is the best way to ensure an effective learning program. The instructional events are also associated with mental processes that the authors hope to achieve in the courseware (Table 2).

The Alessi–Trollip model for design and development [16] has been chosen to design and develop the art criticism courseware. The authors chose this model because the approach is straightforward and simple. It is also general enough to be applied to the art criticism subject. It has three phases starting with planning, then design, and ending with development.

In the planning phase, the following steps help to place the foundation of the project in order. These steps are:

- Define the scope.
- Identify learner characteristics.
- Establish the constraints.
- Cost the project.

Table 2 Gagne instructional events and associated mental processes

	Instructional events	Internal mental process
1	Gain attention	Stimulus activates receptors
2	Inform learners of the objectives	Creates level of expectation for learning
3	Stimulate recall for prior learning	Retrieval and activation of short-term memory
4	Present the content	Selective perception of content
5	Provide “learning guidance”	Semantic encoding for storage of long-term memory
6	Elicit performance (practice)	Response to questions to enhance encoding and verification
7	Provide feedback	Reinforcement and assessment of correct performance
8	Assess performance	Retrieval and reinforcement of content as final evaluation
9	Enhance retention and transfer to the job	Retrieval and generalization of learned skill to new situation

- Produce a planning document.
- Produce a style manual.
- Determine and collect resources.
- Conduct initial brainstorming.
- Define the look and feel.

The design phase helps in the instructional and interactive perspective of the content and can be customized to the needs of the teachers and students. These steps are:

- Develop initial content ideas.
- Conduct task and concept analyses.
- Do a preliminary program description.
- Prepare a prototype.
- Create flowcharts and storyboards.
- Prepare scripts.

The development phase provides ideas and techniques to ensure that the courseware meets the required instructional and learning goals. The phase has the following steps.

- Prepare the text.
- Write program text.
- Write program code.
- Create the graphics.
- Produce audio and video.
- Assemble the pieces.
- Prepare support materials.
- Do an alpha test.

- Make revisions.
- Do a beta test.
- Make final revisions.
- Validate the program.

Csikszentmihalyi discovered the flow theory, a positive, highly enjoyable state of consciousness that occurs when our perceived skills match the perceived challenges we are undertaking. It is when the goals are clear, users' skills are up to the challenge, and feedback is immediate that one becomes involved in the activity. Therefore, people who experience flow tend to be more playful, exploratory, and willing to try new things [17]. This is what is hoped for in this art criticism courseware. It is also hoped that students stay longer, and enjoy engaging themselves in the study of art criticism.

To enable flow in Web design, the websites should be designed to have the following traits.

- *Speed*: Pages should load quickly and minimize the variability of delay. This interactive speed is a significant factor in all models of user satisfaction.
- *Feedback*: There should be fast unambiguous feedback for user input such as links (include hover, visited, and active styles), navigation widgets (menus, etc.), and display performance variables (server load, cache state, page/file sizes, download progress bars).
- *Clear navigation*: Viewers should be able to find their way so they can easily form a mental model of the website. Include signposts such as site maps, breadcrumb trails, and "you are here" landmarks.
- *Match challenges to skills*: Make the interface adaptable or adjustable. Challenges should be easy at first and more complex later as users gain experience. Users should be able to have control over their environment's complexity that is appropriate to their skill level.
- *Simplicity*: Minimize features and provide uncluttered layout to reduce the attention load.
- *Importance*: The content or offerings should appear important and credible with professional design, impressive clients, and outside recognition.
- *Design for fun and utility*: There should be a rich yet responsive experience, plus tools to help users accomplish their goals quickly and easily.
- *Avoid cutting-edge technology*: Research shows that users just want to get their information without the cutting-edge technology that gets in the way of user goals.
- *Minimize animation*: Users often have limited attention, thus minimize animation to avoid distracting the users.

6 Conclusion

This chapter provides suggestions and recommendations for the design and development of art criticism courseware. Based on the problems outlined in the survey conducted, the authors have identified several problems in the teaching and learning of art criticism. These problems can be overcome by combining the three important elements in its design and development: a good art criticism teaching and learning model, good visual selections for the HOTS, and the best ID models.

It is hoped that the courseware will help guide students through the art criticism processes as well as enhance their critical thinking and criticism skills when learning and teaching the subject. The authors also hope that the design and development of this courseware will expand the boundaries of research in art education and the field of educational technology in Malaysia.

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A Preliminary Study of Robotic Education in Malaysia

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and Rosita Mohd Tajuddin

Abstract Robotics education was first introduced in 2005 by the Ministry of Education. This robotics program served as a cocurricular activity that emphasised creativity and innovation. Its program was introduced to primary and secondary schools throughout Malaysia. The program aimed to encourage and motivate students to use higher-order thinking skills (HOTS) and as a way to promote science and technology education to students. Recently, Malaysian students' achievement in science at the international level has decreased drastically. Therefore this research is to review the effectiveness of the robotic programme in helping to improve students' learning and achievement in science and technology. The main objective of the government which introduced robotic education was to produce highly skilled human capital, knowledgeable, dynamic, and competitive in science and technology. The method of implementation is that interested students' can participate in the school's robotic club and those students who can master the skills taught can participate in competitions conducted at the state, national, and international levels. Findings from robotic education have helped elevate students' achievement at the international level through the world robotic competitions. It is concluded that robotic education is able to attract students to study science and technology and improve their achievement at the international level with such skillsets.

Keywords Robotics · Students · Thinking skills · Science and technology

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1 Introduction

Robotics education has been found to be an important tool in education nowadays. It can encourage students to learn hands-on practice and arouse students' curiosity and help in problem solving in science and technology [1]. However, robotic education is not being much implemented in Malaysian education [2].

There are indications that the Malaysian education system needs to be more competitive in today's changing world. Out of 74 countries participating in PISA 2009+, Malaysia performed in the bottom third for reading, mathematics, and science. This was the first time Malaysia took part in the PISA assessment, and the average Malaysian student's performance in all three areas was well below both the international and OECD averages. This statistic is worrying because PISA is an assessment of students' higher-order thinking skills and ability to solve problems in real-world settings, vital skills in the twenty-first century [3].

By implementing it more in Malaysia, the students' achievement in the field of robotics may help raise the ranking in the next PISA report with a better position as shown in Fig. 1.

Many developed countries have introduced this subject to students in preparation for the era of globalisation and knowledge. ICT and technology-based subjects focus on preparing students for the twenty-first century. The traditional education system such as writing and memorising needs to be changed; students not only memorise but must also master certain skills. Learning is a process that should be incorporated from the most basic to the most complex so that students can master the learning outcomes gradually and regularly. The implementation of robotic and FI in school have helped train students' thinking skills [3].

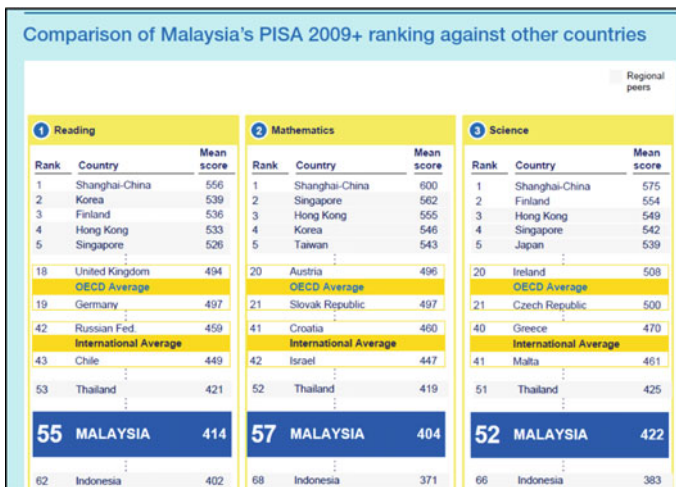


Fig. 1 Comparison of Malaysia's PISA 2009+ ranking against other countries [3]

Initially, only 500 schools participated in robotic competitions in Malaysia; this number is growing every year and in 2013, nearly 3000 teams participated in this competition [4]. This shows that students are increasingly interested in robotic education and is a positive indication that the awareness and interest of students in the field of robotics has increased and become more widespread [5] thus producing students who will contribute to the human capital that complements the needs of twenty-first century skills.

2 Robot Development

The robot was originally created in 1921 and was introduced by a Czech national, Karel Capek, in the drama *Rossum's Universal Robots*. The word robotic was invented by Isaac Asimov in the 1940s in a science fiction story about a robot. For more than 100 years, humans only imagined the robot; there was no specific description of the form and function of the robot [6]. Probably the catapult war machine can be categorised as a robot at that time but using the simplest technology. This tool still needs to be generated by humans and cannot function automatically; then the robot becomes part of the science-fiction story, revolving around galactic warfare as in the film, *Star Wars*, that elevates robots R2D2 and C3PO.

Robots today are very real and perform various types of important work such as exploring other planets, investigating deep-sea volcanoes, assembling cars, and performing surgery [6]. Robots help to do the work and chores of humans, without ever feeling tired. They work the way they are programmed and are not careless. Some robots produce better results than humans. Today robots have various special functions such as getting information through censorship and getting involved in programming and ICT, and can perform tasks efficiently, quickly, and facilitate human life [7]. Robots may consist of vehicles, equipment, or machinery, whether automatic or semi-automatic.

3 Robots in Education

Apart from the above functions, robots are also an important tool in education. The robotic education programme is a learning platform, which can form skilled students for success in the twenty-first century [4]. Robotic education is an initiative to help improve the knowledge and mastery of students in science, mathematics, ICT, and engineering [4] through a solid foundation in science, technology, information and communication technology (ICT), design through hands-on experience, and experimentation [5]. The robotic education programme emphasises some important elements such as problem-solving skills, creative thinking skills, communication skills, teamwork, and involves higher-order thinking skills [8]. The robotic

education programme also allows students to develop logical thinking and systematically produce a fully-functional robot [5].

Over the past years, interest in robotic education has increased and several attempts have been made worldwide to introduce robotics in schools from kindergarten to high school, mostly in the field of science and technology subjects [9], with robotics education conducted in cocurricular time and only accompanied by robotic club students. When students reach year 4 of their primary schooling years, they choose a club for their extracurricular activities. This is chosen based on their interests. For secondary school, students join curricular activities in Form 1 and continue to Form 5. At an early stage, students are usually introduced to robotic components such as NXT (the brain that stores all programming made), sensors, gears, and other components. Students start training to design robots based on knowledge of these components.

The next stage is making a basic programme to move the robot. After students can master all these stages, they carry out training in a competition format. SASBADI Malaysia (the company organising the robotic competition for school students in Malaysia) also participated and made teaching and learning modules such as “5 Minute Robot” where students need to install the components in 5 min and programme it with some basic movements. Training continues until the competition starts. Students need to find the easiest solution in terms of the appropriateness of the design and programming to ensure that the robot can complete the mission in time. Review from past studies acknowledged the role of robotics in education that contributed towards students’ achievement in science education.

4 Robotics in Enhancing High-Order Thinking Skills

Research about high-order thinking skills among students in Malaysia have been conducted since the ministry of education emphasised the importance of thinking skills among students. A study presented by the “Rank Report” found that high-order thinking skills are required by students to succeed in the context of the twenty-first century [10]. This is important because current students should be able to think for knowledge throughout their lives, and should have a variety of important skills such as cognition, including problem solving, reasoning, creative thinking, and innovation [3].

High-order thinking skills (HOTS) are important because they encourage problem-solving skills, creative and critical thinking skills, communication skills between people, and team collaboration skills among students [9]. The study of robotics requires students to design, identify the function, and use the computer program in enabling the robot to function as programmed [10]. Robotic education cultivates curiosity, self-direction, problem solving, and changes students’ attitude towards technology [7].

The importance of thinking skills and robotics has been identified as an effective instrument [2]. Educational robotics can trigger the curiosity of students and raise them to explore and question their ideas with the new tool. It provides students many ways to explore ideas and build their knowledge through real-world experience while using mechanical parts and programming [8]. Robotics-based learning encourages students to explore ideas and their curiosity and make them eager to work on the project. Because they are interested in it, the project can have personal meaning to them.

In the six cognitive domains that were introduced in Bloom's taxonomy, robotic education uses almost all the domains in the implementation of its activities. In the domain of knowledge (memorise and arrange) [11] that is at the bottom of the Bloom taxonomy, students use the knowledge base to design a robot using the basic components of robotics. In the domain of comprehension (identify, classify, explain, indicate, locate) [11], robotic education emphasises each student's need to understand the importance of each component and sensor used in the design. Domain application (apply, choose, illustrate) [11] encourages students to apply their knowledge in designing the robot, in terms of design, the use of sensors, function, reason, and consequence by their actions.

The following are three domains forming the highest Bloom taxonomy involving higher-order thinking skills. The domain analysis (analyse, appraise, calculate, examine, experiment) [11] emphasises the students' analysis of each problem in the production of robots and finding a solution. This domain also requires students to evaluate the effectiveness of each component and the sensor in the design process. In evaluating domain (defend, consider, explain) [11] students can identify the effectiveness of the robot based on the design and programming that has been done. The highest domain, create (decisions, reconstruct, adapt, formulate) [11], makes students ready to explain, to make decisions, and to reconstruct the idea to other people or other concepts.

5 Students' Achievement in Robotic Education

In order to attract students to explore the field of science and technology, robotics is a tool that is able to change the system of learning in the classroom. Enhancing students' learning achievement [12] is important not only in the field of science and technology but also in other areas not mentioned here. Based on Malaysian students' achievement in the World Robot Olympiad, proven robotics education can improve students' higher-order thinking and robotics is the perfect medium to use to improve students' achievement in science and technology as shown in Figs. 2 and 3.

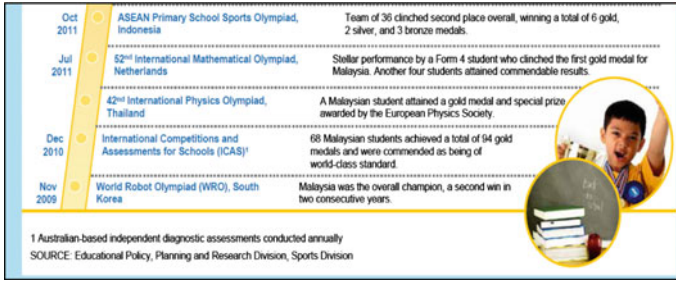


Fig. 2 Malaysia students’ achievement in the World of Robot Olympiad 2009 [3]

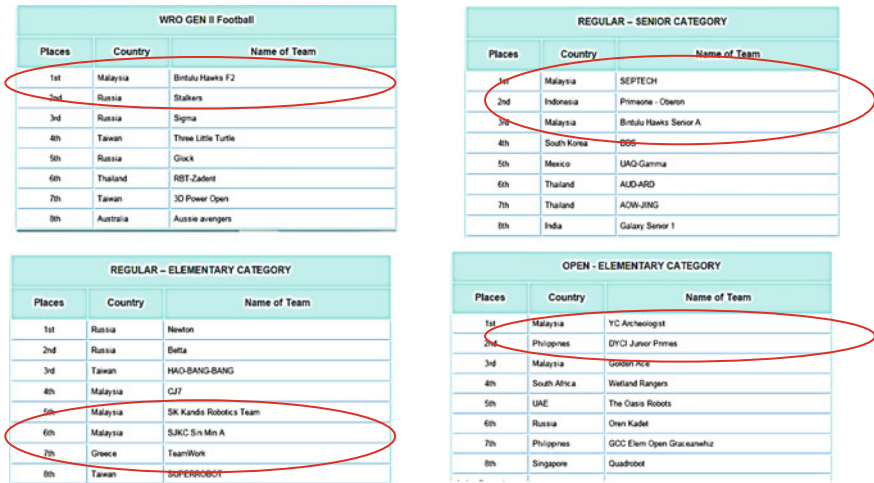


Fig. 3 Malaysia students’ achievement in the World Robot Olympiad 2013 [13]

6 Conclusion

Although robotics education was introduced long ago, many schools still do not have the equipment for robotic learning because the school will need to purchase it and it is not supplied by the ministry of education. These programmes are also not available in many rural schools for the same reason. There are also schools that have the equipment but failed to execute the programme due to the expertise and interests of the teachers. This is a great loss if the programme is not implemented in all schools as it can help improve students’ thinking skills indirectly with the addition that students have to find their own solutions without the help of teachers.

Robotics education has been found to be an important tool in education nowadays. Robotics does not only encourage students to learn hands-on practice; it can even encourage students’ curiosity and help in problem solving [7]. However,

robotics education is not being implemented much in Malaysian education. Although the technology has changed, the learning processes in schools are still influenced by memorising, speaking, and writing. To change the education system, we must be involved in changing the culture and practices of primary schools and secondary schools in Malaysia, moving away from memory-based learning designed for the average students to an education that stimulates thinking, creativity, and loving in all students, meeting the needs of individual abilities and styles of learning, and is based on more equitable access [7].

There are several conclusions obtained through educational robotics as an interdisciplinary approach, as motivation, as a way to promote collaboration, as a way to foster learning of twenty-first century skills (critical thinking and problem solving, communication, collaboration, creativity, and innovation), and computational thinking [14]. Additionally, students with robotic backgrounds could deliver assignments given by teachers in a creative manner [9]. Indeed students with a robotics education background are able to solve problems and work independently [1]. Students are also able to think innovatively and this enables them to perform successfully at schools and higher education institutions.

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The New Developments and Education of Traditional Music: Jiang-Nan-Si-Zhu in Taiwan

Nai Hsien Wu and Mimi Hung-Pai Chen

Abstract This chapter introduces a genre of traditional Chinese music, Jiang-Nan-Si-Zhu, and its development in Taiwan. Jiang-Nan-Si-Zhu means a new type of ensemble music comprising string and woodwind instruments from Southern China. It disseminated to Taiwan via the migration of Chinese inhabitants over several centuries, including its unique performance and educational approaches. However, as time passed, the components of Taiwanese culture, as well as the elements of the modern school of Chinese traditional music, have been integrated into the music of Jiang-Nan-Si-Zhu. Thus, it develops various possibilities for its future promotion and education. The researchers discuss the origin and musical features of Jiang-Nan-Si-Zhu, and its particular approaches for teaching and learning, and present two significant examples of the new development of Jiang-Nan-Si-Zhu in Taiwan. The issues of promotion and education are also discussed. Jiang-Nan-Si-Zhu has found a new direction and solidified a beachhead in Taiwan. There is a need for further attention and resource investment for future development.

Keywords Jiang-Nan-Si-Zhu · Chinese music · Music improvisation · String music · Woodwind music

1 Introduction

The Jiang-Nan-Si-Zhu music which literally means ‘the String and Bamboo of Southern China’ appeared in areas below the southern bank of the Yangtze River about 200 years ago as a branch of traditional Chinese music. It has been one of the

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daily life entertainments used for ordinary people's weddings and funerals. However, after rapid social changes, it was almost driven out of the market by the modern life style and new entertainments. The world of Jiang-Nan-Si-Zhu has been narrowed down and might only be heard on occasions such as school student groups, music institutions, community music groups, or concerts [1].

Although Jiang-Nan-Si-Zhu is no longer a part of people's daily life entertainment, it has found a new life in Taiwan. Now it inhabits professional and amateur groups, and schools as extracurricular activities, through the courses offered by university music departments. It also nourishes performances and composition contests sponsored by public and private sectors, and its small and exquisite form helps it to expand in Taiwan and create new compositions and performing styles.

In this chapter the researchers introduce two of the most symbolic performing groups of Jiang-Nan-Si-Zhu in Taiwan: 'Chai-Found Music Workshop' and the 'Sizhukong'. These two groups bring Taiwan's local spirit into full play, mixing the improvisation style of Jiang-Nan-Si-Zhu with Taiwanese local music and jazz. The Chai-Found Music Workshop integrates the elements of local music works such as Nankuan (folk opera), Peikuan (folk opera), and other Taiwanese opera styles into their Jiang-Nan-Si-Zhu music, whereas Sizhukong blends the improvisation of jazz and the unique tone colour of traditional instruments to create a refreshing new genre. These significantly innovative developments open up new possibilities for traditional Chinese music and expand the space of its future development.

In an age which proclaims the reservation of traditional culture and opposition of globalisation, the survival of Jiang-Nan-Si-Zhu in Taiwan is still a challenge. More seriously, the attachment between Jiang-Nan-Si-Zhu and the cultural tradition of the Taiwanese people is decreasing. When the essence of music diverges from people's taste, it soon will only exist as part of a museum DVD collection and in books despite the fact that Jiang-Nan-Si-Zhu seems to find new ways to promote and survive. If remarkable changes can be made in its promotion and education, Jiang-Nan-Si-Zhu could become one of the outstanding features of Taiwan music.

2 The Origin and Music Feature of Jiang-Nan-Si-Zhu

The following section illustrates the origin and some musical features of Jiang-Nan-Si-Zhu.

2.1 Origin

Jiang-Nan-Si-Zhu emerged in the Shanghai region around the early nineteenth century in China [2]. In those days we would see professional or amateur groups performing in teahouses. Players came from all aspects of society, whereas professional groups would perform at weddings, festivals, and funerals. In Taiwan,



Fig. 1 A small Jiang-Nan-Si-Zhu group

Jiang-Nan-Si-Zhu had been closely related to ordinary people’s social functions, such as festivals, weddings, funerals, religious rituals, and auspicious day activities (e.g., celebrating the opening of a new store, temple ceremonies, and the ritual of moving into a new home). On the occasions of festivals, weddings, and ceremonies, the instruments were gorgeously decorated to make the scene as if it were bursting with joy. The elements of such music were mainly traditional [3, 4]. Figure 1 shows a small Jiang Nan Si Zhu group playing in a concert.

2.2 Music Features

The improvisation and always changing style are two main features of Jiang-Nan-Si-Zhu music.

1. *Improvisation*: The most important music feature of Jiang-Nan-Si-Zhu is ‘improvisation’. Based on an original tune, long years’ experience on improvisation and variation derives new melodies. Experienced folk artists’ continuous experiment and practice created a large body of Jiang-Nan-Si-Zhu music. The techniques of expression include complicating or simplifying the music, and changing the tempo.

The most common rule of improvisation thus far is ‘simple versus complicated’ and ‘complicated versus simple’. That is: ‘I play it simple while you play complicated’ and ‘I play it complicated while you play simple’. The improvisation has been created by the ‘tacit understanding’ among all parts. The change and variation of the tune by each part are all based on the main tone of the original theme. Another technique of improvisation is changing the tempo. For example, if the original tune is slow, changing its tempo to a faster one could be one approach for improvisation. In some cases, we often see a slower version includes variations with



Fig. 2 Repertoire of Jiang-Nan-Si-Zhu: Lau-Liu-Ban [5]

decoration and elaboration. It is worth mentioning that large intervals are rare in Jiang-Nan-Si-Zhu. When third and fourth intervals appear, ornaments would appear in between to buffer the impact of the interval changes. These approaches could be explained by example in Fig. 2 from the repertoire of Jiang-Nan-Si-Zhu: Lao-Liu-Ban.

In Fig. 2, section 'A' is the original melody. Through improvisation, after adding variation ornaments, the variation creates new melodies 'B', 'C', 'D', and 'E' while keeping the main notes, without great intervals. Many Jiang-Nan-Si-Zhu scores were created through such variations, and folk musicians would keep the versions they saw as the best melodies to form their own classical repertoire. In addition, this melody comes from the accompaniment of the Peking Opera. It seems the folk artists would choose and 'cut and paste' from such sources to form new works. The roots of most Jiang-Nan-Si-Zhu music could be found in traditional Chinese drama, folk music, and ancient tunes. With variation, tempo change, and even 'cut and paste' style of blending, folk musicians gave birth to many new pieces.

2. *Always changing music style*: An always changing music style of Jiang-Nan-Si-Zhu also shows the typical characteristics of folk artists. One tune might be repeated several times but there are always slight differences in each repetition; the process of improvisation is in itself a way of re-composition.

In any random performance, because they are working with different or accidental players, under different atmospheres, or even on strange stages, they tend to rely on their own favourite style. As mentioned above, the melody itself, based on an original tune, is simple; and the folk artists would take such advantage to show their flexibility of interpretation. In about 50 or so field interviews with folk musicians in our pilot study, no identical recordings were found on one given piece; every performance is the one-and-only, and the style can even vary tremendously. This reflects the freedom of playing in Jiang-Nan-Si-Zhu. But, then, this makes it hard to teach and learn, and also makes it the top obstacle in maintaining the inheritance [6, 7].

3 The New Development of Jiang-Nan-Si-Zhu in Taiwan

Jiang-Nan-Si-Zhu has disseminated to Taiwan via the migration of Chinese inhabitants over several centuries, including its unique performance and educational approaches. However, as time passes, the components of Taiwanese culture, as well as the elements of the modern school of Chinese traditional music, have been integrated into the music of Jiang-Nan-Si-Zhu. Thus, it develops various possibilities for its future promotion and education. Jiang-Nan-Si-Zhu, though being away from its birthplace, has been enhanced and developed by the creativity of Taiwanese folk artists and promoted onto international stages. Here we introduce two symbolic Taiwan groups, one based on the essence of traditional Jiang-Nan-Si-Zhu, and the other taking on its traditional form and orchestration. Both take Jiang-Nan-Si-Zhu as the foundation, blend creativity, and cross-boundary performance, as well as establish uniquely Taiwanese-flavoured music styles.

3.1 Chai-Found Music Workshop

Chai-Found Music Workshop, established in 1991, has been active locally and internationally. Other than performing traditional Jiang-Nan-Si-Zhu and Taiwanese folk music, it also pays attention to modern/contemporary pop music. It has travelled through Asia, Europe, and North America, and has built its global reputation [8].

In all its performance and composition, whether it is solely a performance or a cross-boundary theatrical work, it intends to build its expertise on the domain of traditional Taiwanese instrumental music and rests on traditional music elements as the foundation for approaching the contemporary. Through continuously learning other fields of arts, it mixes various cultural essences to expand the scope of its own profile.

The work of Chai-Found Music Workshop consists of three parts [9]:

1. *Traditional Taiwanese and Chinese Music*: The orchestration is generally composed of six instruments: Huqin, Flute, Pipa, Guzheng the Zither, Yangqin the dulcimer, and the plucked stringed Ruanxian. This helps to preserve the rich tradition of Chinese string and woodwind and Taiwanese folk music. The multiform instrumental arrangement also distinguishes its own colour of orchestration while revealing other possibilities.
2. *Stage Productions*: Such productions are usually cross-boundary and pop theatrical works blended with dance and drama, including children's musicals and an Eastern Instrument Theatre Series.
3. *Contemporary/Modern Music*: Combining traditional elements and the unique tone colour of the instruments into modern composition, Jiang-Nan-Si-Zhu connects East and West, the old and the new in its own way, and builds a bridge of musical exchange. Attracted by its uniqueness, several international composers have been contributing new pieces for Jiang-Nan-Si-Zhu's repertoire.

Chai-Found also has performed with ensembles equipped with Western music instruments for new compositions and has often been invited to perform in international art festivals.

The musicians in the Chai-Found Music Workshop have contributed a substantial amount of time touring the villages, towns, and cities of Taiwan playing countless concerts in local cultural centres, schools, and outdoor venues. As a cultural envoy for Taiwan the group has been invited to international stages, and has conducted workshops on Chinese music and instruments for the promotion of their music. Most important, in their stage productions, Chai-Found Music Workshop mounts a number of musicals for children such as *'New Adventure of Three Little Pigs'*, *'Shichitaro and the Crazy Girl'*, and *'The Journey of the Monkey King'*. These help the cultivation of possible future audiences.

3.2 *Sizhukong*

'Si-zhu-kong' literally means 'String-Bamboo/Woodwind-Space'. It was established in 2005 by a group of professional musicians who came from either jazz or traditional Chinese music circles with intellectual curiosity and a pioneering spirit. The group's name, Sizhukong, suggests its vision: Si-zhu in Chinese means 'string and bamboo or flute or woodwind', which carries the musical impression; and 'kong' means 'space/emptiness', and projects an almost universally unlimited capacity. The group's name also envisions to enjoy, entertain, and to cure, with not only the sound of nature but also a music world with no boundaries.

Sizhukong define themselves as a jazz band. Indeed, it can be seen as a new breed of jazz; the variations that cross over the standard rules and forms, and the exchange and dialogue between the progressing tunes are, surprisingly, produced by traditional Chinese strings and woodwinds. It is fine, too, to see it as a new breed of traditional Chinese music, because all of the ancient and primitive tunes which had existed in Chinese/Taiwanese memory are now inserted with cross-boundary factors and fresh rhythms; it covers the old and the 'in'; it sounds classical and cozy; and it makes people feel like they can freely swing. Either we see it as creating a new breed, giving birth to Taiwanese World Music, revolutionizing Oriental Jazz, producing the red-hot cross-boundary album, or just fulfilling a simple wish that even Chinese music could kick people into the dance pool, we can say that every measure of their music is definitely unheard of [10]. A remarkable example is that in their works 'Hand in Hand' in 2012, unlike Jiang-Nan-Si-Zhu's musical theatre, this group blends together electropop/synthpop, rock and roll, traditional Chinese opera, and the tunes from Taiwanese aboriginals. Interestingly, the vocalist in this performance is a Taiwan aboriginal who raps and improvises in his mother tongue.

4 Promotion and Education

As mentioned previously, the technique of improvisation and freedom of playing make Jiang-Nan-Si-Zhu hard to teach and learn. In the past, it was usually the apprenticeship that carried the tradition of Jiang-Nan-Si-Zhu. Newcomers played with veteran musicians, joined amateur groups for practice, or listened to their masters play the classics. Later they would do their own homework to find their favourite variations. The learning and passing the tradition relied on the apprenticeship. However, it has become an issue in keeping the inheritance because of less apprenticeship in modern society.

In Taiwan, the promotion and education of Jiang-Nan-Si-Zhu could be found in both the public and private sectors. The student music groups in schools and universities play an important role in disseminating the music. Several music departments in universities provide courses, and the school curriculum occasionally offers information regarding Jiang-Nan-Si-Zhu. In many music contests, traditional string and woodwind chamber music is regularly included as a designated program for advocating more participants. Meanwhile, cultural centres under local governments would sponsor the creative or experimental string and woodwind groups to seek new possibilities for its development.

With respect to private sectors, taking Chai-found Music Workshop and Sizhukong as examples, the former not only provides a series of auditions, training, and performances, but also sponsors contests of string and woodwind compositions and the winners have their own debut concert. The latter, Sizhukong, runs the recruitment through auditions and training in regular classes and implements performances as practical training. Both Chai-Found and Sizhukong have sponsored commercial or formal concerts to enhance new players' learning experience.

Unfortunately, the weak status of Jiang-Nan-Si-Zhu in the school music education system in Taiwan is still an issue. Music education in Taiwan is relatively focused more on Western music, and both Western music and Taiwanese native tunes are significant for students' music learning. For instance, the name *Gongchepu* is the traditional Chinese music notation, and *Guqin* is the ancient Chinese zither which adopts the Gongchepu to notate the music. But today most students have only a few ideas of what the notation or the music score of Guqin is about. Compared to the theory of Western music or music written on the staff, Gongchepu is supposed to be closer to the ethnic culture of Taiwan, but the Taiwanese public education system pays no attention to it. Another example is the first instrument that elementary and junior high school students learn to play is not a traditional Taiwanese instrument but the recorder from the West. All these add to the disadvantage of the promotion of Jiang-Nan-Si-Zhu.

For the future promotion of Jiang-Nan-Si-Zhu, the researchers suggest a re-discovery of its social function, for example, performing in now fashionable 'replica edition' weddings, in the style of an ancient ritual. Even though people do not fully understand the deep spirit of Jiang-Nan-Si-Zhu music, more and more weddings in recent years choose ancient rituals which gives Jiang-Nan-Si-Zhu an

opportunity to grow. Another example is that, every afternoon, garbage trucks in Taiwanese cities usually play recordings of piano music, such as ‘The Maiden’s Prayer’, through loudspeakers at every collection point. If the music can be replaced by Jiang-Nan-Si-Zhu, this new style of string and woodwind music would gradually be rooted in people’s minds. All in all, we still need more effective strategies to enhance the promotion and education of Jiang-Nan-Si-Zhu.

5 Conclusions

Jiang-Nan-Si-Zhu originated from the lives of ordinary people. The traditional music has reflected contemporary social and cultural landscapes. As time passes, its expressions through music and theatre have gradually lost contact with the reality of modern life. In Taiwan, with the effort of both the public and private sectors, Jiang-Nan-Si-Zhu has been able to be preserved and be reborn in some ways in recent years. More and more people have begun to know and listen to this plain, simple, and down-to-earth traditional music. Under a music education system with long years of Westernization, it would be hard to promote Jiang-Nan-Si-Zhu, or for it to go deep and grow its new roots. Here, the researchers suggest the government and music educators could pay more attention to passing on this valuable new form of traditional music.

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Designing Mobile Augmented Reality (MAR) for Learning Chemical Bonds

Nor Farhah Saidin, Noor Dayana Abd Halim and Noraffandy Yahaya

Abstract This research study is about the designing of mobile augmented reality (MAR) applications for learning chemical bonds. Due to the emergence of the MAR in the education field, the authors take this opportunity to adopt the advantages of the MAR in chemical bonds. This is due to the effectiveness of MAR in visualization, which is believed to be helpful in reducing the problems of visualization on the topic of chemical bonds. In order to ensure the learning process is successful as the author needed, the instructional design model, which is ADDIE, has been used in the development of the MAR applications for learning chemical bonds through their learning environment. There were five phases involved in the model to make sure that the process of before, during, and after using the MAR applications has achieved the objectives listed. This study discusses how each phase takes place.

Keywords Mobile augmented reality · Chemical bond · ADDIE · Visualization

1 Introduction

Martin et al. [1] stated the new technology trends in education with seven years of forecast. There is a stage in which the technologies are grouped according to their similarities. This approach is used to determine the direction in which educational technology is progressing. In the next stage, the evolution of the technologies is studied and the meta-trends and evolution flows of the technologies involved are analyzed.

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The prediction technologies include social Web, semantic Web, learning objects, immersive environment (games and virtual worlds), ubiquity and mobile device, and augmented reality (AR). However, the most potential technology highlighted by Martin et al. [1] that needs to be developed is augmented reality. Research predicted that the technologies of augmented reality would be developed by the year 2014 and above because the ability and advantages that AR has, especially in visualization, meet the requirements of students in their learning.

According to the research by Lee [2], the term “augmented reality” was first coined by Tom Caudell. However, the technologies were believed to have existed since the 1960s, which were first used by systems, AR, and virtual reality (VR). The difference clearly seen between VR and AR is, in VR, people are expected to experience computer-generated programs in a virtual environment, whereas in AR, people can experience the real environment which is extended by the information and imagery via the system. In addition, AR also renders three-dimensional (3D) virtual objects and allows people to interact with virtual and real objects at the same time [3]. Yuen and Johnson [4] stated that the 3D virtual objects which include the digital media such as audio, video files, and textual information also can be incorporated into the user’s perceptions in the real world.

The exciting developments and various functions of AR made many researchers in all fields interested to work with the technology. In the educational field, the researchers also believe that AR has a vast potential in the augmentation of teaching and learning [4]. The potential of AR in education is being explored and it is being used widely recently, especially on topics that contain abstract concepts including chemistry.

2 Problems Occurring in Chemical Bonds

2.1 Difficulties Visualizing Abstract Concepts in Learning Chemistry

According to Taber [5], chemistry is a very conceptual subject that contains abstract concepts. For example, the chemical terms, the materials that can manipulate (solution, sulphur) the process, cannot be observed directly and also the ideas or concepts cannot be easily demonstrated and seen with our naked eyes. Peterson, Treagust, and Garnett [6] found that in a group of secondary school students, 74 % were unable to answer conceptual questions about electron repulsion in valence shells, but 78 % were able to answer successfully test questions designed to test this understanding. Similarly, Yaroch [7] found that in “A and B level” high school chemistry students, virtually all could balance the equation, but half could not draw a correct molecular diagram to explain this result. This happened because they did not understand the concept of the subjects that resulted in this misconception.

Moreover, Driel, Verloop, and Vos [8] found that chemistry teachers seem to focus their practice on the content of specific models, rather than on the nature of the models and modeling. In order to teach chemistry in the way that students will understand, teachers need to have a clear and comprehensive view of the nature of a model in general, how their students construct their own mental models, and how the expressed models can be constructively used in class. It is very important that students realize that no model is entirely correct and that they understand that science is more about thinking than just describing objects [9].

From the research by Tasker and Dalton [10], Kamaruzaman and Zainol [11], it shows that visualization by using technologies such as animation is one of the learning strategies that encourage students' new skills with new situations and also accesses their visualization skills in the assessment given, which then helps them to understand properly. In addition, Trindade and Fiolhals [12] found that students in the research have clear data on the structure and molecules of ice when using computer visualizations. This is because computer visualization has an ability to represent the structure and images in 3D which then makes the students see and understand the unseen things or concepts clearly. When talking about representing the 3D structure in chemistry, the synonym topic is chemical bond. This is because the chemical bond requires visualization skills in order to make the students understand the concepts. All the above problems show that this kind of problem had already arisen a long time ago and yet the problems still exist.

2.2 Chemical Bond One of the Subjects Requiring Visualization

Unal et al. [13] explored students' misconceptions on the fundamental concept of covalent bonding in the topic of chemical bonds because there are comments from the students on the presence of misconceptions that exist in their learning. Misconceptions can disturb the students' learning which makes a lot of researchers worried. Nowadays, with the existence of technologies, these problems can be lessened by using the visualization advantages. In research by Stotts and Conceicao [14], there is visualization of pure covalent, polar covalent, and ionic bonds in compounds. It showed a great result where the representations provided better insight into the nature of each type of bond. This shows that visualization is needed in order to help prevent misconceptions in chemical bonds. There is also another example from the research by Garcia-Ruiz et al. [15], which from the research visualization shows that it is worthwhile using it for teaching and learning chemistry. This is because traditional teaching has limitations in terms of facilitating the understanding of the precise properties related to the structure and molecules in a chemical bond. Therefore, students should rely on visual information that is displayed to them.

Table 1 Visualization tools used for chemical bonds

Author(s)	Visualization tools	Used
Ventakaraman [16]	Commercial molecular modeling software package, Spartan student edition	Emphasize basic chemical concepts, and guide students using the software to build, visualize, interact, and simulate molecular-level systems and processes
Frailich et al. [17]	Web-based learning environment (website)	Visualize the structure of the substances (metal, ionic, or molecular), provide information about the physical properties of different substances, show a connection between the structure of the substance and its properties
Garcia-Ruiz et al. [15]	Computer-generated three-dimensional spaces (PyMOL)	The user can interact with the graphical representation generally using desktop and laptop computers, used to display a molecule, display of molecules as anaglyphs, enhancing their 3D structural perception
Wu, Krajcik, and Soloway [18]	Computer-based visualizing tool (eChem)	Build molecular models, and view multiple representations simultaneously.
Hanwell et al. [19]	Computer-based visualizing tool (Avogadro)	Semantic chemical builder and platform for visualization and analysis

There are many examples of research that used technologies in visualization for chemical bonds. The list of the related research can be found in Table 1, which shows that technologies for visualization are really beneficial to be utilized in learning chemical bonds in order to help solve the problems of misconception. This is because an illustration and visualization are needed when dealing with something that involves abstract concepts in the learning process. That is why there are many visualization tools being developed nowadays.

3 Visualization Using MAR

AR was developed over several years and became portable and available on mobile devices as the effect of rapid development of technologies in tablet computing. The convergence of AR and mobile devices delivers an innovative experience that is more exciting for users to explore the physical world easily because it is handheld and portable if compared to PCs [20]. Therefore, all these advantages make AR different from MAR, where MAR can easily be moved with the users. Table 2 shows the recent research in MAR in fewer fields.

Table 2 shows that MAR (which incorporated AR technologies in mobile devices) has mostly been used to visualize the concept or process that cannot be seen by our naked eyes. In the educational field, the subject of science is an

Table 2 Recent research on MAR

Author s)	Areas	Purpose of MAR use
Chao et al. [21]	Geography (campus event app)	To help users find daily campus events by visualizing events in the real world and showing the map and route to the event in real time
Pundit et al. [22]	History	To help visitor conduct enjoyable informal learning at a cultural heritage site
Kim et al. [23]	Health/medical (calorie battle AR)	To promote physical activity among children, but it can also be enjoyed by adults
Chen [24]	Design drawing (3D model visualization system)	To identify user requirements and to aid builders and engineers to a better understanding of real structure

example that required students' visualization skills because it always involves abstract concepts and processes. Moreover, in the literature, most researchers stated that chemistry is a subject which is famous for vast topics that contain an abstract concept which leads to misconceptions. This misconception will create difficulties for the students in understanding the concept.

Therefore, this research develops MAR for the topic of chemical bonds. Although this technology is widely used by many researchers nowadays, this research is more suitable for the Malaysian context. The novelty of this research is the development of MAR on the topic of chemical bonds following the syllabus of *Kemahiran Bersepadu Sekolah Menengah (KBSM)*. Thus, the developed MAR will help students in understanding more based on what they learn in class.

4 Implementation of ADDIE Instructional Design Model in MAR Design

From the aforementioned discussion regarding the problems of learning chemical bonds and the needs of technologies that encourage visualization skills to visualize the abstract concepts, the researchers have taken this opportunity to develop a MAR to help in visualizing the abstract concept in chemical bonds. Therefore, in this study, the ADDIE model has been used as an instructional design model (ISD) to develop the MAR. This is because the ADDIE model is simple and is also the basis of other instructional design models [25]. Furthermore, according to Jeuring et al. [26], ADDIE is widely used in instructional system development, especially for teaching methods, books, educational games, and other technologies in education. There are five steps in the process of the ADDIE model, which are analysis, design, development, implementation, and evaluation as shown in Fig. 1.

Figure 1 shows the ADDIE process that is provided in the research by Jeuring et al. [26]. It shows the flow of how the ADDIE process takes place. The tasks of each phase are highlighted in Table 3.

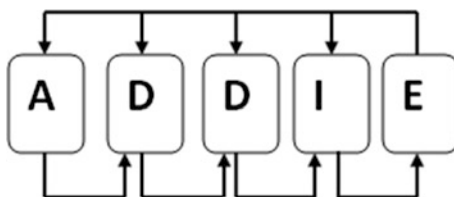


Fig. 1 The ADDIE method (Jeuring et al. [26])

Table 3 ADDIE model tasks

Phases	Tasks
A (Analyze)	<ul style="list-style-type: none"> – Determining learning goals – Analyze the learning materials and background – Analyze teaching method – Analyze related educational games
D (Design)	<ul style="list-style-type: none"> – Design learning task – Sequences task classes – Set performance objectives – Design supportive information – Design procedural information – Design challenges and levels
D (Develop)	<ul style="list-style-type: none"> – Create artistic content – Program the game – Debug
I (Implement)	<ul style="list-style-type: none"> – Implement in test environment – Implement in a teaching environment
E (Evaluation)	<ul style="list-style-type: none"> – Internal Testing – Public Testing – Gather Feedback

Jeuring et al. [26]

Table 3 is the clear version of the tasks highlighted by Jeuring et al. [26], where they developed educational games for their research. These tasks can be the guidelines on how the MAR designs in learning chemical bonds are developed. Below are the detailed explanations on how every phase takes place.

4.1 Analysis

In the analysis phase, there is a process of analyzing the need of MAR development for visualization on the topic of chemical bonds. Next, the instructional analysis is conducted which involves the study and analysis of the learning goals, objectives, learning materials, and teaching method. The aspects related to the learners such as target group, prior knowledge, curriculum, and learner level are also analyzed.

The analysis of the tool used in developing MAR is also conducted. The tool that is used is Unity which consists of Unity3D packages that are used for developing applications in AR. The tool is suitable to be used in developing applications on multiple platforms such as PC, MAC, Android, and iOS.

4.2 Design

The design phase includes aspects such as learning outcomes, teaching strategies, and test items. In the research by Rio, Sabrina, and Guan [27], it is stated that in designing learning materials, principles of sound learning theories and pedagogical aspects of teaching and learning should be taken into consideration. The storyboard is one of the processes in the designing phase which is similar to the designing of the learning task. For the MAR design, there are three parts of designing, which are the design of the storyboard for the MAR application interface, storyboard of the visual when the user points to the marker, and lastly, the draft of the mini-book that is needed as a kit in learning chemical bonds.

The MAR Application Interface

Figure 2 is an example of the storyboard for the MAR application interface. There are a few sections provided in the storyboard such as the screen layout that shows the interface on what the application will look like. Other than that, there are also other sections such as developer instructions, notes, main text, and screen description. In the developer instructions, there is an explanation on how the MAR application functions. This is required to make sure that the MAR application will

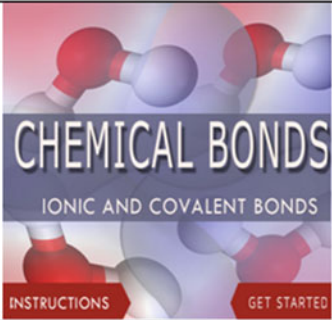
Text & Graphics	
Screen Title: Layout:	Main Page : Chemical Bond 01
Screen Layout:	
	Main Text:
	Screen Description:
Developer Instructions:	This is the main page of the apps. There will be two buttons on the main page which is 'Instructions' button and 'Get Started' button. When the user click the button, the apps will then bring the user to new layout/pages.
Notes:	The screen layout above just an example on how the page will look like. Not the finalize design.

Fig. 2 The MAR application interface

fulfill the learning outcomes that are required for the application. The “Main Text” in Fig. 1 is the section of the text that is going to be displayed on the page of the MAR application. This is done to ensure that the text is clearer rather than writing directly on the screen layout of the MAR application design. Last but not least, the notes provided exist to stress the important things for the developer to take into account when developing the MAR application.

The Visual When User Points to the Marker

Figure 3 is the visual of when a user points to the marker of a MAR application. In the MAR design process, this process should be provided in order to explain how the 3D visual will be displayed when users use the application. It is the same as the previous storyboard, but the difference is the addition of two new sections, which are the audio description and the marker. The audio description is included because when the users double tap on the screen, the audio will be played. Accordingly, the user will be able to hear the explanation clearly while they are exploring the chemical bond in the MAR application. The reason why the marker section is shown is because in AR, pointing up the devices on the marker presents the visual.

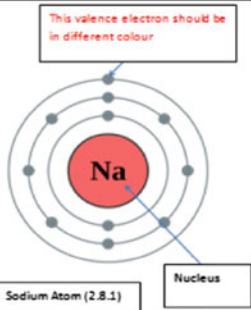

Text & Graphics			
Subtopic: Screen Title: Layout:	Metal Sodium (Na) 04		
Screen Layout:		Main Text:	
Marker:		Audio Description:	This is example of metal from Group 1. If you still remember there are several elements of Group 1 in periodic table and Sodium (Na) is one of the elements. As you can see, Sodium atom has an electron arrangement of 2.8.1. Two electrons in the first shell, eight electrons in second shell and 1 valences electron in their outer shell that highlighted in pink colour.
			
Developer Instructions:	<ul style="list-style-type: none"> When the user point to the Sodium (Na) marker, there will be a visualization of the electronic structure of Sodium (Na) atom in 3D visual. User is able to rotate the molecules to see it in differences angle. Sodium (Na) have an electron arrangement 2.8.1 So there will be one valence electron. The visual will includes all the electrons of Sodium (Na). But, the valences electron on the outer shell will be display in difference colour from the other electrons. (as shown in the picture but the picture in 2D) 		
Notes:	<ul style="list-style-type: none"> The audio will be played once the user double tap on the screen. The illustration on AR in 3D 		

Fig. 3 Visual when user points to the marker

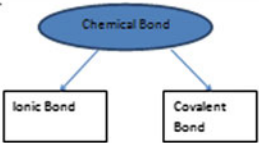
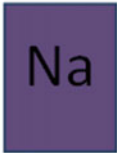

<p>1.</p> <p style="text-align: center;">CHEMICAL BOND</p>	<p>2.</p> <p>Formation of Chemical Bonds.</p> <p>.....</p> <p>.....</p> <p>.....</p>	<p>3.</p> 
<p>4.</p> <p style="text-align: center;">IONIC BOND</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>	<p>5.</p> <p>Metals</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>	<p>6.</p> 
<p>7.</p> <p>Non Metals</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>	<p>8.</p> 	<p>9.</p> <p style="text-align: center;">COVALENT BOND</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>

Fig. 4 The minibook

Differences marker will presenting differences visual depends on what we developed for the specific markers.

The Minibook

Figure 4 shows the design of the draft of the minibooks needed in the MAR application for learning chemical bonds. This draft is provided to make sure that the learning process will be systematic and the students will be able to understand what they are learning. In this MAR application, the chemical bond topics consist of two parts, the ionic bond and covalent bond subtopics. The text is also provided in the minibooks to make sure that the input acquired by the users can last in their long-term memory.

4.3 Development

1. *Development of MAR application:* For the development of the MAR application, the previous two phases, Analyses and Design, can guide the user on how the application should look. There are three pages being developed in the MAR application, the “Main” page, the “Instructions” page, and the “Start” page.
2. *Development of Minibook:* While for the minibook, the books created are based on the draft of the minibook that is provided in the Designing phase. The process and the flow of the books should exactly follow the draft to make sure the minibook makes sense of their users’ learning.

Implementation: Implementation is the phase where the MAR application is tested in the learning and teaching environment. The MAR application is tested by the users, Form 4 students who are taking chemistry.

Evaluation: The evaluation phase involves the process of evaluating the MAR application that was developed. The evaluation process is done by gathering feedback from the users who are the teachers who are instructing the learning, and the students who are learning chemical bonds using the MAR application.

5 Conclusion

Overall, it is important to design before the development of the learning application in order to ensure that the user learning process will be successful [28]. However, before designing, a number of analyses should be conducted to find the problems that really exist in the learning environment. Besides, an innovative way of learning using MAR should be implemented in the students' learning environment in order to help them learn in a fun way instead of learning in traditional ways that they used before.

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Review of Learning Activities in Facebook to Inculcate Meaningful Learning

Nurul Nadwa Zulkifli and Noor Dayana Abdul Halim

Abstract Social networking sites (SNSs) are popular among teenagers and adults. Currently, Facebook is the leading SNS in the world compared to other SNSs such as Twitter, LinkedIn, and Myspace. The astounding popularity of Facebook today has evolved Facebook from a social to a learning medium. Many college students have used Facebook for their social life on a daily basis. To blend the social and learning together, many educators embedded teaching and learning activities in Facebook for optimized learning. The aim of this chapter is to identify types of learning activities using SNSs, specifically Facebook, as the learning platform and its findings regarding use of particular learning. There are 10 research projects that have been reviewed; the findings are used to design learning activities for encouraging meaningful learning.

Keywords Social networking sites · Facebook · Learning activities · Review

1 Introduction

Facebook is one of the social networking sites (SNSs) which are most popular among youngsters and adults around the globe [1]. With its astounding popularity, there were more than 1 billion active users monthly in September 2014 based on a recent statistics report from Facebook Newsroom [2]. Launched in February, 2004 by Mark Zuckerberg, Facebook's mission has always been giving people the power to share and connect across the world openly with others [2]. Initially in 2004, Facebook was used by Harvard students only and the user needed to have a

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Harvard.edu email address to join the SNS [3]. A year later, Facebook opened access to high school students and in 2006 opened to the general public [4].

Ellison and Boyd [5] claimed that the uniqueness of SNSs is that they enable users to express themselves clearly and make their social networks visible and not that they just provide a platform to meet strangers. People use Facebook not only for meeting new people or connections but also to stay connected to people who are already a part of their social life [5]. Thus, a SNS is a place for people to make connections and stay connected with friends and family around the world, expressing their thoughts and sharing their moments of life with others.

Some features in Facebook are attracting the attention of users including Photos and Videos, News Feed, Events, and Groups to name a few. In the Photos and Videos features, people can share and upload unlimited videos and photos on the Facebook wall. They can also create albums and customize the privacy of the albums. Also, the News Feed feature will update stories from their friends, Groups, and Events regularly. Some Facebook users are passive readers where they only read the post without commenting it. Some people use Facebook to read and update news which spreads faster compared to other sources. With the Events feature, people manage to organize events or gatherings such as birthday parties, school reunions, and the like. In addition, people may send invitations and notifications as reminders to their friends using this feature. The Groups feature gives people a private space to share with small groups of people (family, best friend, or organization). For each group, the privacy setting can be customized either to keep it between them or the group can be seen by the public. Therefore, those features may attract millions of people to use Facebook as part of their virtual social life.

2 Facebook to Support Teaching and Learning

The emergence of technology today allowed Facebook to evolve from a social to a learning medium. Many college students use Facebook on a daily basis [6], because Facebook is the leading SNS compared to other SNSs such as Twitter, LinkedIn, and Myspace. Santos et al. [6] claimed that Facebook has the potential to complement face-to-face learning or online classroom activities. Although there already exist platforms for formal learning such as learning management systems (e.g., Moodle and Blackboard) or content management systems, somehow they lack an element of social connectivity and the personal profile spaces with which currently students are familiar [7]. A recent study by Maleko et al. [8] compared student participation on two learning environments, Blackboard and Facebook. The results indicated that Facebook attracted more students compared to Blackboard. This is because Facebook provides social and community learning benefits that encourage

students to support each other. Those social elements existing in SNS make it one of the reasons why educators use informal platforms such as Facebook to support teaching and learning.

However, using Facebook to support teaching and learning might be quite challenging to educators. The issue might be raised among educators of whether Facebook can influence students' academic performance [9] or whether the Facebook function is a distracting influence [10] on students' learning. Wise et al. [10] argued that social engagement might increase academic engagement. He provides evidence to support the idea that Facebook could be a form of distraction and unpleasant to students in class. He also claimed that the association of Facebook with distraction may decrease its potential for enhancing academic engagement. Therefore, to overcome these obstacles, the educator must design suitable learning activities to be conducted on Facebook for student learning.

With the intention of incorporating Facebook in teaching and learning for optimized learning and to solve the issue on association of Facebook with students' academic performance, this study reviews the learning activities used by educators using Facebook platforms and the effects on students' learning as to whether the outcome has a positive or negative impact on students' performance.

3 Methodology

This study aims to identify types of learning activities used on Facebook and its success in students' learning. The following key words were used to search for related journals: Facebook, online discussion & learning activities, Facebook & learning activities, and Social Networking Sites, Facebook & learning. The searches were conducted via IEEExplore, Science Direct, Web of Science, ProQuest, and Google Scholar. Only 10 were considered relevant to studies based on the following criteria: (1) the studies using Facebook as a platform in student's learning, (2) the studies mentioned the learning activities used in students' learning, and (3) studies must be published between 2008 and the present. The journals were analyzed qualitatively and the meta-analysis of the studies of types of learning activities used on Facebook and its findings were summarized in Table 1.

As shown in Table 1, most studies involved students in higher education and elementary school. Various types of learning activities were implemented in these studies using the Facebook platform. Most of the studies had a positive impact on students' learning. The following section elaborates the results.

Table 1 Types of learning activities using Facebook platform

Study	Research purpose	Learning activities	Findings of the study
Rasiah [11]	To assess the effectiveness of social media to enhance teaching and learning in a team-based learning environment involving large classes	Team-based learning	Facebook was indeed perceived as an innovative and effective tool in a student-centered learning environment
Bowman and Akcoughlu [12]	To investigate the cognitive and affective outcomes of using Facebook group in a university mass lecture	Discussion-based learning	End of the semester grades of the Facebook group users were significantly higher than the nonusers, $t(319) = 4.71, p < 0.01$. In terms of affective learning, an analysis of the student responses indicated that students generally felt positive about being a part of the Facebook group. Thematic analysis of the Facebook posts indicated that students mainly used this space to discuss exam-related matters
Kent [13]	To investigate student activity using Facebook as additional discussion forum beside Moodle	Discussion-based learning	The study found the addition of the Facebook forum resulted in a significantly higher level of student activity, in real terms and across the 13 weeks of the unit
Lin et al. [14]	To investigate learner's online discussion behaviors in an art course which is involved in a project-based learning activity using Facebook to support asynchronous online discussion	Project-based learning	It was found that the meta-cognitive knowledge is the most prominent in students' discussion and the cognitive process is focused on understanding and comprehension. An adequate proportion of off-topic discussion also was found in the study

(continued)

Table 1 (continued)

Study	Research purpose	Learning activities	Findings of the study
Omar et al. [15]	To investigate ESL learners' participation in an information-sharing task conducted via Facebook (FB) groups and their feedback on the use of FB groups as the platform for the activity	Discussion-based learning	The study found learners' substantial contribution to the group discussion despite their limited language ability and technical problems. In addition, it also revealed that the use of FB as a platform for the information-sharing task received very positive feedback from the participants
Meishar-Tal et al. [16]	To investigate Facebook platform as an alternative to learning management system (LMS)	Discussion-based learning	The students expressed satisfaction with learning in Facebook and willingness to continue using these groups in future courses
Hwang et al. [17]	To investigate the increase of learning motivation and willingness by using the digital game-based learning (DBGL) model	Game-based learning	The results indicated that DBGL catalyzed learning effectiveness and the peer influence seemed to motivate learner participation
Shraim [18]	To investigate Facebook's potential to support faculty by implementing social constructivist approach to facilitate student-centered learning	Questioning strategies	The results show that Facebook's technological affordances provide valuable support for pedagogical change.
Wang and Hou [19]	To better understand the collaborative creativity by employing a project-based creativity learning activity incorporating Facebook to support learner's online discussion	Project-based creativity learning	Based on the results, the advantages and suggestions of using Facebook to support creativity learning were proposed. Moreover, results of this study are expected to serve as guidance for subsequent collaborative creativity research

(continued)

Table 1 (continued)

Study	Research purpose	Learning activities	Findings of the study
Jumaat and Tasir [20]	To identify students' types of online interaction using Facebook discussion and investigate pattern across time	Questioning strategies	This study revealed that students were more interested in merely voicing their acknowledgment of opinion and using their own judgment to evaluate certain aspects in learning through Facebook discussion rather than comparing and differentiating a particular topic under study

4 Results

Based on the meta-analysis, various types of learning activities implemented in Facebook used by educators were identified: team-based learning, project-based learning and project-based creativity learning, game-based learning, discussion-based learning, and questioning strategies. All these learning activities have their own benefits on students' learning and it depends on the educator to design their students' learning activities based on their justifications in enhancing students' academic performance.

Rasiah [11] implemented team-based learning using Facebook involving understanding team dynamics and mobilizing the power of teams as well as leadership skills among students. All these criteria are essential for effectiveness of online discussion [11]. In addition, the SNSs such as Facebook provide collaborative learning space for teaching and learning, allowing increasing peer interaction, and interaction between educator and students in a highly engaging manner [21]. When the students come as a team, they play their roles in bringing their group together as well-motivated group members, supporting each other's learning, contributing ideas, and brainstorming when doing their assignments. One of the main competences that the students perceived in the study by Rasiah [11] is teamwork competence. Therefore, using team-based learning in Facebook may encourage the students to collaborate effectively with their peers and educators. The collaborative factor should be considered for future research in designing learning activities on Facebook.

Other types of learning such as project-based learning are recognized as learning activities that can provide a sufficient learning performance [22]. A study conducted by Lin et al. [14] implemented project-based learning using Facebook as the platform for learning. The study investigated learners' online discussion behavior

such as students' cognitive level and knowledge construction in online discussion. Using project-based learning can develop a higher level of cognitive skills of the learner [14]. The study indicated that meta-cognitive knowledge was the most leading in students' discussions whereas the cognitive process focused on understanding and comprehension. In addition, the study also found an adequate amount of off-topic discussion online. However, this may have happened due to students of varied ages and genders as the students are adults and older learners. They also found that a significant positive relationship between age and off-topic discussion as the higher the student's age, the higher the numbers of posted messages that refer to off-topic discussion. Therefore, age of learners should be considered for future research in order to design appropriate learning strategies that will be embedded in Facebook as this might be a slight reason for ineffective learning.

The study by Hwang et al. [17] used game-based learning embedded in social networks such as Facebook to increase learning willingness and motivation among students in learning English. They developed Facebook game apps for elementary students to learn English outside school time. The results indicated that the digital game-based learning was well accepted by students and motivated learners' participation by peers and also catalyzed learning effectiveness. This type of learning is suitable for language subjects [23] as the game is a fun factor to motivate language learning. The positive feedback gained from the study is consistent with Liu and Chu [24] in their study which also achieves better learning results and motivation when using games in language learning. Hence, future research should be considered implementing game-based learning in designing learning activities using Facebook especially in teaching language subjects.

Other studies by Jumaat and Tasir [20], Shraim [18] used a varied set of questions to facilitate students' discussion on Facebook. The instructor would ask academic-related questions to students in a Facebook discussion. The questioning can be one technique for educators to enhance students' cognitive level or knowledge construction, in addition, promoting higher-order thinking among students. However, proper guidance from the instructor is crucial in students' discussion [20] so that the discussion does not change tracks from discussing academic content to off-topic discussion. Therefore, proper guidance from the instructor should be considered for future research to guide the questioning strategies that can be implemented in teaching and learning using Facebook.

The most usual learning activity used by educators on Facebook is discussion-based learning [12, 13, 15, 16]. The discussion may involve a group of three to four students or all students where there is no group formed to discuss academic-related matters. Overall, the studies revealed positive feedback from students on using Facebook in their learning. They express satisfaction and willingness to use the Facebook platform in future courses [16]. In addition, students were more involved in their learning as the study by Kent [13] showed a higher level of student activity across the 13 weeks of the semester. Therefore, discussion-based learning is best to get all students involved in learning. However, the educators also should monitor the discussion because there might be students who are passive readers and not involved in the discussion. Thus, for future

research, the researcher should be aware of this hindrance because it might affect the learning.

From the reviews, there are many learning activities that have been implemented on Facebook; the typical learning activity that has been implemented is discussion-based learning. A few factors can be considered as future research in designing learning activities using Facebook. Therefore, the researchers are going to design the proper learning activities using the peer-tutoring model based on analysis from the reviews. This is because the peer-tutoring model also involves collaborative activities between tutor and tutee, the differences in age between tutor and tutee, and the proper guidance from tutor to tutee. Thus, with this review, the researchers can design proper learning activities on Facebook.

5 Conclusion

In conclusion, there are various types of learning activities that can be designed by educators when implemented in SNSs such as Facebook. Each type of learning that will be chosen by educators has its own benefits to enhance students' learning. Without suitable or proper learning activities implemented on Facebook platforms, the students' learning might be ineffective. The proper learning activities can influence students' success using SNSs such as Facebook. Moreover, learning on an informal platform such as Facebook must have guidelines or rubric from educators to avoid irrelevant topics or off-topic discussion. Thus, designing appropriate learning activities in SNSs is important for meaningful learning.

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Needs Analysis in Developing Culturally Responsive Arts Education Pedagogy Module

Siti Zuraida Maaruf, Saedah Siraj and Voviana Zulkifli

Abstract Culturally responsive pedagogy (CRP) is developed based on cultural knowledge and experiences of multiethnic students, with their references and performance in learning. In this research, a module was developed to suit a CRP in the teaching and learning of visual arts education (VAE) to upper secondary school students. The research utilizes the design and develop method as suggested by Richey and Klein in 2007, focusing on the processes of developing a module appropriate in the teaching of VAE at the upper secondary level. This chapter discusses the needs analysis that was carried out to identify students' level of knowledge and learning experiences in VAE and on culturally responsive education. The respondents consisted of 184 upper secondary students of Malay, Indian, and Chinese ethnicity. Results show positive responses from students and their strong optimistic perceptions towards CRP in traditional art and crafts for secondary school VAE. Therefore, results obtained proved that there is a need to develop a teaching module that is culturally responsive in the teaching and learning of traditional arts and crafts for secondary school VAE.

Keywords Visual arts education · Culturally responsive · Pedagogy · Traditional art crafts

1 Introduction

This research aimed to develop a pedagogical module that is culturally responsive for teaching and learning in the visual arts education classrooms for upper secondary students in Malaysia. The module was developed based on the knowledge of culture, students' manifestations with diverse cultures, and multiethnic students' references with engagements in creating relevant and effective learning processes for them. In studies performed by Rasool and Curtis [1] and Gollnick and Chinn

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[2], the researchers settled for and emphasized that a pedagogical approach that is culturally responsive is essential in classrooms of multiethnic students with diverse cultures.

Research into a culturally responsive pedagogical approach in arts education is still lacking and is in need of more in-depth studies. Consequently, the lack of research references in the approach of a culturally responsive pedagogy in arts education at the global level as well as the lack of research at the local level has paved the way for the need to conduct a more comprehensive study in the field. Hence, these researchers feel that it is most appropriate for a study on the development of a culturally responsive visual arts education module at the secondary level to be conducted in order to aid teachers in integrating and implementing multicultural education in the teaching and learning practices at schools with the aim of enhancing students' knowledge and awareness regarding the elements of art and culture inherited by each race that makes up the multiracial society in Malaysia. It is also hoped that with the existence of this culturally responsive pedagogical module for the education of visual art at the secondary level, there will be an improvement in students' interest and academic achievements and that they will become more responsive towards their own culture and those of others.

2 Research Background

To date, the research of multicultural education that broaches the field of specific curriculum such as language and arts education is gaining momentum throughout the world and produces new researchers such as Jacobs [3], Hatton [4], Glazier and Seo [5], Malhotra [6], Bastos [7], Gina Martin [8], Graham [9], and a host of others. In Malaysia, the study of multicultural education is also receiving more attention from academicians. However, a majority of the research conducted is set towards theoretical analyses and general perspective either at the school level or at the level of an institution of higher learning.

This local research includes those conducted by Yusof [10, 11], Raihanah [12, 13], Hamdan et al. [14], Malakolunthu et al. [15], and Malakolunthu [16], as well as Ahmad et al. [17]. In his research, Suhaili [18] used comics as a teaching aid material in the Malay language subject which saw the integration of a multicultural education element. Likewise with the research performed by Ali et al. [19] pertaining to the effectiveness of a multicultural approach to the national integration of history subjects. Isa [20] had included consideration of the issue of multicultural education within the context of visual art education in Malaysia but once again, the consideration that he put forth was limited to theoretical analysis and general perspective only. These researchers felt that the time was ripe to venture into the need to focus and establish research in the application of theory in the teaching and learning practices at schools.

3 Research Problem

With the rise of concerns on national integration and harmony in most major media including the social media, issues that stirred the harmony of the multicultural social setting in Malaysia need to be addressed accordingly and it may take its first step at the school level. Malaysia is still in need of curriculum progression with regard to culturally responsive content and teaching approaches. With the current state concerns over national unity and integration, the academics and policy makers need to step up in developing a social environment that espouses a multicultural environment if they wish to advocate culturally responsive teaching and learning [21]. Much research has been performed in the Malaysian setting only at the surface level on culturally responsive teaching and learning. However, more current research has been performed at a specific level internationally which motivated the present research to be performed. Nevertheless, the present chapter only approaches the development of a culturally responsive pedagogical module for visual art education at the secondary school level.

It is hoped that with the development of the CRP module in visual arts learning teachers and students would have the opportunity to uncover the values and arts belonging to other cultures. Essentially, such opportunity should be able to provide both teachers and students a collegiate multicultural setting and experiences. From the research performed on university students by Awang et al. [21], it was concluded that there is a prospect for a harmonious multicultural setting in the educational environment and beyond. The authors also identified that students are able to develop conflict-avoidance skills and adapt to the values of other cultures. Therefore, it is essential to perform a needs analysis if such an environment may be developed in the school setting and specifically through the teaching and learning of visual arts.

4 Research Objectives

This research attempted to identify the views of educators, especially visual arts education teachers, and learners' perceptions on the need to develop a culturally responsive pedagogical (CRP) module for visual arts education (VAE) at the secondary school level.

Phase 1: Needs Analysis

- i. To identify the students' level of knowledge and learning experiences in visual arts education (VAE) at the secondary school level
- ii. To identify students' level of knowledge and awareness on culturally responsive education
- iii. To identify students' perceptions and acceptance on the needs to develop a CRP module in VAE at the secondary school level

5 Research Question

Phase 1: Needs Analysis

- i. What are the students' levels of knowledge and learning experiences in the visual arts education (VAE) at the secondary school level?
- ii. What are the students' levels of knowledge and awareness on culturally responsive education?
- iii. What are the students' perceptions and acceptance on the need to develop a CRP module in VAE at the secondary school level?

6 Literature Review

For countries that are made up of multiethnic and multicultural it is always a national concern to have understanding of cultural heritage which also requires continuous efforts in creating and maintaining such instance. This understanding may be the substance in the creation of cultural identity. Additionally, students need to become engaged in the diverse cultural forms and develop a sense of individual expression which may develop their creativity and consequently emotional well-being [22]. To have students' active and proactive participation in cultural content in the visual arts education classroom, teachers will have to facilitate them in finding meanings and creatively respond to the students' everyday visual experiences. Consequently, visual arts education teachers may instill meaningful ability to students which responds to what Darts [23] refers to as the "complex visual environment" that they experience daily. Furthermore, Darts [23] also encourages visual arts teachers to exploit various pedagogical strategies combined with strategies and aesthetic methods in providing students with the essential intellectual and creative skills to examine, evaluate, and react to their social environment.

The visual arts education classroom should also be able to provide empowerment to students that allows them actively to explore their own meanings of culture through their personal cultural experiences. It is important to note that students should be able to provide visual and verbal critique from examination of critical questions relevant to their personal experiences, in and beyond school [24]. Findings of Da Silva and Lopes [25] found that the use of art-based education from different cultures promoted the development of a healthy attitude among students towards cultures different from theirs.

O'Farrel and Meban [26] provided a substantial list of constructive evidence towards arts education. For instance, there is a positive correlation between

enhanced academic performance and arts education. In addition, their analyses demonstrated that there is a positive correlation between visual arts education and verbal and conceptual creativity. Interestingly, they also reported that when reading is taught through visual arts projects, students are more motivated to read and evidently improved. This may perhaps circumvent the concern raised by Moncrief [27] on the risk of having a solitary ethnicity within the teaching and learning setting.

Visual arts education is a subject taught in the Malaysian schools as described in the national school curriculum for all levels and its descriptions are available in the Secondary School Education Syllabus [28]. Nevertheless, the researchers feel that it is necessary for a facelift of the curriculum in promoting the various arts from other ethnicities and cultures. This may perhaps provide a platform for students to learn and explore other cultures from various arts activities in and outside the classroom setting.

7 Methodology

The present research utilized the design and development method as suggested by Richey and Klein [29] focusing on the processes of developing a module appropriate in the teaching of visual arts education at the upper secondary level. The present study took up the ADDIE model method and results discussed describe data from Phase 1 of the model to fit the purpose of its focused objective.

7.1 Sample

The samples involved in the needs analysis are 184 secondary school students aged 16 to 17 from three secondary schools around the Klang Valley and Shah Alam (Table 1). The students consisted of those who took the VAE subject at the Form 4

Table 1 Research matrix of phase 1: needs analysis

Participants	Sampling method	Research methodology
Secondary school students form 4 and form 5	184 (N) participants Strata sampling Ethnic groups 62 Malays 60 Chinese 62 Indians Gender 88 Male/96 Female	Survey

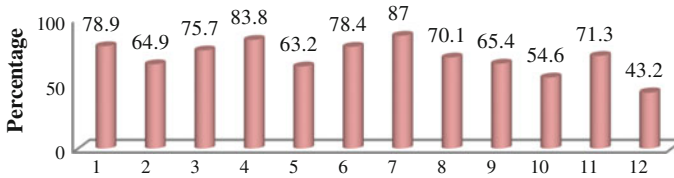


Fig. 1 Students' level of knowledge and learning experiences

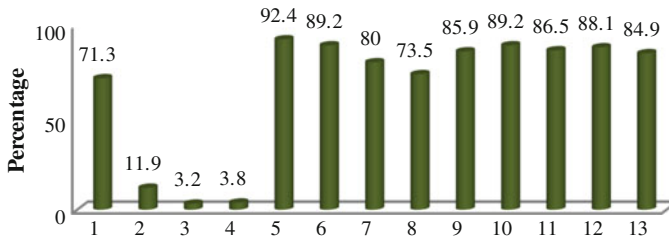


Fig. 2 Students' level of knowledge and awareness on culturally responsive education

and Form 5 levels. There were male and female samples from the Malay, Chinese, and Indian ethnic groups. The needs analysis used the strata sampling method by segregating the populace elements into groups that possessed diverse characteristics and attributes as described by Yusof [30]. The sampling also utilized the suggestions given by Salkind [31] in which gender, ethnicity, socioeconomic background, and level of knowledge may be taken as the factors in identifying the samples.

7.2 Data Analysis

The needs analysis in Phase 1 employed quantitative and qualitative analysis. The quantitative analysis included percentages and frequency obtained from the samples' responses. The analysis was performed using the Statistical Package for the Social Science (SPSS). However, the current chapter only describes the quantitative analysis to fit its objective.

The analysis measured the frequency and percentage of the students' level of knowledge and experiences in learning VAE which corresponded to 12 item labels (Fig. 1). Next, their responses were also measured in the area of level of knowledge and awareness in the culturally responsive VAE classroom with 13 item labels (Fig. 2). Finally, the students' perceptions and acceptance towards the CRP VAE at the secondary school level was measured using 16 item labels (Fig. 3).

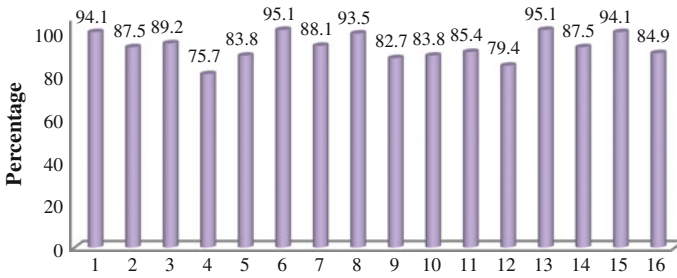


Fig. 3 Students’ perceptions and acceptance on the need to develop a CRP module in VAE for secondary schools

8 Findings

Students’ Level of Knowledge and Learning Experiences in Visual Arts Education (VAE) at Secondary School Level (Table 2).

Students’ Level of Knowledge and Awareness on Culturally Responsive Education (Table 3).

Table 2 Students’ level of knowledge and learning experiences

	The item label
1.	VAE is a very interesting subject and may be used as a medium to develop the society’s culture
2.	VAE helps strengthen relationships among multiethnic students
3.	VAE improves learners’ creativity, innovative skills, awareness, and appreciation towards other culture and arts
4.	VAE encompasses the skills of foundation in arts and design, fine arts, visual communication, industrial design, and traditional arts
5.	VAE encompasses the process of art production that considers the aspects of empathy and critical evaluation of the aesthetics and individual creativity
6.	One of the curriculum contents in VAE is learning the Malay traditional arts and crafts involving practical productions of the arts and crafts
7.	The current VAE curriculum content does not encompass the traditional arts and crafts of other cultures in Malaysia
8.	Teachers execute teaching and learning according to the current VAE curriculum content
9.	Teachers creatively make adjustments in the teaching approach to make learning VAE appealing
10.	Teachers expose learners to knowledge of the arts and crafts of other cultures in Malaysia throughout the teaching and learning process of VAE
11.	Teachers allow learners to explore their personal art expressions and experiences in expanding the multicultural art elements through their art products
12.	The teaching and learning process, the production of artworks, and classroom discussions are limited to only Malay and native ethnic arts and crafts

Table 3 Students' level of knowledge and awareness on culturally responsive education

	Item label
1.	Learners with multiethnic demographic background demonstrated distinctive feedback during classroom activities
2.	The Malaysian education system provides learners with the platform through various methods and exposures in consolidating the elements of other cultures through the teaching and learning process
3.	The Malaysia national education curriculum assists learners in enhancing their awareness of the multicultures existing in Malaysian society
4.	Education in Malaysia utilizes effective techniques in preparing learners towards multicultural education
5.	Learners need to be aware of the multicultural practices that exist in the society of Malaysia
6.	The education system in Malaysia encourages learners to be positive towards multiethnics
7.	It is essential that the national education curriculum promote impartiality and circumvent any forms of discrimination or stereotypes involving the growth of multicultural values in the learning environment
8.	Multicultural education is an effort to uplift the education environment in Malaysia to boost education equity for multiculturalism, ethnicity, and economy
9.	Multicultural education imparts to learners the knowledge that all forms of culture with multiethnicity are associated within a society
10.	Learners need to be made aware that all cultural practices of different groups must be given their due respect
11.	Multicultural education promotes awareness among students on the importance of social justice to learn the various cultural elements from other ethnicities
12.	Multicultural education prepares learners with appropriate skills to live in a multiethnic society
13.	Multicultural education is an enabling tool in enhancing understanding and tolerance for a multiethnic society.

Students' Perceptions and Acceptance on the Needs to Develop a CRP Module in VAE at the Secondary School (Table 4).

Table 4 Students' perceptions and acceptance on the need to develop a CRP module in VAE for secondary schools

	Item label
1.	Multicultural elements need to be given consideration as part of the objectives for the teaching and learning of VAE in secondary schools
2.	The teaching and learning of arts may be considered as a method and a tool to improve a culturally harmonious, empathetic, and responsive society
3.	Arts education is not restricted to learning the arts of monoculture or monoethnicity
4.	Learners are able to be culturally responsive when they are exposed to and encouraged to incorporate the elements of "visual culture" based on their personal experiences in daily settings
5.	Arts education may be a bridge that connects deliberate learning and understanding the arts of other cultures consequently, appreciating the values held by others in a society
6.	Learners must be provided with exposure and knowledge on the diverse culture and the arts available in multiethnic Malaysia
7.	Teachers need to be creative and not spare their efforts to integrate multicultural elements in the teaching and learning of VAE at the secondary school level
8.	Learners must be given the freedom to display multicultural elements of the various cultures through the creation of arts and crafts in the teaching and learning process of VAE at the secondary school level
9.	Utilizing CRP through the teaching and learning of VAE at the secondary school level promotes the conception of a learning environment that is effective and appealing
10.	The CRP module through the teaching and learning of VAE at the secondary school level is able to improve and develop learners' awareness and understanding towards the diverse cultural heritages that make up Malaysian society
11.	CRP through the teaching and learning of VAE at the secondary school level would be able to enhance learners' understanding and social collegiality in a multiethnic environment
12.	CRP through VAE is aligned with the aspirations of 1Malaysia
13.	The multicultural art elements of all ethnics that make up Malaysian society which are the Malay, Chinese, Indian, and native groups must be taught in schools to enhance the future generations' awareness and appreciation of the aesthetic values held by any art forms and cultures
14.	The teaching and learning process of VAE that is culturally responsive would be able to improve learners' creativity in producing an art product
15.	Culturally responsive teaching through VAE opens up the door for learners to learn various cultural art elements that exist from the diverse ethnic group
16.	Creative teachers who are able to employ culturally responsive pedagogy in the teaching and learning of arts would be able to deter "cultural blindness" among future generations

9 Conclusion

In answering the research questions on the students' levels of knowledge and learning experiences in visual arts education (VAE) at the secondary school level the analysis on the responses gathered from 184 secondary school students demonstrated that the students only are what is considered to be average (Fig. 1;

Table 1). This result may be an offspring of the analysis obtained by Hassan [32] in which he identified that some of the students found the subject to be boring and worthless. Similar to this, Kampouroulou et al. [33] affirmed that even the students in their study concluded that visual arts education is such a chore and academically irrelevant. The students also demonstrated that their level of knowledge and awareness towards multicultural education in VAE is fairly limited. The students highlighted some concerns such as whether the Malaysian educational system could equip students with all the necessary tools and environment in bringing the multicultural elements through the process of teaching and learning.

In response to the next research question on the students' level of knowledge and awareness on culturally responsive education, the analysis proved that the Malaysian education curriculum lacks in equipping students with the necessary skills of awareness and on top of that, their level of awareness is not enhanced with effective techniques for teaching and learning (Fig. 2; Table 2). Ali et al. [19] identified that multicultural tolerance, ethnic and identity empathy, and national integration among students from the control group are only present in a limited measure. Nevertheless, their findings showed otherwise with the treatment group in which they demonstrated a relatively significant positivity to all the said traits.

In response to the research question of the students' perceptions and acceptance on the needs to develop a CRP Module in VAE at the secondary school level, the findings identified that the students demonstrated a significant feedback towards the need for the development of a CRP module in VAE in the secondary schools (Fig. 3; Table 3). This may be a calling to the policy makers on the significance of such a module as students are becoming more aware of the arts and crafts from other cultures that make up the Malaysian population. As mentioned by Malhotra [34], students need to improve their level of understanding on the elements of cultural anthropology, history, and sociology as added values and knowledge on the issues of a multicultural society. Additionally, Malhotra also believed that students need to acquire the distinct perspective of individual value judgment and how it affects their social environment. Malakolunthu et al. [15] suggested that teachers need to provide their input in the considerations for the development of CRP so they would be ready in transmitting curriculum content in the teaching and learning process.

Further efforts in investigating the need for a culturally responsive arts education pedagogy module need to consider looking into methods that may be the vehicle that can be utilized to strengthen collegiality within a multiethnic society such as in Malaysia. Further study may look into how the arts education classroom may be enhanced as a platform that not only exposes students to various art crafts from other ethnicities but also promotes diversity through various art crafts activities. More importantly, in efforts to strengthen unity in a diverse society, art crafts activities may be extended beyond the classroom setting to realize the Malaysia aspirations.

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Hybrid Elements in Installation Visual Artwork

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Abstract Hybrid is a term that was recently established in visual art practice and engaged with electronic technology. The application of hybrid has been explored by artists and designers from other develop country, which successfully delivered different outcomes through the appropriate medium and process. Therefore the intent of this study was to determine the features of hybrid elements recognised from selected samples of visual installation artworks and observation with the several parallel elements such as material, technique, and contexts. Then, the listed hybrid elements are matched with selected visual installation artwork, and analyzed accordingly. The hybrid elements of the visual artwork show the expression and application of hybrid technology in visual art. The positive outcome will influence higher institutions, communities, and the shared new model and possibilities to support the National Key Economic Area (NKEA), for arts, education, design, technology, and creative industry.

Keywords Hybrid · Element · Installation · Visual · Artwork

1 Introduction

Installation practises include traditional media such as print, clay, or bronze, but others have selected new or unusual material for their artworks, such as recycled form industrial materials, through form and expressing their artwork. The artworks were established and collaborate with other media, for instance, with photography,

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video, and digital media. The studies of hybrid technology were successfully established in other develop countries. They used computer-based design and fabrication tools, which might enable new models of practise that yield a greater integration between 3D arts. In design discipline there are contributions of new knowledge through the development of analytical and evaluative critical language for computer-designed or fabricated objects [1].

Even though Kluszezyuski pointed out that focus how to blur the boundaries between human and machine, science and science fiction, including a discussion of the critical concept of hybridity that inter-related the debate and practises of the interdisciplinary domains of media, cultural, and aesthetic theories [2]. On the other hand, Colangelo points out that really discusses exploring emerging modes of digitally mediated participation in urban space that engage bodily and architectural relationships with data-rich environments [3].

The specific study related to technology and attached with the hybrid approach is now well explored. There are several integrated explorations of hybrid and textiles that have been determined by Schulke [4], which is focused on how the use of intelligent fabrics can be integrated more effectively in artworks that explore artistic and technical opportunities to enable new aesthetic perspectives. This study discusses in depth music and visual art by Erkin [5], focuses on the connection between music and visual arts through the idea of hybrid art form, and considers scientific and technological developments and the way they affect art perception. The current study found that [6], for example, argues to shape the form of visuospatial attention towards Paulik77evitch's performance artwork based study's model (VAF). This exploratory study is able to show that the combination 2D and 3D installation artwork that represents the form qualities of visuospatial attention in visual art could be an alternative concept of attention. Many artists working today incorporate more than material, or technique in ways that create hybrid art forms. Combinations of still image, moving images, sound, digital media, and found objects can create new hybrid art forms that are beyond what traditional artists have ever imagined. The objective of this study is to determine the features of hybrid elements that will be recognised from selected samples of visual installation artwork. Later, the study also gathers relevant data and visuals that collaborate with the hybrid features.

2 Overview of Hybrid and Visual Art

The term hybrid had come to be used to refer to something of mixed origin or composition which adds variety or complexity to a system [7]. A hybrid art form expands the possibilities for experimentation and innovation in contemporary art. It also can mean cross-breeding art-making with other disciplines, such as natural and

physical science, industry, technology, literature, popular culture, or philosophy. The 1980s and 1990s saw an explosion of new artistic techniques derived from cutting-edge developments in science and technology. Robotics, genetics, biotechnology, virtual and augmented reality, 3D, interactivity, and the Internet all open up new areas of artistic research and experimentation [8]. Therefore, in terms of innovation, hybrids and variations, both material and procedural, have been applied by artists around the core studio practises of relief, Plano, graphic, and serigraphic printmaking, with a particularly intensive period of experimentation taking place in the 1960s and 1970s [9].

The characterised hybrid art form is one in which two distinct arts are combined; there are artistic phenomes that might be called hybrid in which an existing art and some pre-existing technological process or semi-artistic activity are brought together, for example, neon and laser sculpture, computer music, computer graphics, video installations, and earthworks (the latter joining sculpture to a body of construction skills). The distinct arts can share a common material and still represent different media, for example, stone sculpture to a body of construction skills [10]. Hybrid status is primarily an historical thing, as is, in a way, being a biological hybrid. An art form is a hybrid one by virtue of its development and origin and by virtue of its emergence out of a field of previously existing artistic activities and concerns, two or more of which it in some sense combines [10]. At this moment in visual art, some of the effects of globalisation are hybrid art historians and critics, or the mixing of the traditional forms of different cultures to create new blends and new connections. As an example of the world's cultural icons, Takashi Murakami has been dubbed Japan's Andy Warhol. Murakami draws on consumer culture for his imagery. Murakami fantasised about illustrating Japanese graphic novels called manga, which are also hybrid. Though the illustrated manuscripts have as long and distinguished a history in Japanese art as they do in Western art, their modern form is heavily influenced by American comic books, which infiltrated Japanese culture soon after the end of World War II.

3 Classification of Hybrid

3.1 Importance of Material

Hybrid visual artwork was required as the element of physical engagement with substance, texture, and material beyond the underlying virtual or conceptual driving forces. Media in the present context are not equivalent to material or physical dimensions. Rather, by a material it means a developed way of using given materials or dimensions, with certain entrenched properties, practises, and possibilities.

3.2 *Technology-Based Media*

Media is the plural of medium (middle, center, intermediary). Media remain an intermediary in order to transport information used to communicate (such as the press, radio, television). Media disseminate information to a large number of people without customisation of the message. That is why we speak also of mass media. However, the term is used in more general senses, to designate the means of communication such as language, writing, or music. In media technology one of the biggest challenges is to create cost-effective solutions to practical problems by applying scientific knowledge to building things in the service of mankind. Today media technologies are built via electronic and computer systems but as the definition said, it's a medium; that's why working in media technology can teach a lot about other disciplines.

3.3 *Dimensional Art*

Multidisciplinary is characterised by autonomy of the various disciplines. This discipline has not led to changes in the existing disciplinary and theoretical structures. Cooperation consists in working on the common theme but under different disciplinary perspectives. Interdisciplinary remains characterised by the explicit formulation of a uniform, discipline-transcending terminology or a common methodology. The form scientific cooperation takes consists in working on different themes, but within a common framework that is shared by the disciplines involved. Transdisciplinary research is based upon a common theoretical understanding and must be accompanied by a mutual interpenetration of disciplinary epistemologies. Cooperation in this case leads to a clustering of disciplinary rooted problem solving and creates a transdisciplinary homogenised theory or model pool.

4 Installation Hybrid Artwork

4.1 *Video Installation and Sculpture*

Video installation and sculpture is an art piece usually of mixed media that is organised for and placed in a specific space. The artwork of Fig. 1 presents work to the toilet as an amalgam of bodily and machine interface, and the fantasy of a toilet that functions as a medical device in assisting one's bowel movements. To redefine the relationship of the human body and technology to the bowel and toilet as everyday 'invisible' interfaces.



Fig. 1 Ian Haig installation artwork *Excelsior 3000*. By Ian Haig *Excelsior 3000* Video installation and sculpture, Sound: Philip Samartzis, 2001. Source Ianhaig.net

4.2 Hybrid Wall Installation

Video is art made with recording cameras and displayed on monitors, and having moving imagery. Inspired by Edgar Allan Poe, Roman Kirchner's hybrid wall installation *Maelstrom* invites the audience to contemplate a fluid choreography of vortex-like material phenomena that provoke astonishing psychedelic effects. The fascination of and the struggle with the uncontrollable natural force of the infinitely small and the infinitely large are here of technical nature. That is a contemporary art form that combines video technology with installation art. The artwork in Fig. 2 tries to combine these two perspectives to look at how the inner and outer world



Fig. 2 Roman Kirchner video installation artwork *Maelstrom*. By Roman Kirchner *Maelstrom* an installation inspired by Edgar Allan Poe's short story, image, animation. Sound: Els Viaene, 2010. Source Ars Electronica 2010, Festival for Art, Technology and Society

Fig. 3 Koen Vanmechelen installation artwork *evolution of a hybrid* Koen Vanmechelen. *Evolution of a Hybrid Transparent* container, lit by breeding lamps, stores three 3D prints. 2013. Source Prix Ars Electronica 2013



may interrelate when images, stores, and information are flowing through heads at accelerating speed. *Maelstrom* is an artwork autonomous mirror of reality in perception and dream. The installation melts down concept and technique, digital, and analogy to a working organism.

4.3 Hybrid Installation

This is a contemporary art movement in which artists work with frontier areas of science and emerging technology; the artists work with fields such as biology, robotics, experimental interface technology, and more. Figure 3 was a very unique installation artwork designed by artist Koen Vanmechelen, with element 3D prints. The installation at Pavilion 0 consists of a transparent container which is lit by breeding lamps and held 3D printer representations at the genomes of three chickens. The display is aimed to help build a bridge between art and science. In the words of the artist, Koen Vanmechelen, 'Art is hybrid'.

5 Summary

The expected outcome of this proposed study is hybrid installation artwork planned for exhibition. It will transfer a new concept of self-visual attention for public experience. The procedures of this study orient visual artists, painters, designers, and critics to borrow unfamiliar tools to explore the invisible objects in this world in deep examination. The study of hybrid is important as an alternative approach to innovation and creation that will produce a new method in visual artwork.

Therefore, this study carries benefits to the following of an opportunity critically to examine maps in this area and industry by using technology. It is anticipated that an increased understanding of this mode of practice will deliver understanding of and an appreciation for hybrid art and design practices. The benefit for art and design practitioners will be exploring and documenting the use of digital technologies by diverse contemporary practitioners from 3D art and design discipline. That will offer new inspiration and different styles to the art practitioners to engage and encourage them to exploit technology, and extend the technology development in ICT to extend our local art scene broadly with technology on an international platform. Furthermore, this study adds on the exciting material of hybrid art in Malaysian art.

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Monoprint Technique: Medium and Expression

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Abstract In fine art printmaking, the monoprint is part of a well-established technique. The characteristic of monoprint is easily recognized as a single output and different from the edition that is usually created through another medium such as silkscreen, etching, engraving, and others. Therefore, the objective of this study was to explore the monoprint technique to investigate the type of medium and expression from several selected artworks produced among local printmakers in Malaysia. This study began by choosing various samples of artworks that showed the features of monoprint. Then, the classification of the artworks through the specific theme was explored to categorize the outcomes of the medium and effects within the expression. Examination of the artwork represents the individual who recognizes how the artists choose the medium and transfer the creativity to their artworks. This study delivered proper instruction and differentiated between edition and single expression through monoprint.

Keywords Characteristic · Monoprint · Technique · Medium · Expression

1 Introduction

Monoprint means producing a single print of an image. It is possible with other forms of printmaking, such as etching, engraving, silkscreen, lithography, and lino printing, to produce an edition of identical images. A monoprint is an individual impression. It is the simplest and least restricted form of printmaking, and as such

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has great appeal. An impression that is taken from any surface and is unlikely to be duplicated exactly by the same process can be considered a monoprint. The monoprint started in Europe in the seventeenth century but was picked up by Malaysian visual artists in the 1960s when an exhibition of artists Jeera Prises SriSonta from Bangkok was held at Kuala Lumpur in 1963. The main goal of this research was to study the monoprint's characteristic created by several local artists in Malaysia, in order to investigate the originality that is easily recognized as monoprint artworks. More than that, the researchers wanted to select monoprint artwork that was made by local artists in Malaysia to categorize and explore the variety of creative expression that used the monoprint medium. The researchers also need to react to the questions that specify monoprint features that were displayed and recognized as an original monoprint. As a result the appropriate approach was to categorize and analyze selected monoprint artworks produced by local artists in Malaysia such as Faizal Suhif, Azizan Paiman, Loh Foo Sang, Tajudin Ismail, Phoo Poh Wai, Wong Siew Lee, Raduan Man, and others.

The clarification to examine this investigation had three phases: first, analysis which comprises previous research and contemporary research. Second, the observation must be based on casual activities to see how far the medium of production goes and to identify the originality of the monoprint. Finally, the visual analysis resolved interpretation by the characteristic aspects of this study that considered how to recognize the main characteristic of a monoprint that was created by every sample of the artwork. This study was significant to establish the monoprint technique with the public or other related institutions, although for visual art practices, this printmaking medium will sustain mixed-media techniques and enhance the original characteristic of the monoprint. Then, the analysis of the selected artwork, composed with the monoprint technique established different meanings, issues, and even the content and context of artworks.

2 Overview of Printmaking

This research conveyed a general overview from several conventional techniques in printmaking such as intaglio, relief, lithography, screen-printing, monotype, and mixed media. Each technique had different output as to the ways the medium was explored. This was to provide a general understanding and awareness of what each technique involves. As with any artistic enterprise, the medium or process exists as the means to realize an idea. Considered were such structural and conceptual perspectives, the “how” and the “why” of printmaking can hold many creative opportunities, just like the moments along the path of making provides inspiration to reside in each individual artist. Ultimately, understanding the authority and, in turn, qualitative evaluation of the resulting artwork, must include awareness of the artist's intent.

Bahaman [1] describes that the “definition of printmaking is prints that have been viewed as multiple images produced from a plate. The plate is an

intermediary- a flat, hard, rigid surface that contains the picture or message. The image receives ink and the inked image is transferred to the paper by pressure.” But based on Melot [2] “... the terms ‘print’, which conveys the idea of impressing a design or image, of transferring it from one surface to another...” Different artists have their own perception of the definition of printmaking. In printmaking, to produce an artwork the images must be designed on the plate and transferred to another surface by pressing.

Printmaking is one of the fine arts disciplines besides paintings and sculpture that has its own uniqueness. The conventional definition of printmaking, is emphasis on producing an “impression” that traditionally consists of several components, namely, there are differences between “print” and “original printmaking.” In the context of print is that which conveys the idea of impressing a design or image, of transferring it from one surface to another surface. Original prints are traditionally signed that have been chosen by the artist to make as the artist proof which was selected by the artist according to several criteria. An original print is actually one piece of a multiple original work of art, through the four traditional methods, the use of a plate, block, stone, or stencil that has been hand created by the artist for the sole purpose of producing the desired image.

The definition of print and original artworks also emphasizes the main aspects of printmaking relating to the use of printing blocks and categorizing a print as an original work of art, and different reproduction. This is because the prints are produced using three basic steps which involve the formation of a block or matrix and putting the color on the block and transferring the image from the block onto another surface. Ragans [3] asserts that printmaking is a process in which an artist repeatedly transfers an original image from one prepared surface to another. Paper is a common surface to which the printed image is transferred. The impression created on a surface by the printing plate is called a print.

A print is produced and considered as an original artwork if it has been conceived by the artist for the chosen medium. It can be derived from a painting or drawing using the artwork as a source of material, and can still be considered original. However, if the work is directly transposed onto a screen, block, or plate by photographic or other means, solely in order to produce it in duplicate form, then this is not considered an original print but a reproduction, and should be labeled and sold as such. If a work is printed by a student, the image must be first created by the artist and then printed under their lecturer if it is to be considered an original artwork. The usual practice is to decide on the number to be printed, which the artist will then sign and number in pencil. Smaller editions can command higher than very large numbers. The early numbers are considered more desirable as the image would be sharper, the plate or block being less worn down by wiping or pressure. However, although it is now possible to steel face softer plates to prolong their life, most artists who print their own work generally prefer to move on to their next image before the plate or block deteriorates.

In the twentieth century there were many developments that affected the practice of printmaking. One of them was the arrival of computer graphics. Because of its instant results, many artists were seduced into feeling that the traditional methods

were by comparison too slow and expensive. However, it is now generally recognized that the computer is a hugely important, and exciting, complement to many forms of printmaking. For example, screen-printing, polyester lithography, and photo-etch would not have developed in the same way without the use of computer technology. In contrast, traditional methods still need to be continued and inherited because they bring unique features that cannot be imitated and copied.

The printmaking must be based on the definition and the characters that exist within it. In fundamental traditional printmaking, it is static in which the production needs to meet all of the definition and characters of printmaking. Conversely, in the making of conceptual artwork, it is more dynamic and open. Nonetheless, “definition” is the essential (block or matrix, transferring, and by-product) and a must to comprehend in producing an artwork despite that the artwork is two-dimensional, three-dimensional, or four-dimensional, depending on the redefinition of the artist. “Character” listed is dependent on the concentration of exploration by the printmaker.

Conventionally, printmaking owns many personal laws on the way to presentation, printing features, characters, and elements that should exist. Printmaking has a term called “original printing” as a way to identify the originality of printmaking. The statement below shows the essential element that should be available to be considered as the “original print”. Shih [4] claims that “*Selalunya seni cetak original hanya dihasilkan dalam jumlah cetakan yang kecil; karya-karya ini mesti ditandatangani dan dinomborkan bagi memastikan keaslian (originaliti), kualiti dan juga kuantitinya.*”

Long Thien Shih is a traditional artist. For hundreds of years, this conduct has been practiced. Conformity should be applied in creating the work to ensure the printmaking produced fulfills the laws that differentiate between painting and sculpture as well as other visual arts. Printmaking seems relevant in line with contemporary art. To make the effort of expanding understanding printmaking possible, it must have a framework or a suitable model for reference. In an effort for printmaking artists to make improvements, numerous steps have been taken to establish printmaking. Understanding printmaking in the academic perspective has certain basics being applied to give printmaking room outside the printmaking convention itself.

Grabowski and Fick [5] supposed that “Monoprints are one of a kind, printed images.” They have been called “the painterly print” or “the printer’s painting.” Indeed, making a monoprint brings together ideas from both practices, as well as concern from drawing. Monoprints are also sometimes called monotypes. The two words are often used interchangeably, with monoprint type started in Europe in the seventeenth century but there are some different views on which artist started this monoprinting technique. Palmer says that although there is no single accurate information about who began the monoprint method and the date, he explained that; “The first artist of note to employ the process to any great extent seems to have been Benedetto Castiglione. There are a number of examples of his work, produced mainly during the 1650s: and many may be seen in the Royal Library, Windsor Castle and in the British Museum” [6].

A researcher interested in the record, Rhein [7] stated that the process producing a monoprint is more interesting because there are two techniques to produce images: the “indirect” and “direct.” The direct technique in the process of producing monoprint images is described as “...a glass plate is rolled with printer’s ink, placed in a vertical position and covered with a sheet of tissue which should be glued lightly to the top or the back of the back of the plate. If the tissue paper is then pressed firmly against the inked glass plate with whatever objects are handy, traces will appear on the back of the paper.” Beng [8] also explains the definition of monoprint by stating that “... a print that has been altered by colouring the paper before printing or by varying each impression during or after printing. A monoprint derives all or part of it [sic] image from printing elements where as in a monotype the image is transferred to a paper in a press. This [sic] prints are often hand-coloured and may include collage elements.” In the context of the history of printmaking in Malaysia, Beng [8] has explained some of the local oil painters of the 1960s who worked in monoprint artwork and in their main work of oil paint. He said, “In the development of art in Malaysia, types of monoprint was [sic] attracted several artists since the 1960s.”

3 Definition of Monoprint

Monoprint is a means of producing a single print of an image. It is possible with other forms of printing, such as etching, engraving, lithography, and lino printing, to produce an edition of identical images. A monoprint is an individual impression. There are few technical limitations to the monoprint. In fact, it is the simplest and least restricted form of printmaking, and as such, has great appeal. No complicated process has to be learned and little equipment is required. Palmer [6] believed that the monoprint is the more common and generic of the two. A useful distinction, favored by many, is that a monoprint employs some form of repeatable matrix used in the development of the image, whereas a monotype is not dependent on the ability to repeat information. In this chapter, the term “monoprint” is used both for the general class of prints and for the specific case of works employing repeatable matrices. The term “monotype” is used specifically for works without repeatable matrices (P. 187). The method was named by the British painter Henry Tonks and is sometimes employed by painters at the end of the day’s work so that the surface of a picture is easier to paint on the next day. Although the purpose of the process is not to obtain monoprints, it is not unknown for a painter to develop a print gained in this way. The “monoprint” is often used interchangeably when referring to this medium, so a useful starting point in exploring this form of printmaking is to investigate how the term has been defined and applied.

Monoprint applies to the production of singular works. A monoprint is a singular work that can be produced without the need to undergo a series of steps. The nature of the monoprint means that historically it has been difficult to define or categorize. Although the technique follows the printmaking template of reproducing images

from one surface to another using ink and pressure, the marks made and the immediacy of approach are more closely associated with painting. Printmaking is traditionally a medium that allows the production of multiple copies or the auditioning of the image from the initial plate, block, stone, or screen. In contrast, the monotype allows only one pull of the original image, followed by a “ghost” and a “mirror” print in some circumstances. Although printmaking is traditionally seen as a way of making a painter’s work more accessible, painters have often used monotypes in their preparatory sketches as a means of experimenting.

4 Monoprint as a Medium

Based on current and previous studies the characteristic of a monoprint was created by local visual artists in Malaysia and it needs more detailed information compared to the other developed countries that established their printmaking medium. The printmaking medium in Malaysia was gradually explored by a few visual artists, who used this technique as an alternative to present their creative artwork, rather than other media such as painting, drawing, sculpture, and installation artwork. However, the printmaking practice is well known in Japan, Australia, and Thailand. Kicker [9] reviewed that printmaking had been established and explored through the contemporary approach; in fact, artists in Toronto from a center in projecting their creativity to enhance printmaking by printmakers who created artwork towards contemporary practices [10]. Another study that specifically focused on printmaking in New Zealand dominated printmaking development in their country from 1930–2007 [11]. Indeed, Prince [12] was successful and made documentation about printmaking, which used digital methods only in America. However, the earliest studies by Palmer [6] stated that the medium of monoprint failed to become a popular medium, not only because of the several limitations of a mould for each sketch made, but also because they seemed to rely too heavily on the impact of accidental and uncontrolled properties such as ink or paint on a flat surface when subjected to pressure or rubbing.

5 Monoprint Basics

Little equipment is required for monoprinting. It is possible to produce prints without any addition to the tools and materials used for oil painting. An image may be taken with a sheet of paper or card forming the plate if nothing else is available. It is helpful to have rollers and printing inks, but these are not essential. No press is required and there is no involvement with chemicals or special cutting implements. All that is required for beginning work with monoprints is using pigment, brushes, knives, palette, thinners, rollers, printing plates, and paper. The researcher used the

following, adapted from Palmer [6], in analyzing the characteristics from selected artworks.

1. Simple monoprints from objects
2. Monoprints from plates
3. Oil and water monoprints
4. Collage monoprints
5. Mixed-media monoprints
6. Overprinting monoprints
7. Variation monoprints
 - Marbling
 - Transfer print
 - Frottage
 - Photographic monoprints
 - Photogram
8. Additions to the image after monoprinting
9. Chine Collé monoprints

6 Monoprint in Malaysia

In Malaysia the printmaking medium is also practiced by several artists. Khoo and Mohamed [13] established significant documentation that included the movement of traditional printmaking and the exploration of digital print. In addition, Saifulitibuyan [14] also emphasized the manifestation of variety lines explored and used in monoprint that usually sustained ideas in the creative artworks process. The study of the type of monoprint in Malaysia was embedded with detailed analysis comparing the technical aspects that distinguish between monoprints and monotype [15]. Therefore, as seen in established related studies, this research needed to yield about the type and characteristics of monoprint that made this medium and the artworks represent the unique monoprint features illustrated through the creative artworks among visual artists in Malaysia. Indeed, before the artist chooses an appropriate medium for experiment, the artist needs to consider the specific element in monoprint that represents expression that forms the uniqueness of any artwork so as to compare the monoprint and edition prints.

Printmaking is a medium that usually uses various creative artworks that include different processes, either creating multiple original images (print) from one original surface or to another surface. The technique includes relief print, stencil, lithography, intaglio, and monoprint. Therefore, this study concentrated on the artworks created with the monoprint medium. Most of the samples were gathered from local artists in Malaysia from 1960 to 2010. The selected local artists for this study

included Faizal Suhif, Azizan Paiman, Loh Foo Sang, Tajudin Ismail, Phoo Poh Wai, Wong Siew Lee, Raduan Man, and others. The examination of this study considered how to recognize the main characteristics of monoprint that were illustrated by the selected sample of artworks. Included here are a few selected works that explain the characteristics of monoprint; please refer to Figs. 1, 2 and 3.

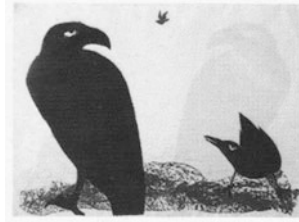


Fig. 1 Li Chong Chuan (1979) *Eagle, Crow, Sparrow* (Monoprint) on paper, 56 cm × 76 cm. From *Inventori Himpunan Tetap Warisan Seni Tampak Negara 1958–2003* (p. 200), 2003, Kuala Lumpur: National Art Gallery

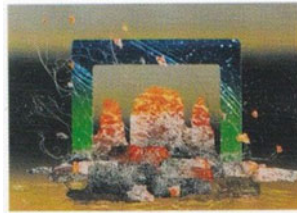


Fig. 2 Loh Foh Sang (1994) *Greeting Spring* (Monoprint) on paper, 49 cm × 69 cm. From *Inventori Himpunan Tetap Warisan Seni Tampak Negara 1958–2003* (p. 299), 2003, Kuala Lumpur: National Art Gallery



Fig. 3 Tajudin Ismail (1974) *Dari Tingkap—From The Window* (Monoprint) on paper, 47 cm × 47 cm. From *Inventori Himpunan Tetap Warisan Seni Tampak Negara 1958–2003* (p. 166), 2003, Kuala Lumpur: National Art Gallery

7 Characteristics of Monoprint

1. *Simple Monoprints from Objects*

This series of prints (Figs. 1, 2 and 3) illustrates the basic principle of monoprinting. No two prints are identical and it would be impossible to reproduce any of the images again by the same process. Any addition of ink between the printings, rather than helping to reproduce a duplicate would probably have altered it further.

2. *Monoprint from Plates*

These are prints taken from partially cleaned printing plates and palettes, prints taken from inked plates onto which a design has been drawn, a design under a glass plate, or the image on the plate before printing. Once there is a plate, it is just painted on directly with etching or lithography inks using any kind of brush. After the image is painted, the plate is put on a press bed, carefully placed on previously dampened paper and the plate and paper run through a press using light or moderate pressure.

3. *Oil and Water Monoprints*

Monoprints can be created also by using water-soluble materials such as watercolors, crayons, watercolor pencils, watercolor felt tip pens, or commercially produced monoprint inks. Prior to drawing, the plate to be used (usually plexiglass) needs to be finely sanded and the edges bevelled. This will allow color to fix better on the plate and make drawing much easier. A sponge or small brayer is used to apply a thin even coat of hand soap to the entire printing surface and the soap allowed to dry. The soap will perform as a releasing agent and allow the colors to be lifted during printing.

4. *Collage Monoprints*

The term collage is not used in its traditional meaning; materials are not glued on the surface but are used on the paper either inked or not inked (only used to produce embossments on paper). Materials often used are cut or torn shapes from textured papers, lace, cloth, thin vinyl sheets, leaves, and even metal grating.

5. *Mixed-Media Monoprints*

Almost any combination of media and processes are possible in monoprinting. With the addition of certain materials, for example, glues, sand, or drawing inks, the accidental element is heightened.

6. *Overprinting Monoprints*

There is no reason why a monoprint should not be the result of a number of printings. After seeing the results of a first impression it is often possible to rework parts of the plate so that certain areas may be emphasized and others subdued, corrections made, and ideas developed.

7. *Variation Monoprints*

Although not monoprinting in the usual sense of the term, the ideas in this section deal with methods that may be used to obtain individual prints in various media. The following are all found in variation monoprints.

- *Marbling*: A simple process of taking prints from the surface of the water.
- *Transfer Print*: A transfer print or drawing is produced by placing a sheet of paper on an evenly inked surface.
- *Frottage*: Frottage is name given by the painter Max Ernst to the process of obtaining images by placing paper over a surface and rubbing it with a wax crayon or pencil.
- *Photographic Monoprints*: Although this is not the place for detailed analysis of photographic methods, the conclusion of one or two simple ideas seems appropriate.
- *Photograms*: Sometimes known as rayograms after the artist Man Ray, these may also be considered as another form of monoprint.

8. *Additions to the Image After Monoprinting*

The monoprint can form an excellent basis for development with other media. Additions may be made that extend the monoprint image or improve further upon the accidents which may have occurred during printing.

9. *Chine Collé Monoprints*

This method requires the use of two kinds of paper: one durable which serves as a base of the print and one which is really lightweight such as Japanese papers. The image is printed onto the Japanese paper which is glued on the more durable paper.

8 Conclusion

This study acknowledges monoprints and the public and institutions that appreciate and are aware of this kind of artwork. It also upgrades printmaking in terms of approaches and techniques important for producing artwork in the future by using monoprint as a medium to convey the idea and message. The study provides new directions that could be the answer to expanding the meaning and performance in the making of monoprint artworks. This kind of artwork is important in art development and to widen the terminology in monoprints that can be accepted by all. In this research, the researchers attempted to develop printmaking by analyzing the functional definition of what is characteristic of a monoprint.

Acknowledgment The authors would like to acknowledge the Minister of Higher Education Malaysia under RAGS grant scheme, Universiti Teknologi MARA, and Research Management Centre for the administrative support.

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Women Artist in Malaysian Visual Art History and Development

Umairah Arina Mokhtar, Juliana Manan and Rafeah Legino

Abstract The National Visual Art Gallery, which is located in Kuala Lumpur, has become the main organization responsible to manage and oversee visual artwork collections. The Gallery has been collecting various disciplines of visual artwork since its establishment in 1958. Based on previous related studies, which include observations from the past and current visual art exhibitions, the documentation on history and development on the visual art of painting and revolution of modern artists in Malaysia was well established. Therefore, the objective of this study was to investigate the history of women artists in Malaysia, in order to determine the visual artwork development that contributes to the visual art movement of this country. Then, several samples of the selected artwork produced by women artists were classified and categorized appropriately. A suitable method was used to interpret and trace the relation of history in how it influences the style of visual artwork in Malaysia. It is hoped that through this study, the uniqueness and creativity of the women artists' artwork can be brought to attention and subsequently appreciated. Indeed, the establishment of women artists' artwork through this study is to highlight the uniqueness and the creativity of the women artists' artwork.

Keywords Women artist · Malaysia · History · Development · Visual art

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1 Introduction

Historically, male artists were always more established compared to women artists. It can be seen with several groups of artists in Malaysian visual art development such as the Penang watercolorist art group, Wednesday Art Group, Angkatan Pelukis Semenanjung, and Anak Alam [1]. The main objective of this research was to investigate the history of women artists in Malaysia, in order to determine the visual artwork development that contributed to the visual art movement in this country. Several samples of the selected artwork produced by women artists were classified and categorized appropriately. Based on previous related studies, which include observations from past and current visual art exhibitions, the documentation on history and development on the visual art of painting in Malaysia was well established [2]. Comprehensive research and study has also been done on the revolution of modern artists in Malaysia [3]. A separate study on technique and media in Malaysian pictorial art has also been done with a focus on artwork from 1980 to 1990. Malaysian modern artwork from the pioneer era to the pluralist era (1930–1990) has also been extensively researched and studied [4]. Apart from that, a study to survey Malaysian figurative art to understand the aesthetic value of the female figure in the works of women artists has been conducted in recent years [5]. This study helps to create awareness of feminine aesthetic value and its characteristics. Not forgetting the Islamic art influence on Malaysian modern art, research has been carried out to study Islamic contemporary art and how it blends with visual art in Malaysia. This research utilized samples from Malaysian Muslim artists in the 1980s and 1990s [5]. Related research from other developing countries carried out a comparison study from selected Asian countries of China, Korea, and the Philippines as to how the women artists involved in visual art practiced. The study was within art historical and critical guidelines that described form, artist, biography, and iconography [6]. An interlink with the women artists in China described Chinese contemporary women artists that emerges through their artwork and approaches. Based on the above studies and research, Malaysian visual art is growing and building gradually whereby all the above literature provides significant benefits to the improvement and growth of Malaysian modern art. However, studies that focus on Malaysian women artists need to be undertaken, especially to provide proper documentation of the artists' medium, style, developments, and achievements. The authors hope that this research will improve understanding of the women artists' artwork and recognize their contributions and roles in the development and improvement of Malaysian modern art. It is also hoped that this research will be a valuable source of information to other students and researchers in studying their artwork.

2 Literature Review

The origins of modern art in Malaysia could be traced back to the early 1930s [7]. According to Ref. [1] the development of Malaysian modern art was influenced by three factors, namely colonialism, migration, and educational status. English colonization introduced a new style of painting known as easel painting, starting with the group of Penang impressionists by the British army and their wives. They used watercolor as a medium to produce impressionist styles of landscape. The members of the group were Abdullah Ariff, Yong Mun Seng, Tay Hooi Keat, and Khaw Sia. Thus, the presence of artists from China in 1930 caused a different atmosphere in Malaysian modern art. The first institution of art academy was called the Nanyang Academy of Fine Art by Lim Hai Tak. This was the first institution of British Malaya to offer fulltime courses in painting and sculpture in 1938. Among these émigré artists were Cheong Soo Pieng, Chen Wen Hsi, Georgette Chen, Chen Chong Swee, and Lai Foong Moi. The Nanyang artists received proper art training such as in Shanghai, Canton, and France and were exposed to modernist art tendencies such as western style and traditional Chinese painting. In 1952, the Wednesday Art Group was created in Kuala Lumpur and Peter Harris founded it. The group of members was Patrick Ng Kah Onn, Cheong Lai Tong, Dzulkiffi Buyong, and Ismail Mustam. Several women artists who joined this group included Liu Siat Moi and Grace Selvanayagam [8].

Another group was created in Kuala Lumpur on 1956 called Angkatan Pelukis Semenanjung Malaysia and the founder of this group was Hoessin Enas. The artists in this group were Mazli Mat Som, Idris Salam, Zakaria Noor, Yusoff Abdullah, Ahmad Hassan, and Mohd Salehuddin. They produced portraits and landscapes as themes. Subsequently, artists who returned from studying abroad in the late 1960s brought back the modernism style with expressionism and the abstract expressionist style. These artists were Syed Ahmad Jamal, Tay Hooi Keat, Yeah Jin Leng, Ismail Zain, Abdul Latiff Mohideen, Redza Piyadasa, Jolly Koh, and Anthony Lau.

Concurring with Ref. [8], the significance of women artist's levels increased due to the opening of the local art college. In 1966, the Malaysian Institute of Art was created. Among the artists who graduated with an MIA was Eng Hwee Chu. This was followed by the Department of Art and Design in Universiti Teknologi Mara in 1967 and in 1968 The Kuala Lumpur Art College and The Specialist Teachers' College were established. Among the first female students from Institute Teknologi Mara were the painter artist, Sharifah Fatimah Syed Zubir, ceramicist Ham Rabeah Kamarun, and textile artist Fatimah Chik. Since then, ITM has been producing talented women artists including Mastura Abdul Rahman, Soraya Yusof Talismail, Sharmiza Abu Hassan, and Nurhanim Khairuddin. Other women artists that studied abroad were Noor Mahnun Mohammed and Nadhiah Bamadhaj. The improvement of education provided opportunities for the development of visual arts in Malaysia. The improving education, increasing opportunities, and changing cultural attitudes towards women's participation have changed the world of modern art in Malaysia; refer to Table 1. Much progress has been achieved which is also able to highlight

Table 1 Samples of text analysis

Title	
Diversification of Malaysian art 1990s–2010s [10]	Development
Malaysian digital painting [11]	An historical study
Thematic approach in Malaysian art since the 1990s [12]	Impact of thematic taken by Malay artist
Comparison colonized and non-colonized countries in Malaysia and Thailand [13]	Explored in development art
A complication of Malaysian modern artist on 80s and 90s [6]	Development
Female figure in the work of Malaysian women artist [5]	Figurative in Malaysian women artist painting
The localization of Malaysian abstract expressionist	Style
Malay symbol expression [4]	Technique and media

women at a par with men. Through the resulting work women were able to express their creative ideas in line with issues of humanity, dignity, family, and identity and also as social commentators [9].

3 Research Methodology

Data collection was from secondary sources through related previous research, and current research such as academic journals, articles, books, exhibition catalogues, and online resources. This method is the best way to understand the development of visuals that clarify Malaysian women artists' views towards visual art.

3.1 Text Analysis

See Table 1

3.2 Classification and Analysis

To make it more convenient, the samples of the artwork were classified and categorized into specific disciplines such as painting, printmaking, photography, ceramics, and sculptures (please refer to Figs. 1, 2, 3, 4, 5 and 6).



Fig. 1 Georgette Chen (1950) *Rambutan*, oil on canvas, 60 × 49 cm. From Inventori Himpunan Tetap Balai Seni Visual Negara 1958–2003, Kuala Lumpur, National Visual Art Gallery



Fig. 2 Siew Lee Wong (2001) *The Reformasi Series—Print I: Reformasi*, print on wood and paper, 41 × 40 cm. From Inventori Himpunan Tetap Balai Seni Visual Negara 1958–2003, Kuala Lumpur, National Visual Art Gallery



Fig. 3 Normah Nordin (2004) *Fated—Semangat Kayu Pulau Carey*, photography, 82.5 × 87.5 cm. From Inventori Himpunan Tetap Balai Seni Visual Negara 2004–2009, Kuala Lumpur, National Visual Art Gallery



Fig. 4 Ham Rabeah Kamarun (1990) *Globe*, ceramic, 64 × 182 × 121.7 cm. From *Inventori Himpunan Tetap Balai Seni Visual Negara 1958–2003*. Kuala Lumpur, National Visual Art Gallery




Fig. 5 Sharmiza Abu Hassan (1996) *Coaches*, mixed-media, 22.8 × 15 cm. From *Inventori Himpunan Tetap Balai Seni Visual Negara 1958–2003*. Kuala Lumpur, National Visual Art Gallery

4 Preliminary Summary

The researchers hope this study can improve understanding of the uniqueness of the artwork produced by female artists and it is very important to recognize the contribution of women artists and understand their identity and development. In Malaysia the study and publication of the development of women's art and writing is very limited. It is hoped that this study may provide useful information to other researchers and students, especially in Malaysia. This study is very important to our generation today because it can show the uniqueness and identity of the Malaysian women artists' artwork.

Fig. 6 Hamidah Suhaimi, *Kebaya* (1970) Pastel, 59 × 49 cm. From Inventori Himpunan Tetap Balai Seni Visual Negara 1958–2003, (p. 297), Kuala Lumpur, National Art Gallery

Artworks	
Content	<p>Kebaya is one of the artwork produce by Hamidah Suhaimi on 1970. The size of artwork is 59 x 49 cm and she used pastel color as a medium. It is permanent collection of National Visual Art Galley</p>
Context	<p>The subject show a beautiful characteristic of Malay women with curly and black hair, brown skin color, and wearing traditional Malay costume “Kebaya” The background is plain and the style is more to realist. Used of curve line, horizontal line, and diagonal line. The colors are warm.</p>

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The Structure of Malay Woodcarving Motifs in Craft Education Module

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Abstract This chapter presents an attempt to examine the characteristics of the design motifs employed as an integral part of wood carvings, which in doing so manifest the cultural values that exist between the religious and cultural heritage of the Malays. Malay woodcarving is perceived and modeled upon a Malay-centric world view. Cultural identity is a treasure that vitalizes mankind to seek nurture in its past, by assimilating the contributions from other cultures that are compatible with its own norms in continuing the process of its own artistic creation. An aim to study the structure of Terengganu Malay traditional woodcarving motifs based on interpretations of Malay aesthetic principles and elements is being applied to the new design motifs in contemporary artwork of painting and installation art. The artist's statement is related to a master carver to create the new motif design interpreting Malay aesthetic principles and elements in their work. Based on collective information, it can be said that the structure of Terengganu Malay traditional woodcarving motifs is determined by three steps of structural motif. The findings of these three steps are vital in understanding the intricate artworks of woodcarving motifs. They should be used as guidelines by those who are related in the artwork fields such as the artist creating a new design, thus giving meaning and depth to overall work, without sacrificing the unique Malay aesthetics and identity. In the syllabus of visual art education (craft education-related courses) in secondary schools and also in the Department of Art and Design Education, Faculty of Education, UiTM should introduce the topic of creating motifs and patterns according to culture, tradition, and heritage. On that topic, students are required to create their masterpieces according to the three stages presented in this research. Hence, students should know and be introduced to our cultures which have their own rules and structures in creating new motifs before applying them in visual arts artwork.

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Keywords Motif structure · Woodcarving · Craft education

1 Introduction

Malay traditional woodcarving motifs are influenced by nature and are rich with symbolism. According to Jamal [1], forms and motifs of Malay traditional woodcarvings have always been closely associated with Malays' way of life and are illustrative of culture, values, and beliefs. He explains further that Malay traditional woodcarvings consist of a few elements such as living creatures, cosmic elements, plants, geometric shapes, and calligraphy. The art of Terengganu woodcarving has been regarded as a traditional Malay skill for generations. In the past, woodcarving activities were usually carried out during the time after the fishermen and farmers had finished their work for the day, after the harvesting period, and during the monsoon season. During rainy seasons, they took advantage of the monsoon period to create woodcarvings as their side income. Woodcarvings have been a side income career for some craftsmen in Kelantan, Terengganu, and Pahang. Woodcarving has always been connected with the production of furniture, main gates, houses, women's accessories, and *sampan*. The current practice sees woodcarving go beyond means as a side income and being commercialized extensively. Some Terengganu wood carvers have succeeded in introducing their most artistic woodcarving for government buildings. But now, the same woodcarvings found in furniture, houses, and buildings have been carved by foreign woodcarver artisans. The development of the woodcarving industry is no longer solely the work of skilled Malaysian craftsmen but is also dominated by woodcarvers of neighboring countries.

2 Study Background

This study is a visual research about the Terengganu woodcarving motif. In this study, the art of Terengganu woodcarving is analyzed from two different aspects: the structural aspect and the motif aspect. Advance Learner's English—Malay (2003) stated that the "Structure" means the way in which something is put together, organized, and built or how one part is related to another. It also means anything made of many parts or any complex whole. This research studies the structure in Malay traditional woodcarving motifs and how the elements are organized or arranged to form a whole motif. In traditional woodcarving, the motifs are part of a decoration, carved in two dimensions or three dimensions, that are then arranged to create the decorative design or pattern [2]. Understanding the structure would benefit the artisan tremendously in motif designs through an arrangement of some or whole elements in a pattern. Designing woodcarving involves a process of deliberately selecting, assembling, and arranging the design motifs according to the

philosophy of Malay woodcarving that stresses the characteristic of a steady movement that emanates from a mysterious source, which slowly and naturally evolves in equilibrium and harmony as found in the concept known among the Malays as *awan larat*. The philosophy dictates that:

tumbuh berpunca
 punca penuh rahsia
 tajam tidak menajah lawan
 melilit tidak memaut kawan
 tetapi melingkar penuh mesra.

This translates into English as:

In growth is source
 Rooted in mystery
 Its sharpness harms no foe
 Encircles nay a friend
 Yet together entwined in blissful harmony.

According to Ismail [3], motif is a main part of the decorative elements in woodcarving. Apart from this, it also acts as a vital base in other artworks such as painting, carving, and others. Motifs arranged properly in spaces would create beautiful patterns on the craft surface. It means terms of motif can be used to describe the whole of decorative elements. Elements inspired by nature are not directly copied into the design, but are transformed in simple or abstract shapes. She defined three basic developments in the creation of Malay traditional motifs. Arrangement of visual elements and motifs create a whole form, also known as pattern or design, in the Malay traditional crafts. Development of the motif form begins with the basic visual elements such as dotted elements, lines, and color. Siti Zainon also defined three basic phases of motif development which begins with dotted elements and lines, the form of the motif, and the last phase the arrangement of the motif. In the first phase, the dotted element will develop various lines such as horizontal, vertical, meander, intersection, spiral, and others. The second phase of the development defines the carving of the continuous long lines, meander lines, or curve lines and edging lines to create some forms. Most of the basic motif forms used in the traditional Malay craft are circle, square, diamond, hexagon, and the triangle which is also known as the bamboo shoot and others. The third phase is a combination of the same motif in one situation to create a pattern. Diversities enhance the appearance of patterns through positive and negative sides. In the third phase, Ismail [3] explained seven general patterns used as a decoration. They are known as the horizontal pattern, vertical pattern, slanting pattern, chess pattern, square lattice pattern, diamond pattern, and triangle pattern. The study discussed in this chapter employed Ismail's theory [3] as the methodology involving three basic developments of motifs in determining the structure in Malay traditional woodcarving motifs.

3 Study Problem

Nowadays, a lot of the traditional Malay woodcarving motifs are being used as ornaments in their design or artistic works. These motifs can still be found as photos in books, in the libraries, and as artifact samples in museums. Malaysia, in fact, has a lot of marvelous woodcarving motif designs and complicated designs. In addition, the techniques used in these woodcarving motifs vary accordingly. These days, there is a tendency for designers and visual artists simply to duplicate such motifs in their works without fully understanding their original content. The designers and artists have worked the final designs without any originality. Thus, there is an absence of originality in their artwork. Simplifying the motifs without any meanings defeats the creative and aesthetic elements of the Malay norms and cultures imposed by our ancestor craftsmen. Currently, most artists duplicate the traditional artworks without understanding the meaning and the beauty which lies behind them. Therefore this study was done in order to find the thoughtful processes behind all these inspiring woodworks.

4 Literature Review

Today, many young designers, artists, and architects cover up the weaknesses of the motif design according to their own standard without considering the aesthetic elements that should be included in designing motifs. The placement angle, structure, and the development of idea of the motifs are usually ignored. The action of ignoring the motif designs that should have their own meaning, creativity, and aesthetic norms, can be considered a disrespectful action towards the previous woodcarver and also his or her intellectual knowledge. Today, many of us tend to copy the motifs without understanding the beauty of the traditional woodcarving motifs. If this continues, there might be no more real woodcarving motifs in the future that contain the real aesthetic value of the Malaysian traditional woodcarving style. Therefore, it is vital for us to study deeply and in detail about the content of the motifs' structures before creating a new motif inspired by woodcarving activity. According to Tajuddin [4], modernization is the main issue that caused the problems in producing Malay woodcarving motifs. The question is how we study the structures within the woodcarving motifs according to interpretation of the elements and the aesthetic elements in Malay cultures today.

5 Research Methodology

The study aims to identify the structural design of Terengganu Malay woodcarving motifs. The study, which is carried out using a qualitative framework, employs two methodologies: historical and background study based on primary and secondary data, and practice-based research whereby the researcher carries out a visual art experiment from the ideation process such as sketches and drawings to a final contemporary artwork. Data are collected from varied sources and through a tiered process. Photo recording is the first method of data collection in which the researchers visited Balai Seni Ukir Wan Po located in Besut, Terengganu. Photographs that represent Terengganu Malay woodcarving are visually captured before they are analyzed in relation to the three steps proposed by Ismail [3]. Document analysis is carried out, among others, on Malay Terengganu woodcarving-related websites, books, newspaper articles, and pamphlets taken from galleries.

6 Findings

6.1 Basic Form—Basic Structures from Circle, Square, or Polygon

Before drafting, the two basic structures are referred to as the basic frame for plotting the motif (circle and polygon shape). According to Ismail [3], the first and second phases of motif creation in Malay traditional craft use the circle and polygon shapes as a basic frame. The circle is usually the basic shape but others such as the square, hexagon, triangle, and polygon can be used as well. All the basic shapes are also used as frames, serving as the border or boundary in constructing the motif structure. Selection of a shape as the basic structure depends on the final function either as a decoration or placement. Mohamed or Nakula's concept [5], about God and Universe has stated that the circle is the essence of Allah. The circle, based on the moon shape, symbolizes the "heart" whereas the sun symbolizes the "essence of God". Most of his concepts begin with the circle creating the symbol of the lotus flower, the moon, and the *Wau* (traditional kite). This clearly states that the shape of the circle has its reasons and meanings in the concept of God in Malay art interpretation. Critchlow [6] in his research about Islamic patterns based on the analytical and cosmological approach has defined that the circle is the basic shape for other polygons such as the square, hexagon, triangle, and other polygons. Because of its divisibility, the circle is the basis for all polygonal geometric design. However, Jamal [7] has included the cosmos element as one of the Malay woodcarving elements. From the basic circle, it divides into a general semicircle structure known as a *Potong Limau* (lemon slice) and a quadrant. The semicircle is usually used as the motif *Gunungan* on top of an entrance doorway. The basic square

structure is commonly used in Malay traditional woodcarving. The forms and motifs of Malay woodcarving have always been closely associated with the Malays' way of life and are illustrative of their culture, values, and beliefs. Many of the traditional motifs have symbolic meanings and form part of an extensive repertoire of designs reflecting a heritage handed down by generations of woodcarvers [1].

A square is a common structural unit for all polygonal designs, widely used in multiples of four. It is similar to the geometric element used in the Malay woodcarving motif as defined by Jamal [7]. The square shape represents a symbol of earth, materiality, and boundary between the internal and external world in which human behaviors have their limitation and guide. Symmetry and repetition are used to further emphasize and establish the idea of never-ending pattern, giving the impression of infinity.

Geometry enlightens the intellect and sets one's mind right. All its proofs are very clear and orderly. It is hardly possible for errors to enter into geometrical reasoning because it is well arranged and orderly. Thus the mind that constantly applies itself to geometry is not likely to fall into error [8].

This view is further supported by Ali [9, 10]. It is from the basic square that the design base can be expanded into a design base, that of horizontal rectangle, vertical rectangle, quadrant, and triangle in shape. The triangle represents the symbol of human consciousness. It is commonly used as a base for brackets (*sesiku*) reducing the sharp 90° angle, a principle of opposite (*berlawan*) in Malay aesthetics. Having chosen the basic structure, one of the four arabesque structures is needed in the Malay traditional woodcarving motif. Ismail and Lamy Al Faruqi [11] has defined the four different structures as the multiunit structures, the interlocking structure, the meander structure, and the expanding structure. The first two structures are discontinuous and the rest are continuous. Most Malay woodcarving motifs exercise one of these structures. In Nasir's [12] analysis, these four structures have similarities. He has defined three patterns in the woodcarving motif. They are the complete pattern (*pola lengkap*), the single pattern (*pola bujang*), and the combination pattern.

6.2 Basic Outline—Base Structure from Spiral

The next phase is the spiral and sinusoid lines used as the base structure to support the main motif structure. In the first phase, Ismail [3] has asserted that the creation of the spiral and meander lines (sinusoids) begins from the basic dotted elements or lines in the basic visual elements. In Malay woodcarving, the element of plants and the cosmos are integrated in a motif as the manifestation of nature's beauty and the great creation of Allah. Plants and cosmic forms are translated into a shape or structure based on the spiral. Humbert [13], in his study based on the mathematical geometry approach, the spiral completes the sinusoid as the structural basis for foliage and decoration. However, according to Jamal [7], the cosmic element *Awan Larat* is variedly translated as floating clouds, parading clouds, and meandering

clouds but the floral elements are based on the characteristic of the tendrils and stems as part of the Malay design. The variation of structural lines (spiral and sinusoid) has given a considerable range of possibilities, particularly in foliage decoration. The idea is also represented in Malay literature by Mohamed or Nakula [5]: "... sprouting, bending not pointing upward, pointing downward but not" [5].

Even in its stylizing technique, it symbolizes each character which is manifested in the philosophy of *Awan Larat* by Wan Po. "Craft as a totemic symbol of a culture's presiding spirit and sensibility embodies not only that people's way of life and idiolect, but the inner sanctum of their psyche and the bedrock of their enduring values" [14].

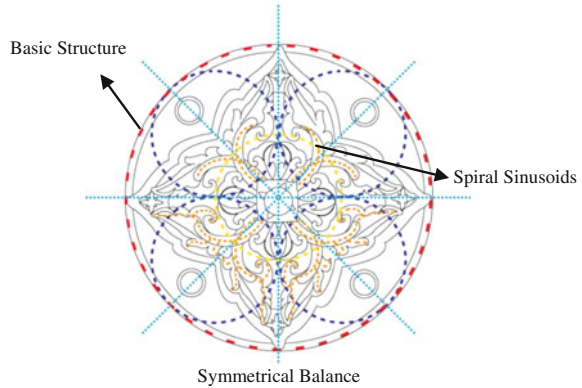
Nakula [5] described that the foliage in the woodcarving motif represents the nature of the plant's biological character and it relates to the character of the spiral and sinusoid structured lines. The sinusoid structural line comes as three basic characters, which are single-stranded (narrow or wide), double-stranded plait, and plait with two parallel strands. These characteristics are usually used in Malay traditional woodcarving to interpret the plant and cosmic elements of the Malay woodcarving motifs. A combination of two structural lines also creates intersection-like structures and other structures in the woodcarving motif. Mustafa and Su, the son of famous woodcarver Wan Su Othman, explains the rules of *Awan Larat* are:

1. The spaces have to be the same; that is, the elements must be evenly distributed over the composition.
2. The voids, or spaces between the elements of the composition, must be approximately the same size as the carved elements.
3. The elements must be plants, whether real or imaginary.
4. When there is a central motif or "ibu", such as a flower, leaf, branch, or vase, the design must be repeated around it. The carving, which results from an application of these rules, is generally spirally, creeping, or extended plants, with leaves, flowers, and buds.

6.3 Detailed Interpretation and Symbolization of the Motif

The last phase in the structure of the woodcarving motif base is a combination of the first and second phase structures with added details on each motif. The circular spiral structure lines are used to construct the details. This phase also represents the elements of the intricate beautifications and fineness of Malay aesthetics. Each motif symbolizes the meaning of the carving itself. For example, the lotus flower symbolizes purity and faith. Symbolism is part of the Malay aesthetic principles. Most of the elements used in woodcarving motifs have their own meaning and interpretation. Symbolic meanings in the woodcarving motifs are influenced by Malaysian customs, religion, daily life activities, and nature. Examples of the plant elements used in a woodcarving motif are the *Bunga Cengkih* (clove flower) which

Fig. 1 The basic structure development to create Malay traditional motifs



is used as an herb and spice for flavor and sweet smell in traditional cooking. The *Bunga Teratai* (lotus flower) is used in woodcarving motifs to symbolize faith, belief, and purity of the human character. The *Ketam Guri*, a flower, is usually used in woodcarving motifs to symbolize *Semangat* or spirit. Please refer to Fig. 1.

Jamal [1] says that the cosmos has inspired Malay carvers to create designs featuring the sun, moon, and stars, sometimes seen adorning the gables of homes and roofs of mosques. Other natural elements are also depicted in traditional architecture. For example, a mountain is represented in the architectural roof-like style known as *atap tumpang*, also known as *masjid bentuk meru* (mountain-shaped mosque), and mountain ranges have inspired the creation of scallop-like carvings known as *gunungan*, frequently featured on roof eaves. The arabesque *awan larat* (as explained above, translated variously as floating clouds, parading clouds, meandering clouds, or meandering pattern) is another commonly used Malay motif in many art forms. The value of woodcarving is not only for decoration alone, but also as a symbol for other meanings. The symbol is a factor that ties between content and form. The flourishing flower motif symbolizes beauty and praises nature and has been used by many artists and writers. Most woodcarvers have this agreeable notion that the open flowers' woodcarving petals have a greater satisfactory sensation compared to the closed ones. "...Everything in nature begins from the seed. (Human being comes from the 'seed' of husband and wife.) Trees from the seed, or sprouting, bending not pointing upward but pointing downward yet not weakening" [5].

Mohamed [15] says that the Malay concept of beauty is related to the concept of "truth and goodness" that corresponds with al-Ghazali's notion of beauty, referring to the outer as well as the inner aspects of beauty. In other words beauty is not only perceived through the five senses but its appreciation goes even beyond the soul [16, 17]. According to Ali [9], there are six principles that constitute the Malay's concept of beauty:

1. Refinement, which refers to the sense of refined sensitivity with artistic sensibility and skillfulness.

2. Functionality that stresses the practical function of the artifact in addition to its beauty for visual attraction.
3. Unity, which seeks to combine the various elements that provide the framework of an orderly compositional structure.
4. Contrast refers to two or more different various qualities of opposite characters, which create a sense of harmony that results in a dynamic composition.
5. Symbolism, which reveals the symbolic meaning of certain objects to unify form and content that man has to go through in order to make his journey towards God.

6.4 Craft Education Artwork

The topics of motif and pattern creation according to culture, tradition, and heritage are incorporated in the visual arts syllabus at the primary and secondary school levels. In the primary school curriculum, either KBSR or KSSR, students are encouraged to produce art pieces to demonstrate their appreciation towards the arts and our heritage. At the secondary school level, the introduction and stress on arts crafts such as batik, embroidery, crocheting, ceramics, and so on need the students' creativity in creating and interpreting the respective crafts and their traditional motifs. Hence, through the study done on structures of Malay woodcarving, students would be able to create new motifs according to the steps discussed above.

At the university level, Universiti Teknologi MARA, for example, programs such as Arts Education in the Faculty of Education as well as Faculty of Arts and Design are offered where students have to attend a number of courses such as Craft Design and Function (ADE630) and Craft Design and Society (ADE 680). Both courses require students to expand their ideas in creating new motifs for arts and crafts products including batik, embroidery, kites, ceramics, book crafts, shadow puppets, and others. Hence, with the three-step approach in creating a motif through Malay woodcarving structures, students will be able to apply them in creating new motifs in their art pieces.

7 Recommendations

The Malaysian woodcarving industry, particularly traditional woodcarving, has its own sets of challenges. High costs and the absence of modern technology in its production have limited its production volume. Its industry has to compete with imported carvings from Indonesia, Thailand, and China due to their low selling price. Modernization also affects the selling of traditional woodcarving [18] products as many households prefer modern concepts for their home interiors, and are willing to pay a high amount of money for these imported products. In the

attempt of better repositioning of woodcarving products in the market, improving the perceptions of Malaysians towards woodcarving products and quality upgrade, several recommendations are made [19]. First, society has to be made aware of the importance of upholding the value of traditional products, the understanding of the role of traditional woodcarving, and its place in society. This can be achieved through education as it is the most effective means in reaching all Malaysians. At primary and secondary school levels, the topics of motifs and patterns of traditional Malay woodcarving should be incorporated in the syllabus. Students should be given the opportunity to create their own masterpieces according to the three stages discussed in this chapter. At the tertiary level, the students pursuing arts and craft-related [19, 20] courses should be exposed to traditional Malay woodcarving to enhance their appreciation of the culture, tradition, and heritage.

Second, the arts of traditional Malay woodcarving should be transferred to other media such as the fashion and design industries. This is one of the ways to ensure the continuous existence of traditional Malay woodcarving [21]. Fashion designers should try to adopt the motifs and patterns of Malay woodcarving in their designs, either for traditional or modern apparel. These motifs can also serve as the design for fabrics and textile used for clothing, curtains, tablecloths, and other household items. It can also be upgraded as a corporate logo and used in the name or business card, and as a letterhead. Researchers who wish to delve in the same area might want to study the aspects of potential and marketability of traditional Malay woodcarvings. Very few studies have been carried out in this area and the findings from such studies would feed information to the woodcarving industry of the means to market the products to the target and potential markets.

8 Conclusion

In conclusion, this study describes the connection between the motifs of the traditional Terengganu Malay woodcarving artworks with Malays' philosophical values. The aesthetic values of the Malay's traditional style are also stressed. It is important for the new generation to understand fully the process of creating the motifs. This would ensure that the motifs carry along the original values and the heritage and traditional culture can be preserved. It is hoped that by deeper research and further future research, the production of the motifs by the younger generation will be done with real understanding of the traditional motifs without being affected by global modernization.

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Utilisation of the Research Workbook as an Assessment Tool in Promoting Cultural Awareness and Understanding

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Abstract This chapter discusses the utilisation of the research workbook as an approach in enhancing trainee teachers' understanding of cultures, and encourages the effort in manifesting this understanding through their creative endeavours. The research workbook is an important requirement in the assessment of two courses offered by the Art and Design Education Program, Faculty of Education, Universiti Teknologi MARA (UiTM). Trainee teachers pursuing a bachelor's degree in education (art education) with honours are required to undertake the courses of Craft Design and Function (ADE630) and Craft Design and Society (ADE680). The RWB accounts for 40 % of the overall assessment structure for both of these courses; students embark on studio-based research in completing their RWB. One of the essential research areas is the culture from which the selected craft originates. Hence, the discussion in this chapter revolves around how the implementation of RWB as an assessment tool allows the trainee teachers to deepen their knowledge about various cultures and the roles of these cultures.

Keywords Art and design education · Faculty of education UiTM · Research work book · Studio based research

1 Introduction

Knowledge and understanding of the variety of cultures that exist are important assets for trainee teachers, especially for courses involving crafts and culture. It is not only that cultural awareness is an important aspect for trainee teachers, but the

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understanding of how the different cultures work and shape the landscape of Malaysia's lifestyle and quality of life is equally important as these trainee teachers would one day become educators who help in moulding the nation.

2 Craft Education and Cultural Understanding

Four aspects have been identified as precursors in the development of knowledge: culture, quality of life, cognitive, and health [1]. In the learning of visual arts, the understanding of culture and the awareness of its importance are crucial in enhancing the way cultures are perceived. Artwork is regarded as more meaningful when it succinctly and effectively portrays the lifestyle and setting of its subjects. The national curriculum for visual arts prescribes that the learning of visual arts be manifested through various culturally-based visual art activities [2]. The importance of culture in the learning of visual arts is supported by Isa [3], stating that the understanding of culture that emerges from visual art activities can potentially improve students' appreciation of various cultures which may affect their thinking styles and also the style of artworks produced by the students.

In instilling understanding and appreciation of the myriad cultures that coexist in Malaysia, the Art and Design Education program of the Faculty of Education, UiTM incorporates culture appreciation in almost all aspects of its teacher training curriculum, however, two courses are specifically designed and carried out to promote and embed cultural understanding: Craft Design and Function (ADE630) and Craft, Design, and Society (ADE680). The assessments for these courses, through the completion of the research workbook (RWB) and artwork production with the focus on traditional and contemporary craft through studio-based research method, are hoped to produce the washback effects of cultural understanding, empathy, and appreciation. This effort is in line with the National Education Philosophy (NEP) that aims to produce individuals with commendable personality, balanced, and in harmony with intellectual, spiritual, emotional, and physical development.

3 Research Workbook (RWB) as an Approach in Craft Education

A research workbook (RWB) documents the processes involved in visual arts research, containing information in the forms of visual sketches and writing. It is a record of the expression of ideas which is supported through readings and observations as well as analysis of photographic images, sketches, drawings, video recordings, websites, and the like. Grauer and Anami [4] defined RWB as 'similar to, yet different from a sketchbook. It is kept as a type of journal, the content

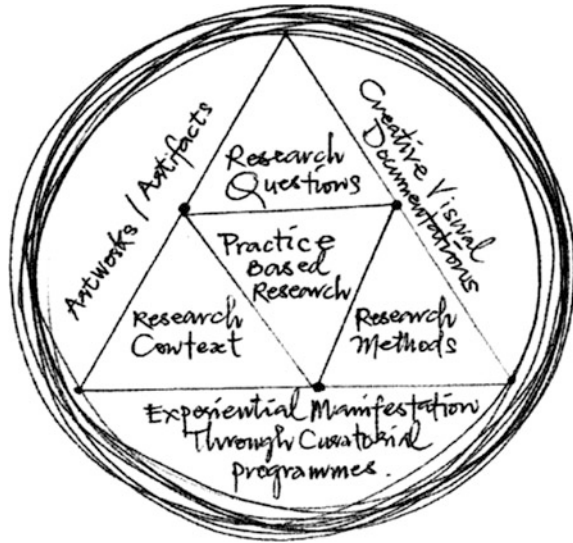
showing visual thinking, narration, reflection, goal setting in a variety of forms: drawing, sketches, collages, photographs, graphics, and personally meaningful symbols. Words invariably become an important part of the RWB, as describe (narrate) and support depictions, becomes graphic devices, aids reflection on personal theme and metaphor' (p. 14). Anwar et al. [5] informs us that research which took the nature of practice as its central focus was called 'practice-based' research. This particular research was carried out by practitioners such as artists, designers, curators, writers, musicians, teachers, and others, often, but not necessarily, within doctoral-type research programmes.

3.1 RWB as a Pedagogical Approach

RWB provides trainee teachers with the opportunity to embark on idea exploration and carrying out visual research. In the art and design education program, RWB calls for 40 % of the overall assessment structure. Such weightage reflects the important role of RWB as a tool that demonstrates students' skills and knowledge. The trainee teachers are required to produce RWB for all studio and computer-based tasks, particularly for the final art projects. Amongst the important aspects which are considered in producing the research workbook are aesthetic values, national culture, sociological aspects, individuality, solutions to problems on creativity, and critical and innovative thinking skills. In a practice-based research, the production of artwork, be it in craft education or in other art-related fields, starts with the RWB. Hassan [6] asserts that in RWB the usage of the word 'I' or 'the Artist' is important as it relates the experience in producing the artworks. This includes the artists' experience and observation of the experimentation of their own artworks. This is known as an *artist statement*, which is being used in universities that offer post-graduate programs in visual arts such Pratt University, United States and Wollongong University, Australia. This leads to the explanation of the artist's own preference such as a book written by Datuk Syed Ahmad Jamal titled *Rupa dan Jiwa*. From the view of practical-based studio research, the visual is a form of documentation of the art pieces manifested in RWB and this soul is a value of intuition and emotions of the artist related to the inner issues raised by the artwork.

Abdullah (2010) regarded the preparation of the RWB as a main criterion for studio-based research, a paradigm shift towards curriculum renewal and the coursework of the syllabus for the National Visual Arts Education. The clear explanation by Abdullah (2010) and also the precise definition about the practice-based research by Anwar et al. [5] are important in the production of the RWB. Apart from that, artists should also consider their own local or international references. The purpose is to ensure that the trainee teachers have their own style examples and certain streams to inspire them in creating new artworks. In producing new artworks, trainee teachers must also make art criticism of the artist to whom they have made reference either in their research workbook or in the craft artworks.

Fig. 1 Practice-based research framework (Abdullah 2010)



Abdullah (2010) proposed a guiding framework for practice-based research. In this framework, the author identified a number of aspects pertinent to any practice-based research. He added that practice-based research should be developed based on the needs of practice and practitioners; and that research strategy, predominantly research methodologies, should be carried out according to specific methods familiar to visual art researchers. Gray and Malins [7] indicated that the process of visualizing research, particularly practice-based research, involves developing and making creative work as an explicit and intentional method for specific research purposes and distinct from practice and making it accessible, transparent, and transferable (in principle if not specifics); the work might embody the research concept, provide visual evidence, and illustrate findings in some way. Figure 1 shows the practice-based research framework [8].

4 Recommendations

Malins et al. [9] defined the concept of practice-led research as research initiated in practice and carried out through practice. Malins and his coauthors believed that practice-based research is the most suitable form of research in the visual arts field as such studies shed light in relation to existing skills and implied knowledge in topics related to the visual arts.

Gray [10] also mentioned some of the specific methods used in practice-based research in relation to information gathering. These are summarised below:

1. Making art and design work
2. Observation and drawing (in all forms)

3. Sketches or notebook, idiosyncratic notation or symbol
4. Visual diaries, self-reflection, personal narrative, or critical writing
5. Photography and video sound
6. Models and experimentation with materials
7. Concept mapping and diagrams
8. Use of metaphor and analogy
9. Organisational and analytical matrices, flowcharts, storyboards
10. Multimedia, hypermedia applications
11. Modelling, simulations, and soft systems
12. Electronic databases, visual and textual glossaries and archives.

Craft, Design and Function (ADE630) exposes the trainee teachers to a number of traditional crafts such as hand-drawn batik (batik pelangi, batik cop, etc.); printing including lino printing, silkscreen printing, and mono printing; weaving; and embroidery (tekatek and bead). Trainee teachers are also presented with the opportunity to expand their knowledge with traditional crafts such as shadow puppets, kites, ceramics, craft books, and woodcarving through their involvement with Craft, Design and Society (ADE680).

4.1 RWB as an Assessment Tool

RWB is a form of portfolio assessment, as it documents the processes involved in undertaking studio-based research (Abdullah 2011). Similarly, the portfolio is a compilation of student work with a common theme or purpose [11]. Griffin [12] perceives the portfolio as a mean of showcasing students' depth and breadth of skills and knowledge through the selection of annotated and validated information. Portfolio assessment is considered as a more authentic form of assessment as compared to the traditional pen-and-paper test which provides indirect evidence of student learning [12]. A portfolio can be assessed with a focus on process or product or with both process and product emphasis. Though the aim is to see the end product (product), the learning that students have acquired while carrying out the assessment can also be taken into consideration (process). Hence, RWB is a powerful assessment tool as it would provide teachers with evidence of learning what the students are able to achieve at the end (summative) and the learning (formative). The value of artistic studies particularly in carrying out RWB-related tasks involves higher-order thinking skills and it requires intellectual force and, sometimes, inspiration through feeling and emotions. Communication via visual means is not complete if the context of culture and society is not included.

Successful completion of RWB is the result of student engagement in three domains of learning. Not only does RWB demonstrate students' cognitive skills and abilities (cognitive domain), it is also evidence of creativity: a construct that heavily embeds the affective domain. RWB also documents processes and steps that reflect learning within the psychomotor domain.

4.2 *RWB: Assessment Requirements and Criteria*

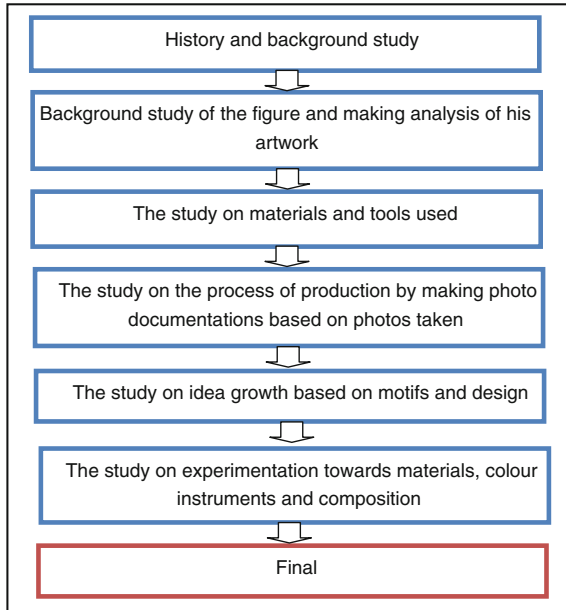
The RWB produced should comply with the requirements outlined in the courses of ADE 630 and ADE680. Consisting of at least 40 A3-sized pages, the focus on creative writing and art criticism is expressed through growth of ideas, with elements of exploration that centre on artistic principles. The RWB should document the trainee teachers' experiments with media and materials and produce the RWB in a manner that is almost similar to a sketchbook, scrapbook, or portfolio but with a more structured direction in relation to content and format. Exploration of styles and art materials as well as experimenting with techniques is compulsory.

1. *Critical Reflection*: Designers/artists do reflection and consideration pertaining to sketches.
2. *Art Criticism*: Designers/visual artists critique sketches to see the accuracy and application of art and design elements.
3. *Comment Writing*: Communication in the form of comments or writings detailing important details.
4. *Dialogue*: A form of interaction between the designer and the sketch to see the impact of the sketch.
5. *Experimentation*: A form of research to see the ability and effects of experiments on certain methods, techniques, and items used in sketches or products.
6. Idea Exploration
7. *Inspiration*: Of sketches from early ideas either in borrowed form, what is already available, or something that is being innovated.
8. *Growth of Idea*: The growth of idea is in the form of progressed sketches from idea exploration (sketches, pre-sketches, comprehensive, precomprehensive, thumbnails, drawing, final drawing). Research is either in the form of new creations or modification of a sketch. It is usually used in graphic design courses and development of animation and multimedia.

Trainee teachers are expected to produce RWB that fit the following characteristics.

1. Clearly demonstrates, in visual and written terms, how personal research has led to an understanding of the topics (ideas) being investigated
2. Produces artefacts in the use of creative thinking models to show how ideas are developed, and experimentation to find solutions to visual and technical problems
3. Produces artefacts that show critical analysis about meaning and visual qualities of an art using an informed vocabulary
4. Shows awareness of cultural, historical, and social aspects of themes from more than one perspective
5. Produces artefacts on your reflections on their performance and processes of their own completed artworks within the context or art.

Table 1 All the subjects offered by visual arts education



In the production of RWB in both ADE630 and ADE680, the trainee teachers are required to select their topics based on the given syllabus. Table 1 demonstrates the RWB production.

4.3 RWB and Future Learning

Image development is a constant challenge for artists and teachers alike. The nature of documentation encouraged by RWB is not only the perusals of artists. History shows that great thinkers have been recording, documenting, and reflecting on their ideas using various visual forms. One can easily envision Edison’s light bulb sketches, Da Vinci’s flying machine, and recently Stephen Hawking’s space–time diagram. This form of documentation is a record of thinking and a step towards reflection and metacognition. Some examples of artists employing RWB and/or sketchbooks are Pablo Picasso, John Singer, Lee Kian Seng, Villard d’Harnoncourt, Frida Kahlo, Henry Moore, David Smith, George Back (watercolors), Ella Libermann-Siber (WWII confinement), and Dan Eldon (activism in Somalia, murdered at the age of 23). In addition, well-known Malaysian contemporary artists such as Amron Omar, Jalaini Abu Hassan, Ramlan Abdullah, and Yusof Ghani also utilise RWB in producing their artwork. A number of artist/educators such as the

late Datuk Syed Ahmad Jamal and Prof. Dr. Abdul Shukor Hashim also stressed the importance of exploring the RWB concept in producing their art work and included this in the teaching and learning of the art courses.

Thinking about how we think moves, reflects, and allows us to look beyond the immediate situation. This is essential in the world that is continuously changing. As an art educator, the routine and use of RWB is beneficial to inculcate learning and understanding of cultures and of various cultures. As a visual arts educator, the use of RWB is something that must be included in everyday teaching and learning situations. The lecturers in studios should guide their students to explore and provide them the necessary and appropriate tools, media, and techniques.

5 Conclusion

This chapter discusses the use of RWB as an approach to enhance trainee teachers' understanding and appreciation of culture(s). Through craft education courses, preliminary research through the employment of RWB is necessary in the production of high-quality artwork. In addition, the use of RWB expands student knowledge with regard to traditional crafts and the role they play as national assets and legacy.

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Appropriateness of Animated TV Advertisements in Creating Awareness of Truancy Among Secondary School Students: A Case Study in Klang, Malaysia

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Abstract In this study, the use of animation in television advertising was studied based on the specific target audience and its main issue which is school truancy. The purpose of the study was to identify whether an animated TV advertisement is a useful tool for creating awareness among students. Opinions from experts with different backgrounds, including an animation practitioner, a teen's psychologist, a media-related person, as well as parents and school students helped to determine the appropriateness of animated TV in creating awareness of school truancy. A survey conducted with the target population of secondary school students has established that animated TV advertisements can be an effective means for transmitting messages concerning school truancy. Most of the secondary school students agreed that the animated TV advertisement was attractive. However, when the Likert scale was used to measure how strong the answer was, the result was not as impressive. There are different feedback and opinions regarding different aspects of the prototype. The most important factor was the quality of the animation. Thus, a good quality of animation has a relation to a student's interest in viewing the animated TV advertisement.

Keywords School truancy · Animated TV advertisement · Secondary school students · Creating awareness

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1 Introduction

Truancy is a discipline problem among students that reverberates with the community at large. According to the Ministry of Education, truancy is the second most common problem in a list of eight discipline problems among students. Only “improper behavior” is a more common discipline problem, whereas crime-related activity, wasting of time, cleanliness of clothing, naughty behavior, vandalism, and obscenity make up the less common disciplinary problems [1]. Generally, discipline problems among school students were connected with the students’ behaviors such as vandalism, truancy, smoking, lingering around and wasting time, being rude to teachers, improper appearance, free littering, and many others [2]. These problems might seem to be small problems but when they occur repeatedly a larger problem arises that can affect the future of the students. Over time repeat offenders can become involved in bullying, gangs, drug abuse, murder, and rape. Therefore, it is important to find an effective means of communicating the risks of negative behaviors to students, with a goal of early prevention. If made aware of the dangers, perhaps the students will not head down the wrong path.

Animation, in the form of television advertisements, might be one method of reaching today’s students. Animated TV advertisements have the potential to be a medium in channeling messages to school students concerning truancy. Animation is a communication technique which is produced in a creative way and has its own appeal. The statement saying animation is a communication technique is supported by Lasseter [3] in his article, where he claimed that animation is not only an art form but also a technique of communication that denotes entertainment. Thus, animation is an art form in which the idea is visually communicated. However, one should learn about basic graphic design, which is the vocabulary and grammar of graphic communication, to communicate ideas clearly by visual means. To achieve an idea that has more impact and can be absorbed and retained by audiences, one should design an image that can communicate the idea clearly. Yet communicating the idea visually is insufficient without entertaining and interesting aspects.

In addition to communication, a goal of animation is to entertain. This fact was supported by Lasseter [4], who noted that the first purpose in animation is to entertain. He also noted two concepts that the animator should clearly understand: first, the goal is to entertain the viewer, and second, he or she must have the tools and skills necessary to execute the ideas. These two aspects are connected to each other. Ideas and skills combined with tools can produce great animation. Klynn [5] added that one can use humor or serious presentation of material to help connect to the audience which can be efficient in transmitting information. Animation can adjust itself to almost any subject and can convey a broad diversity of material with its distinctive voice.

Animation may be the most flexible and far reaching of all forms of communication, as it is limited only by one’s imagination. Lee [6] mentioned that animation has the great combination of story and art, music and imagery, fantasy and myth. Technology available to today’s animator, such as computer animation

tools and virtual reality, makes animation more possible than ever before, with fewer hours invested. Cartoons or animations have been used in television advertisements since the inception of television and animated television advertisements were produced as early as the 1940s [7]. Animation has continued to flourish in TV ads ever since.

This chapter is organized as follows: Sect. 2 covers the methodology employed in the study. The results and discussions are presented in Sect. 3 and Sect. 4 concludes the chapter.

2 Methods

In this research, a hypothesis testing was conducted with secondary school students aged 15–17. It was to investigate whether a particular animated TV advertisement was able to attract the secondary school students. The survey carried out in this research aimed to obtain opinions from the samples. Thus, this study used survey research as the research methodology. Questions such as, “Do you think this animated TV advertisement is appropriate in creating awareness concerning school truancy?” and, “Do you think that this animated TV advertisement is attractive?” are priority needs in this research. The objective of the survey was to determine whether the animated TV advertisement concerning school truancy was appropriate for the school students. No existing local television animated advertisement concerning school truancy could be found, thus an animated TV advertisement was created based on an interview from respective panels, animation practitioner, teen’s psychologist, media-related person, and parents as well as a perspective from secondary school students. The respondents were from three different schools in Klang, Selangor. School A consisted of only male students, School B consisted of female and male students, and finally School C was a religious school consisting of male and female students. The questionnaires were distributed to the secondary school students aged 15–17 regardless of race and gender. The students used as samples included those with records of absent without reason (truant), absent with reasons, and those with full attendance records. A random sampling process was chosen to collect the sample from the target population (Fig. 1). Thus, everyone in this target population had an equal opportunity to be selected in the sample.

Primary data as well as secondary data were obtained in this study. Primary data questionnaires were in the form of open-ended as well as closed-ended questions. Open-ended questions were used to get more information regarding the issues raised in this study [8]. The responses from panels in the animation industry, a teen’s psychologist, a media-related person, and parents as well as secondary school students were vital in this study. Their opinions led to the development of the animated TV advertisement. The diversity of their backgrounds brought about an interesting variety of insights. The interview questions first ask for an opinion of the panels regarding animated television advertisements and if the animation were suitable to be used in public service advertising, and then the questions led to the

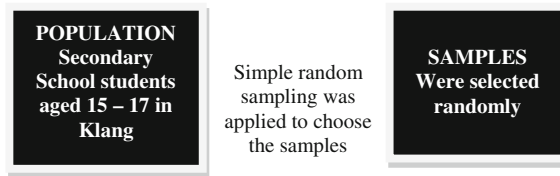


Fig. 1 Sampling process

main subject, which is the implementation of animation in public service advertisements for secondary school students regarding school truancy.

Later, they were asked to give their opinions on the prototype produced by the researchers concerning school truancy. The questions asked were in reference to the contents of the animated TV advertisement and whether they thought the prototype was attractive or otherwise, in delivering the message concerning school truancy. Because there were examinations at the time data were collected, interruptions were forbidden. Therefore, the animated TV advertisement was presented outside the school area, and students viewed the animated TV advertisement from a laptop put on a stool in front of them. After watching the ad, the students were asked to answer the questionnaires.

3 Results and Discussions

Surveys were one of the methods used to obtain quantitative data concerned with obtaining statistical inferences rather than describing meaning. A set of close-ended questions concerning secondary school students' opinions of the animated TV advertisement prototype was put into a questionnaire and given to the sample population. Analyses of frequencies of the survey data helped in finding the majority's responses and identifying the different responses between the levels of categorical variables of the secondary school students. The graphs were used to represent the data collected for frequencies. The questionnaire was divided into four parts: Part A was about student's understanding of the animation; Part B was about student's responses towards the animated TV advertisement prototype; Part C was the recommendation and suggestion regarding school truancy; and Part D was the profile of the respondents.

Although 101 questionnaires were given out for the survey, only 72 samples answered: 13 of the questionnaires were returned blank and 16 were rejected because the questionnaires were returned incomplete. Analyses of the frequencies and cross-tabulations of the data were made based on 72 respondents and 29 of the respondents considered were rejected, based on insufficient and incomplete information. The discussions were based on the following questions.

3.1 Question 1: Do You Think the Animated TV Advertisement Prototype Is Attractive?

Figure 2 shows the percentage of respondents who found the prototype attractive. Overall, 77.8 % of the respondents agreed that the prototype was attractive and 22.2 % thought the prototype was not attractive. However, when the attractiveness of the animated TV advertisement prototype was evaluated in terms of its content, special effects, character, slogan, concept, storyline, genre, color scheme, jingle, and animation quality, there were variations in opinion from respondents on how they evaluated the attractiveness of the prototype. The Likert scale was used to see the ranks from strongly agree, uncertain, disagree, and strongly disagree. For the content, most of the respondents either “agree” or “strongly agree” that the prototype was attractive with the percentage of 55.6 %. This was followed by special effects used in the prototype with 51.4 %. Character, slogan, and concept used were 48.6 % for each element. Storyline, genre, color scheme, jingle, and animation quality were 47.3, 45.8, 44.4, 40.3, and 38.9 % respectively.

Figure 3 shows the 10 elements that were used to evaluate the attractiveness of the prototype. Animation quality was the most important element above all. Poor

Fig. 2 Percentage of respondents who found the prototype attractive

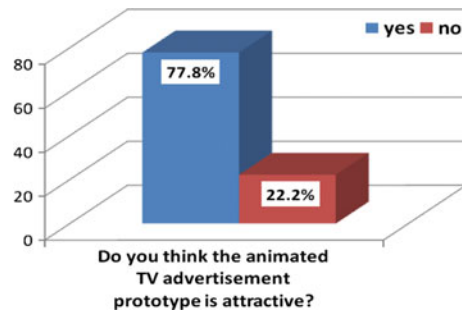
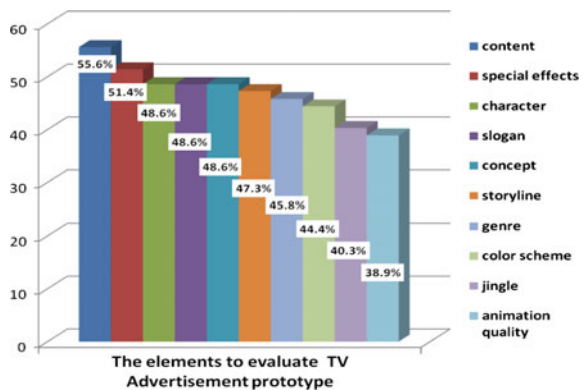


Fig. 3 Elements to evaluate the attractiveness of the prototype



animation quality resulted in the failure to gain attention from this young generation. Though other elements could support the overall TV advertisement, the quality of the finished product was important.

3.2 *Question 2: Is This TV Advertisement Giving You Good Information on School Truancy?*

Figure 4 shows most of the respondents agreed that the animated TV advertisement gave them good information on school truancy. Of the respondents 61 (84.7 %), said “Yes” to the good information contained in the animated TV advertisement and 11 of them (15.3 %) did not agree with the statement. The research showed different views from the students. Though 11 respondents disagreed that the animated TV advertisement was attractive, information on school truancy still could be transmitted. Regardless of their interest in attractiveness, they mostly agreed that the message was delivered to them.

Although there were only 56 respondents who commented on the attractiveness of the prototype, all of the 72 respondents had the same opportunity to give comments on the content of the animated TV advertisement.

3.3 *Question 3: Do You Realize that Truancy Is a Form of Juvenile Delinquency After Watching the Prototype?*

Figure 5 shows 83.3 % of the respondents agreed that they realized truancy is a form of juvenile delinquency after they watched the prototype, but 16.7 % respondents still did not know that truancy is a form of juvenile delinquency.

Fig. 4 Responses to the animated TV advertisement on school truancy

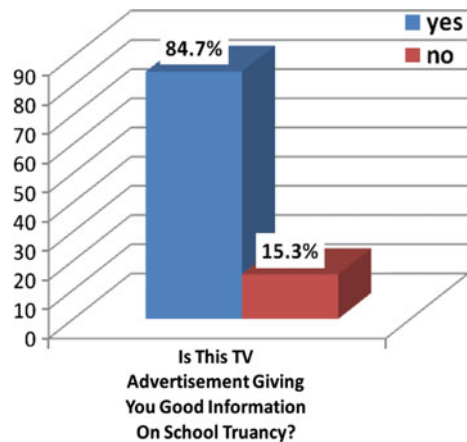
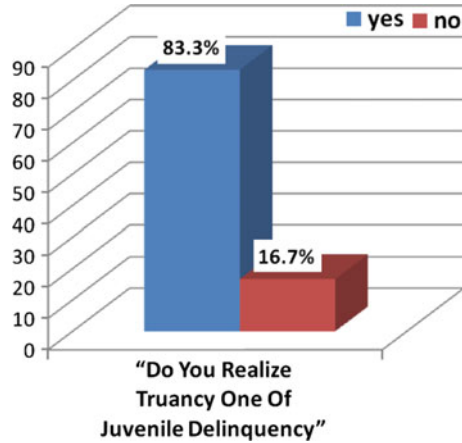


Fig. 5 Responses to question 3



4 Conclusion

Secondary school students from three schools in Klang, Selangor were chosen as the main target audience in this study. The animated TV advertisement prototype was viewed by these students before responding to the questionnaires. Overall, the prototype was accepted by students and most of them agreed that the prototype was attractive. The Likert scale showed attractiveness problems when students were asked in depth about the individual factors influencing the attractiveness of the prototype. A large majority of them agreed that they understood the content, even if there were issues around animation quality. They agreed that they actually had acquired good information on school truancy. Most of the students were aware that school truancy was appalling and some of them understood that they would get arrested if they were truant, and that the police could easily find them. Students indicated quality of animation to be the most important factor in the advertisement's attractiveness. Nevertheless, the animated form can be successfully used to communicate a serious message to secondary school students.

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Analysis of Ergo-Aesthetics Assessment: A Case Study of Public Park Benches

Velu Perumal and Khairul Adlin Azlin Rahman

Abstract Urban parks are recognized as an important feature that may improve the quality of urban life. Therefore, it is essential to design user preferable parks and accessories such as benches. Results show the lack of attention towards anthropometrics and user preference factors in designing have made these benches become unfavorable to the users and may even induce stress. This study aimed to redefine user preferences factors and the need for the ergo-aesthetic design method model. As a conceptual framework, this research study included a review of previous research relevant to the scope of “user preferences” in relation to various designs. A case study involving qualitative and quantitative method was used in this research in investigating reasons behind user’s preferences towards park benches. The case study was conducted among Putra Perdana Public Park, Putrajaya’s visitors. It is expected to serve as a reference point for future parks and their accessories design development in Malaysia. The research findings proved the lack of ergo-aesthetic factors on park benches and the need for an ergo-aesthetic design method model.

Keywords Ergo-aesthetics · Benches · Public parks

1 Introduction

Recently, demonstrating urban environments with parks has become a common practice. Terms such as “public open space”, “urban parks”, or “public parks” may show some contrasts in terms of reference, but they reflect similarities in their intended purposes. Frequenting public parks is not a Malaysian culture. It was

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brought here by colonials in the 1890s [1]. After independence, these parks were opened to the public. Since then the parks' image and usages changed greatly [2]. Presently parks are associated with health and recreation and thus demand for them has enormously increased. This is due to the upsurge in urban population and awareness about the importance of parks [3]. This is due to recreational parks being strongly linked to the element of 'distress' and comfort [4].

As a result, the Malaysian government has been giving high importance to public parks or open spaces. In 1994, the Malaysian government implemented the "Garden City" concept to guide the development of Putrajaya, a new Federal Government Administration Centre. Putrajaya is a modern city that showcases the best of Malaysian architectural design in an environment-friendly setting of beautifully landscaped lakes and parks. However, to test the park's effectiveness in terms of serving its purpose, it is still highly dependent on its benches.

Evidently ergonomically appropriate and aesthetically pleasing benches will encourage the public to frequent these recreational parks. Likewise, it's expressed that good bench designs in parks would give physical and mental comfort [4]. However, it is still a question of whether all the benches are preferred by the user public. Designs of these benches are based on western anthropometry that is also closely related to climate, history, and lifestyles that may not be preferred or suitable for the Malaysian public and environment. And this may lead to disuse and neglect of the parks. This is mainly due to lack of research on benches at public parks [4] and there is a lack of Malaysian anthropometry data available for Ref. [5].

Designers are always seen in a dilemma to finalize their design solutions because they have to consider many factors in the due process of generating design solutions [6]. Moreover they are always skeptical about their enthusiasm and acceptance of a new design by the individual users or the general public [7].

This phenomenon becomes more complex when the designers fail to consult the experts before finalizing the design [8]. Ergonomics and aesthetics are the most important factors or values that need to be addressed by designers in their design. Research also shows that aesthetics has always played a vital role in the success of a product or system. However, the problem arises when the designers fail to highlight aesthetics as an integral part of ergonomics studies and not regard it as a central topic of human factors research [9].

Emphasizing the beauty and the needs of ergonomics is essential for designers to win the user's trust. Thus, this chapter is intended to identify the common keywords to formalize the understanding of ergonomics and aesthetics among current designers and design study undergraduates. This chapter also identifies and describes various reasons behind the most user-preferred, preferred, and less-preferred benches at Putra Perdana Public Park. And finally this chapter explicates the factors that designers essentially need to consider in the process of designing public benches.

In addition to that, the objective of this research is to identify the need for ergo-aesthetic principles in enhancing park benches. A case study method was used to meet the objective. The case study is about surveying a person, group, episode, process, community, society, or other unit of social life [10]. Thus, the case study method is considered suitable to derive conclusive responses on the factors that

Fig. 1 Putra Perdana public park

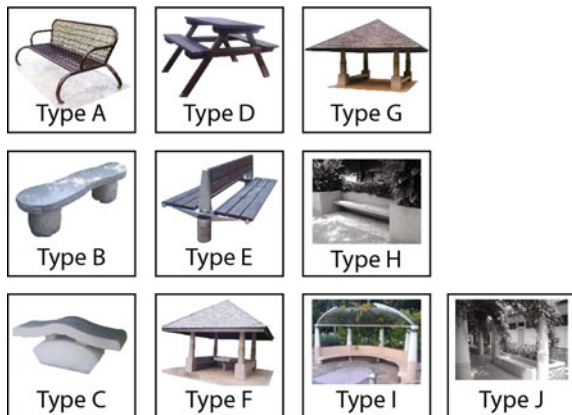


influence user preferences of park visitors towards its benches. Benches at Putra Perdana Park, Putrajaya were selected as a case because they are expected to represent other parks in Malaysia [11].

Putra Perdana Park is located at the peak summit in Prescint 1, Putrajaya. Encircled by a beautiful boulevard called “Persiaran Sultan Salahuddin Abdul Aziz Shah,” this park stretches over an area covering 159 acres (Fig. 1).

The location of the park extends itself well to project a panoramic view of Putrajaya with all its other attractive elements. Putrajaya is Malaysia’s Federal Government Administration Centre which substantiates the creativity and innovation of the country’s urban development. It is also classified as “the first Intelligent City in Malaysia,” a vibrant and lively place to attract people. The park serves as one of the attractive landmarks in Putrajaya which attracts both local and international attention [12]. Thus people tend to stay for longer periods if the benches serve the purpose. Well-equipped and maintained parks with good access play a vital role in increasing real estate, tourism, and environmental benefits, in addition to providing health, community, and social integration [13]. The park provides 10 types of seating objects to offer comfort and a memorable visit to the park’s visitors (Fig. 2).

Fig. 2 Types of benches at Putra Perdana public park



1.1 Determining and Defining the Research Purpose

In the new millennium, “state of art” of public places such as parks is necessitated by visitors. These features inevitably increase user demand within the “user-centered design” world [14]. Benches are one of the important features in achieving a park’s purposes. Thus, to understand user preferences of benches in parks, the researchers began by reviewing previous research ([15–45]; Fig. 4). Nine most-cited user preference factors were identified for further studies.

The purpose of this study was to chart out the application of ergo-aesthetic features in enhancing the user preference scale of benches at public parks. This study explained further why visitors are inclined to sit only on some benches and not others. The researchers were primarily interested in determining whether the ergo-aesthetic features enhanced user preferences towards benches in public parks.

An analysis study was used to collect information about the user’s preference level towards benches based on ergo-aesthetic design features. It enabled further definition of the goal of this study in enhancing furniture design processes and methods. Hence, the furniture designers, especially the junior designers, will be able to design furniture equipped with ergo-aesthetic features.

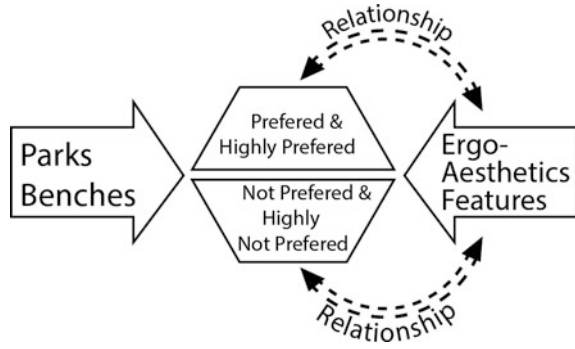
1.2 Data Collection

The method of using a questionnaire provided insights into people’s beliefs, attitudes, values, and behavior [46]. Thus, the researchers obtained data by using specific questionnaires, which comprised open-ended and close-ended questions to meet research objectives and derive answers. There were 100 visitors to Putra Perdana Park, Putrajaya who were selected randomly to participate in the survey.

The responses to these questions were used as a yardstick in gauging and rating the most popular benches at Putra Perdana Public Parks, Putrajaya. The questionnaires were designed to evaluate various independent variables based on a literature review to identify user preference factors towards the provided benches. It was formulated with the Likert scale whereby all ratings used a 5-point scale ranging from 1 (strongly not preferred with) to 5 (strongly preferred with). The researchers were able to make a comparison and could identify the highly preferred benches. The open-ended questions helped the participants to express their views and opinions. This provided additional information that were not considered or thought of before by the researchers.

Ergo-aesthetic design complies with ergonomics and aesthetic features. Referring to previous research, it is expected that the level of user preferences towards a product or furniture depending on ergo-aesthetic features would be highlighted in Fig. 3.

Fig. 3 Basic structure of user preference system



2 Result

2.1 User Preference Factors

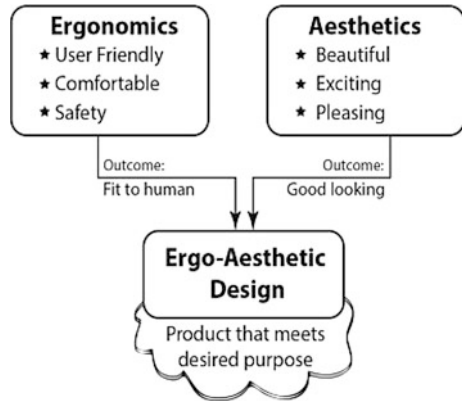
The findings were organized around nine most outstanding user preference factors that were identified from the previous study. These user preferences factors were capable of influencing the user’s sitting experience on benches at a public park. These were aesthetically pleasing design, structurally sound design, functionally appropriate design, user-friendly design, safety design, worthy design, familiarity or familiar design, culturally rich design, and social status indicated design. Based on the literature review list, the most highly scored five users’ preference factors of aesthetically pleasing design, functionally appropriate design, structurally sound design, safety design, and user-friendly design were selected to evaluate the relation to the highly preferable, preferable, and less preferable benches. Classification of user’s preference factors is shown in Fig. 4.

Fig. 4 User’s preference factors

Preferences Factors	Aesthetics							Functional										
	Aesthetic	Functional	Comfortable	User friendly	Safety	Worthiness	Familiarity	Aesthetic	Functional	Comfortable	User friendly	Safety	Worthiness	Familiarity	Social status			
[16] Seung, Bin Im																		
[17]																		
[18]																		
[19] Wuttrich																		
[20] [28] McDonald, Haslam																		
[21]																		
[22]																		
[23] Falk																		
[24]																		
[25]																		
[26] Engstrom, Purcell & Taylor																		
[27]																		
[28]																		
[29] Harrison																		
[30]																		
[31]																		
[32]																		
et. al.																		
[33] Hsu et. al.																		
TOTAL	10	8	5	6	7	0	0	4	2	12	6	5	4	4	3	2	3	1
GRAND TOTAL	22	14	10	10	11	3	2	7	3									

- Aesthetically Pleasing Design: 65%**
- Functionally Appropriate Design: 41%**
- Structurally Sound Design: 30%**
- Safe Design: 30%**
- User-Friendly Design: 32%**

Fig. 5 Proposed ergo-aesthetic model



The results shown in Fig. 4 underscore that the user’s preference factors are important for designers to enhance their design processes. The user preference factors also could cluster into smaller groups such as ergonomics, aesthetics, and functionality. As per the existing researcher’s findings, ergonomics comprises many factors, namely user friendliness, comfort, and safety. Beautiful, pleasing, and exciting could be clustered under aesthetics. Aesthetic appearance of the product or system is very significant to sustain in the user’s mind. However, it has been ignored ominously in the study of ergonomics [9].

Ergonomics and aesthetics are the core factors in creating user-preferable designs, whereas, in the process of creating a functionally appropriate product, ergonomics and aesthetic factors are essential to blend together as ergo-aesthetics. Parallel to that to optimize product’s function and enhance user preference, an ergo-aesthetic model is proposed as shown in Fig. 5. Hence, it could be concluded that ergo-aesthetically designed products are functionally appropriate and user friendly.

2.1.1 User Preference Benches

The Likert scale was used to rate the respondent’s preferences in selecting the benches. The benches are identified as type A to J. Figure 6 shows the user preference level among Putra Perdana Park benches.

The analysis obtained from Fig. 6 shows in detail each type of bench and seating preferences among Putra Perdana Public Park visitors. The most preferred bench to sit on was type F (92 %). The second most preferred seating bench was type G (87.2 %). The third most preferred seating object was Type A with 86.5 % of respondents. Seating object Type E was ranked fourth where 79.2 % of visitors preferred the seating preference. The rest of the benches scored less than 50 % of the users’ preferable rating, hence, those are not significantly liked by the visitors. For example, bench type I obtained only 33 %, type D was 28 %, type H 25 %, and

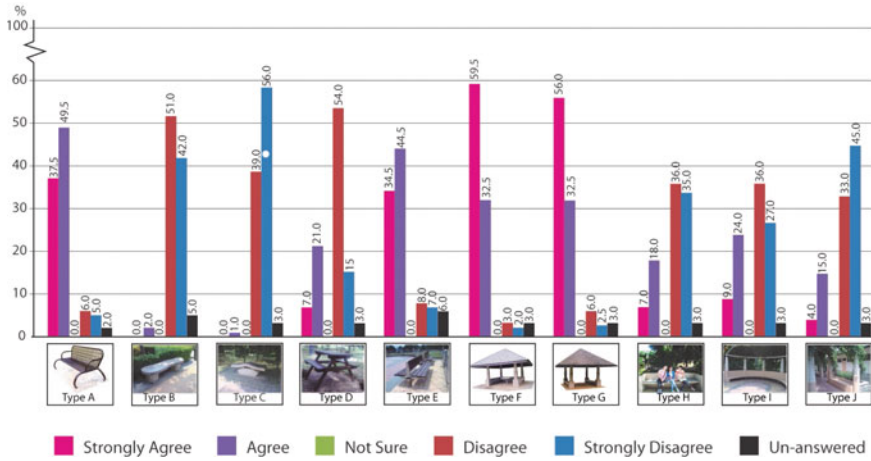


Fig. 6 Overall preferable level of benches



Fig. 7 The most preferred bench type F

type J scored only 19 %. The results also show that type B benches scored 2 % and C scored 1 %. So, the benches type B and C were rejected by the users.

Based on the overall result, it could be concluded that bench type F, as shown in Fig. 7 is highly preferred by the park visitors. The highly not preferred bench amongst the provided 10 types was bench type C as shown in Fig. 8.

The gazebo benches with tables were specifically designed for people in small groups to rest and enjoy their refreshments and recreational activities. Furthermore these designs gave an ambience of village lifestyle. The materials that were used to build these benches were concrete, granite, wood, and shingled roof as shown in Fig. 7.

Bench type F was easily on top of its class and popular in its design compared to the other nine types of benches provided. The finding shows that all the preference factors especially aesthetically pleasing design, structurally sound design, user-friendly design, safety design, and culturally rich design scored more than 80 % of agreement from the park visitors. In addition, the open-ended questions also show that the respondents mostly preferred type F benches due to the existence of ergonomic and aesthetic features as stated in Tables 1 and 2.

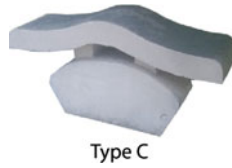
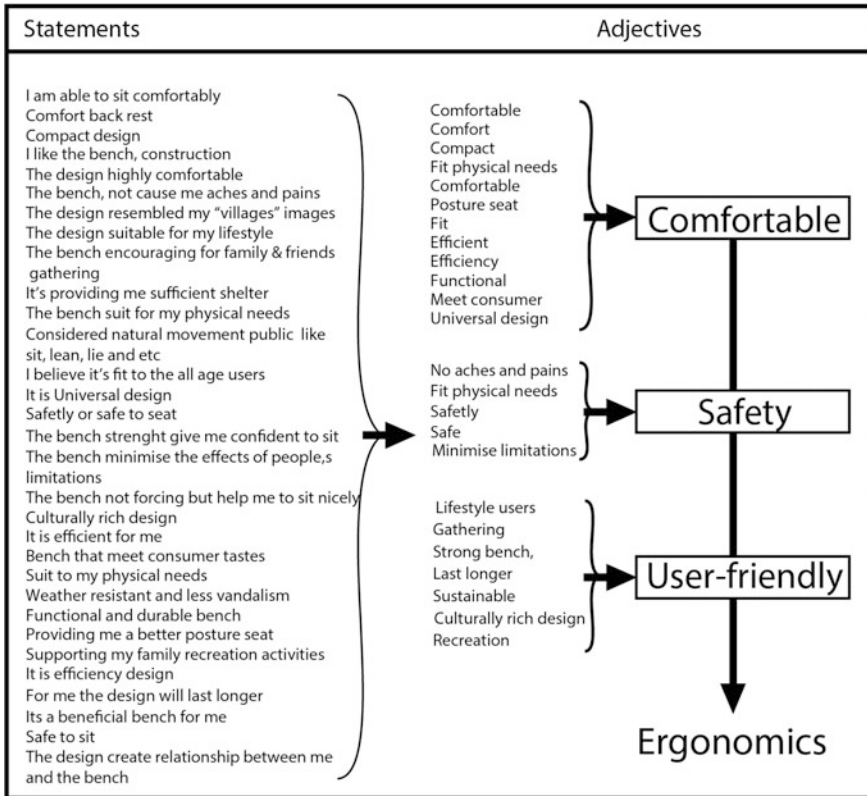


Fig. 8 The most unpreferred bench type C

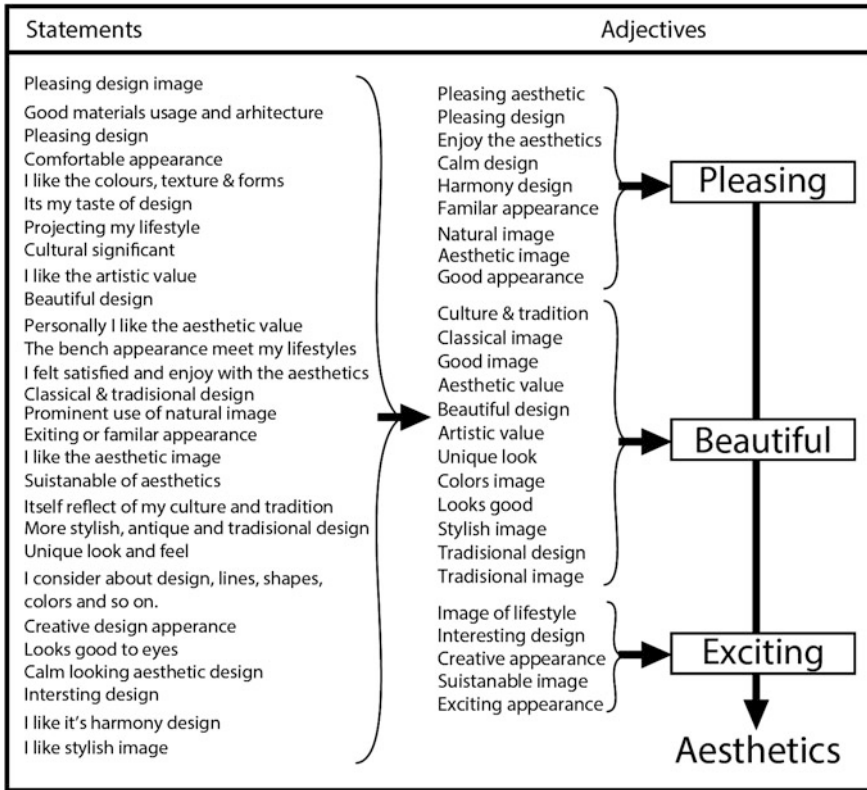
Table 1 Respondent’s feedback on preferred bench against ergonomic factors



Referring to the open-ended question on bench type F, 33 statements on ergonomics and 28 statements on aesthetics were collected from the respondents. Respondents’ statements basically expressed their views on why they prefer to sit on the particular type of bench.

The ergonomics statements were clustered to five adjectives such as comfortable, safety, pleasing/comfort, user-friendly, and pleasing/trust. These clusters were

Table 2 Respondent’s feedback on preferred bench against aesthetics



narrowed down and grouped into three adjectives such as comfortable, safety, and user friendly as shown in Table 1.

The aesthetics statements from respondents were clustered in four groups such as comfortable, safety, pleasing/comfort, user-friendly, and pleasing/trust. The aesthetics clusters were narrowed down to three adjectives such as pleasing, beautiful, and exciting as shown in Table 2. The ergonomics and aesthetics clustering of adjectives were done with the advice of two professional furniture designers.

The type C bench designs were classified as poor. In its fabrication process, the metal rods were headed for the skeletal design of the structure and shapes were formed using concrete. It is one of the oldest, strongest, and durable materials and its applications are limited only by the imagination. However, not even 1 % of the respondents voted the design as “strongly agreed”. Only 1 % of respondents voted as preferring to sit on it. A total of 95 % of the respondents have stated “strongly not agreed” and “not agreed” to the type C benches, and 4 % of the respondents did not even show interest in answering this particular question.

The type C bench design, as shown in Fig. 8, has a significant number of negative votes on preference factors. More than 90 % of the respondents stated “strongly disagree and disagree” with all the preference factors. For instance, none of respondents agreed with the type C seating object as a familiar or culturally rich design. User preference factors such as aesthetically pleasing design, functionally appropriate design, user-friendly design, structurally sound design, comfortable design, social status projection design, or safety design did not show a score of more than 2.5 %. This negative response was due to the poorly designed bench with noncompliance with ergonomics and aesthetics factors as shown in Tables 3 and 4.

Based on the open-ended questions, which were posted to park visitors to stimulate their reasons for rejecting this type of bench, 24 statements on ergonomics and 22 statements on aesthetics were collected. The ergonomics statements were clustered to three adjectives such as uncomfortable, unsafe, and not user-friendly. The aesthetics statements were clustered to three groups such as unexciting, un-beautiful, and not safe. This clustering of adjectives was done after consulting two professional furniture designers.

Table 3 Respondent’s feedback on un preferred bench against ergonomics

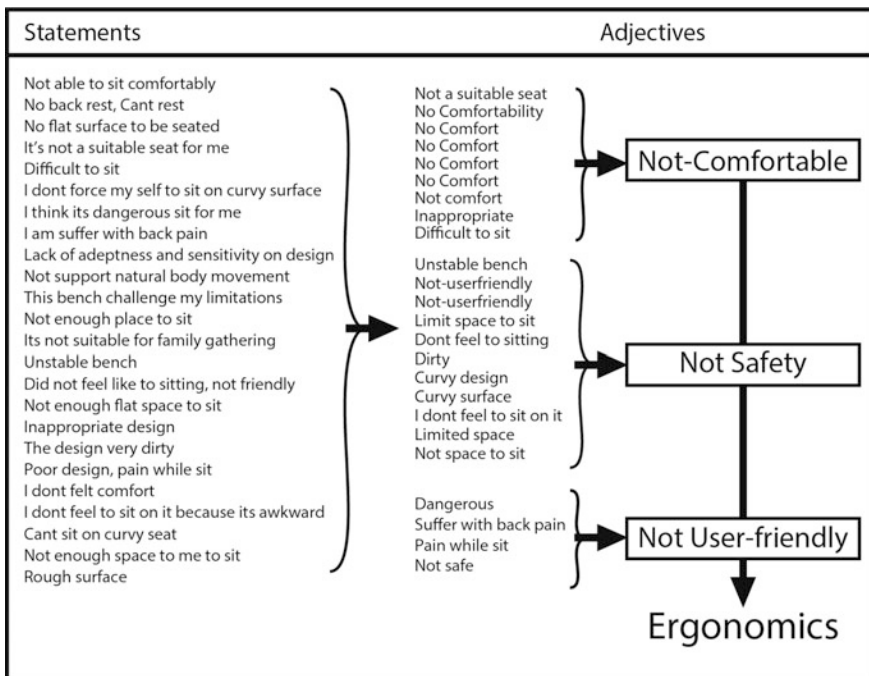
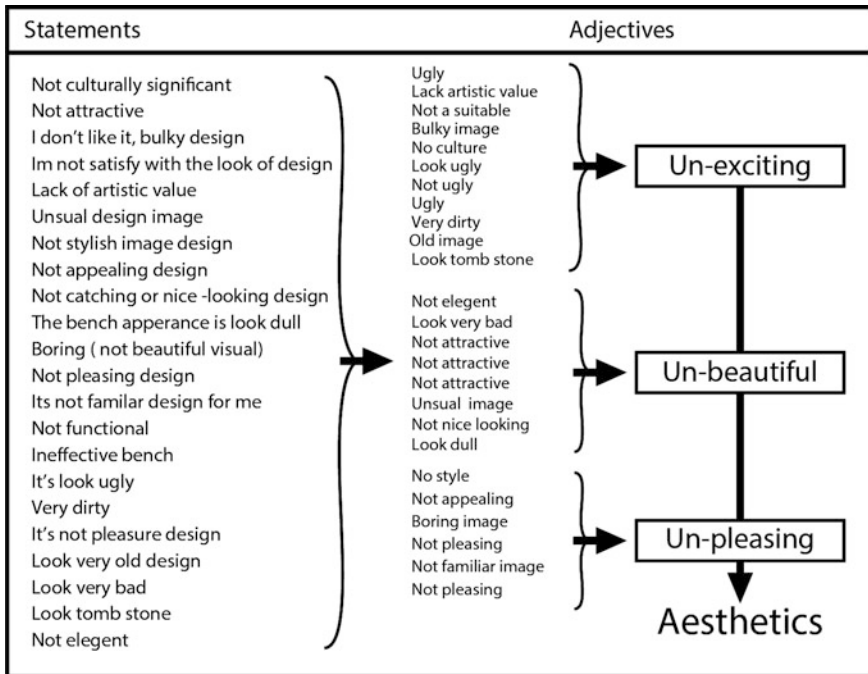


Table 4 Respondent’s feedback on unpreferred bench against aesthetics



3 Conclusion

Analyzing the research findings, it can be concluded that even though parks are equipped with many types of benches, not all of them are preferred by visitors. Some existing benches are in high demand and the others are totally ignored by the user public. The research findings also show that most of the designs are lacking user preference factors. These factors could be grouped as ergo-aesthetics factors. Thus, it could be definite that the rejection of park benches is due to the lack of ergo-aesthetic factors in designs.

Therefore, ergo-aesthetic elements are the most essential factors that need to be emphasized in the design development of park benches. This is to ensure that the provided benches are utilized at an optimum level. Thus, designers need to generate ideas based on ergo-aesthetics design method models. An ergo-aesthetic design method model will stimulate the creation of functionally appropriate design and it would incur user preferences towards desired benches.

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Cost-Related Issues in Malaysian Construction Contracts

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Abstract Time, cost, and quality are the three main challenges of the construction industry. This research chapter focuses on the different contractual obligations between the Public Works Department (PWD) standard form of contract and *Persatuan Arkitek Malaysia* (PAM)'s form of contract. Comparative studies of the cost-related clauses (the PAM and PWD Contract, With Quantities) have been carried out. The research aimed to investigate the cost-related issues faced by the construction parties by focusing on the applications and principles applied by the courts for disputes brought to courts by the suffering parties. This chapter deduces important lessons that must be fulfilled to avoid and minimise the cost-related disputes in the construction industry.

Keywords Construction contract · Standard form · Cost-related clauses · Construction parties · Dispute

1 Introduction

There were many contractual issues recorded in the dispute resolution or in the litigation about the failure to settle another party's monetary claims. Many rejections of claims related to the costs of projects have been contested. In addition,

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the rights available in the contract pertaining to any breach of contract that raises the right to deduct a certain amount of money from the defaulting party's account have always been disputed.

2 Cost-Related Issues in Construction Contract

The cost-related provisions in the standard form of a contract can be regarded as the considerations that must be made for works completed by the contractor. Moreover, the provisions impose some liabilities in the event of a breach of contract by one of the contractual parties. In the conditions of the contract, provisions related to the cost-related clauses underline the procedures, obligations, and remedies available to contractual parties, mainly the client and the contractor. These clauses are shown in Table 1 (both are standard forms of Contract With Quantities).

For the following discussions, it is important to note that some of the references were taken from the English cases, inasmuch as Malaysian common law was developed from English law.

2.1 Performance Bond

To assure a project can be completed successfully on its completion date, the performance bond is a guarantee made by the contractor as a promise that he will not involve with any default during the construction period. The performance bond involves three parties, which are the bondsman, the employer, and contractor. In a construction contract, the contractor will make an agreement with the bondsman, not the employer. The bondsman, also known as a bank or insurance man, will pay a sum (5 % of the contract sum) to the employer for any default caused by the contractor [1]. In practice, a bond can be obtained in the form of Bank Guarantee, Insurance Guarantee, or other stipulated forms that are allowed in the contract.

Clause 13.1(a) of the Public Works Department (PWD) Contract provides another option, which is Performance Guarantee Sum (P.G.S.). The P.G.S. is more favoured because the contractor can waive his liability to render collateral to the

Table 1 Cost-related clauses in PAM contract 2006 and P.W.D. 203A (rev. 1/2010)

No.	Time-related clause	PAM contract 2006	P.W.D. 203A (rev. 1/2010)
1	Performance bond	Clause 37	Clause 13
2	Retention fund	Clause 30.51	–
3	Variations	Clause 11	Clause 24
4	Loss and/or expense	Clause 24	Clause 44
5	Certificates and payment	Clause 30	Clause 31 and 61

bank or insurance company. In addition, no initial capital is needed because the method to recoup the sum is by deducting 10 % of the monthly progress payment until the total deduction has reached the 5 % of the contract sum. Once the project is completed, the employer will release the Performance Bond or P.G.S. In the PWD Contract, it will be released after the Certificate of Completion of Making Good Defects (C.C.M.G.D.) is issued (Clause 13.5) whereas in the *Persatuan Arkitek Malaysia* (PAM) Contract it is within three months after the practical completion (Clause 37.3). A bond that only covers until after practical completion will disadvantage the employer to protect himself against financial shortfalls in retaining some allocations in case the contractor's default happens during the Defects Liability Period (D.L.P.) [2].

Inconsistencies of the provision in the contract and difficulty to understand the principles governing the resolution pertaining to the Performance Bond are the large cases reported to the courts. In the United Kingdom, some issues associated with the bond are due to the language used in the guarantee that is difficult to be understood, confusions between a Conditional Bond or Unconditional Bond, wrong interpretation of the terms incorporated in the bond agreement and problems that are related to the requirement to submit a claim for a Performance Bond [3]. Many cases had shown that the contractor will challenge the employer's right to forfeit the Bond by applying the injunctive relief through the court. The court somehow will only intervene in situations where the conditions in the Bond fail to express the parties' right in clear terms.

For example, if the contractor is able to prove there was fraud (*LEC Contractors Sdn. Bhd. v Castle Inn Sdn. Bhd.* [2000] 3 AMR 2625) and the element of unconscionable (*Nafas Abadi Holdings Sdn. Bhd. v Putrajaya Holdings Sdn. Bhd.* [2004] 1 LNS 127) has been made by the employer, then the Performance Bond will not be forfeited. In *Cygal Bhd. v Bandar Subang Sdn. Bhd.* [2004] 4 AMR 252 and *Bakti Insani Sdn. Bhd. v Pembinaan BT Sdn. Bhd. & Anor* OS D24 NCC 174-2011, the demand to release the Bond due to default by the contractor can only be made after dispute resolution has been made by the parties. For disputes related to Conditional or Unconditional Bond, there are many authorised cases that can be relied upon. It can be accepted that a Performance Bond will become a Conditional Bond if the agreement states that a written demand is needed, condition on the failure to perform the contract must be clearly stated, and there must be nonperformance from the contractor side (*Esal (Commodities) Ltd. & Reltor Ltd. v. Oriental Credit Ltd. & Wells Fargo Bank NA* [1985] AC 546 in *Fasda Heights Sdn Bhd. v. Soon Ee Sing Construction Sdn Bhd* [1999] 4 MLJ 199). If a contract does not term out these three principles, then the Bond can be considered as an Unconditional Bond, which means the bondsman will have to forfeit the sum of 5 % into the employer's account immediately without the need to wait for any instruction.

It can be agreed that the Performance Bond can be an immediate tool to recover the breach of contract caused by the contractor, but the express requirements in the contract provisions must be sufficient enough to be understood by the parties. To remove problems related to inconsistencies, it is suggested that uniformity in the

Bond's content and careful choice of words should be adopted in drafting the Bond clauses so that they will not be challenged later in the court.

2.2 *Retention Fund*

Other than the Performance Bond, another mechanism available to protect the employer against any defaults while carrying out the work is the Retention Fund. Nonetheless, this fund is only imposed in the PAM Contract (Clause 30.5). The significant difference between the Retention Fund and the Performance Bond is the way that the fund is collected, which is through the deduction of monthly progress payments that are payable to the contractor (10 % deduction from each progress payment). The recoupment will stop after the fund reaches 5 % of the contract sum.

Some issues related to the opening of an account have been found from the English cases, which principles have been outlined in the PAM provision. In Clause 30.6(a), the contractor may inform the employer to open a separate account for this fund or vice versa. Here, the employer will be considered as the fiduciary of trustee (can be found in *Rayack v. Lampeter Meat Co. Ltd.* [1979] 12 BLR 30). Once there is an express provision regarding this requirement and the referred party to open the account failed to do this act, the court will consider this failure as a breach of duty (as held in *Wates Construction (London) Ltd. v. Franthom Property Ltd.* [1991] 53 BLR 23). Clause 30.6 (c) and (d) describe the process of releasing the said fund, which the first half shall be released upon the issuance of C.P.C. and the latter released upon the issuance of C.C.M.G.D.

2.3 *Variations*

Changes in construction are among things that cannot be avoided. In construction contracts, the provisions related to change or variation are available to safeguard the interest of both contractual parties. The contractor wants to get the costs entitlement, on the other hand, the employer needed to change the work to meet requirements imposed by the local authorities, to rectify certain works due to unforeseen conditions onsite, or to satisfy her own needs by changing the design, quality, and quantity of the original work. According to the PWD Contract, variation means any changes that can be related to the design alteration, modification, quality, or quantity from the original scope of work in the contract document (Clause 24.2). In the PAM Contract, the gist is still similar. However, Clause 11 defines more the term 'variation' as limitations associated with the working hours and working space, matters related to access, and issues associated with the execution and completion of the works [Clause 11.1(d)].

A variation without instruction is a risk to the contractor. The S.O. or architect is the authorised person who has the right to issue the instruction pertaining to the variation works. If the project is more related to engineering works, normally the engineer will act on behalf of the employer to issue instructions. Therefore it is required for all evidence to be submitted by the contractor in order to get the monetary entitlement. In Clauses 31.1 and 31.2 of the PWD Contract, a three-month period after the practical completion will be sufficient enough for the contractor to submit the particulars to claim variation such as the progress report, voucher, instruction, or others. Then, the S.O. will make a reasonable assessment. In a recent case, failure to incorporate evidence will exclude the right to get the cost entitlement for the variation works (*Winstech Engineering (M) Sdn. Bhd. v. ESPL (M) Sdn. Bhd.* [2011]1 LNS 811).

In the PAM Contract, Clause 11.3 describes the requirement for the architect not to issue further instruction after the practical completion. However, if the instruction is given to comply with the requirements issued by the local authority or service provider, it is required for the contractor to comply with such direction. This provision is not allocated in the PWD Contract. However, it is commonly practiced in government projects that the contractor will still carry out the variations when the works are mainly to fulfil the authority's requirement. Hence, difficulty may happen in assessing the valuation cost because the works were not originally priced by the contractor. Some consideration is, therefore, needed for the employer to look at the actual cost incurred because the amount is surely higher than the one priced during the tendering stage.

Both PAM and PWD Forms set out the rules of valuating the variation works, which are subject to the nature and condition of the works. They are named as BQ rates, fair rates, and daywork rates (Clause 25 of the PWD Contract and in Clause 11.6 of the PAM Contract). Difficulty in quantifying the fair rates may cause a dispute inasmuch as these evaluation methods are not objective and can vary. The PAM Contract has improved its condition by clearly expressing the term in Clause 11.6(c) as 'fair market rates and prices', which means the contractor will only get the actual loss plus the costs for overhead and profit directly from the variation works [*Crittall Windows v T.J. Evers* [1996] 54 Con LR 66 in Tan et al. (2010)]. In *Harrington & Co. Ltd. v Wooder* [1914] AC 71, the House of Lords defined the term 'market price' as costs to be construed with its surrounding circumstances [2]. Thus, it can be agreed that the definitions of fair rates can sometimes be universal and, therefore, the court would normally take the view in a subjective way as long as it is relevant and fair to the contractual parties.

From the reviews, there is no provision to claim additional expenses in the PWD Contract. However, in the PAM Form, this provision is stated in Clause 11.7. This allocation must be proven by the contractor when it happens to be that the variation has caused him to incur additional expenses whereas the other provisions are not adequately relieved. The contractor must comply with the procedures, which is quite similar to the process of claiming the extension of time, before the compensation could be reimbursed to him.

2.4 Loss and/or Expense

Loss and expense is a reimbursement for costs that the contractor finds difficult to be reimbursed from the Payment provisions of the contract. This allocation covers the costs incurred for regular works that are materially affected by the delay and disruption caused by the contractor. There are three categories of claim, which are the prolongation cost, acceleration cost, and disruption cost. The heads of claim in the construction contract can be classified further into the cost of overheads, loss of profit, loss of productivity, fluctuations, and financing charges [4].

It is important to note that it is not a condition precedent for the loss and expense to be paid even if the Extension of Time (E.O.T.) has been awarded to the contractor. Most construction contracts have distinguished these two provisions even though the grounds of claim are similar. A good reference can be made to the UK Society of Construction Law Delay and Disruption Protocol (2002) Clause 1.6.2., which says 'entitlement to an E.O.T. does not automatically lead to entitlement to compensation (loss and expense)'. This understanding is still being practiced in the Malaysian construction contracts. If misconception happens, contractors should not put high expectation to get the cost reimbursement for certain delay and disruption activities that have direct relations with the granted E.O.T.

There is a wide difference between the government and private practice's provisions in regard to the loss and expense. Clause 44 of the PWD Contract describes the grounds for the claim to be applied based on the relevant events for E.O.T, which are due to the defaults by the government (i.e., suspension of works; disputes with the neighbour; S.O.'s Instruction; late events caused by the S.O.; and delay on the part of artists, tradesmen, and others engaged by the government). On the other hand, Clause 24 of the PAM Contract considers all relevant events for the E.O.T. as valid grounds to claim the loss and expense. The procedures to be complied with upon submitting the claim are also described in its Clause 24.1.

Likewise, the provision in Clause 24.2 states the requirement for the contractor to keep her contemporaneous records in the proper way to avoid any dispute due to vague and unstructured content in the claim submission (i.e., claim not being supported with documents such as the minutes of meeting, vouchers, receipts, timesheets, and others). The judge in *Attorney General for the Falkland Islands v Gordon Forbes Construction (Falklands) Ltd.* [2003] BLR 280 derived very good propositions that claims should be notified to the employer at the time they arise and all contemporary records have to be kept properly. In *London Borough of Merton v. Stanley Hugh Leach* [1985] 32 BLR 51, the judge reasoned that if the documents are insufficient to assist the architect to perform his duty, the contractor will lose his entitlement and will not be allowed to complain that the architect has breached his duty. Methods or techniques used to ascertain the claim must be recognised and accepted by professionals especially the architect and quantity surveyor to avoid any breach of justice to the other party concerned.

To a certain extent, we have to understand that the Malaysian government standard form still has no guideline on the method of ascertaining the claim made

by the contractor. In *Hick v. Raymond & Reid* [1983] AC 22, when the period to ascertain the claim is not clearly stated, ‘reasonable period’ will have to be considered. *Wright Ltd. v. P.H. & T (Holdings) Ltd.* [1968] 13 BLR 26 is a case where the court held that the claim for loss and expense should be estimated similarly to damages recovered through common law. Hence, the potential to get the claimed entitlement will depend on the justification, calculation, and the proof of evidence submitted by the contractor.

2.5 Certificates and Payment

Payment is the lifeblood in the construction world (*Gilbert-Ash (Northern) Ltd. Modern Engineering (Bristol) Ltd.* [1973] 71 LGR 162). In the law of contract, an agreement is considered as binding when the considerations are made by both parties. In the construction industry, payment is the consideration honoured by employer to the contractor. Nevertheless, payment problems continue to be among the regular issues faced by construction parties.

Both PWD and PAM Contract apply the stage payment (refer to Clause 28.4 and Clause 30.2, respectively), whereby the most common practice in stage payment is known as monthly progress payment. This method is said to be applied with the principle of fairness [5]. This method ensures that the payment will be made in monthly intervals so that the regular cash flow can be maintained effectively and any deficit can be avoided. Prior to that, it is condition precedent for the payment to be released, after the certificate of payment has been issued to the contractor (*Tuck Sin Engineering & Construction Sdn. Bhd. v. Tee Hen Manufacturing (M) Sdn. Bhd.* [2007] MJLU 416).

The most common issue related to this clause is the late payment or nonpayment by the employer within the stipulated time prescribed in the contract. The most common payment dispute in Malaysian construction industry is nonpayment, with a percentage of 13.5 % [6]. A good reasoning can be seen in *L' Grande Development Sdn. Bhd. v. Bukit Cerakah Development Sdn. Bhd.* [2007] 4 MLJ 518, whereby the judge said ‘a failure on the part of the plaintiff (employer) to pay ... constitutes a breach of an essential term of the contract’. The employer is obliged to make payment based on the certified amount stated in the certificate issued by the S.O./architect. In the PWD Contract, time allocated to honour payment shall be within 30 days after the date where the S.O./architect issues the certificate (Clause 28.6). In the PAM Contract, 21 days is given to the employer to pay the money due promptly (Clause 30.1). Several options that were normally chosen by the contractor when facing the nonpayment or late payment events are slowing down the work, suspension of work, charging for interest, applying for summary judgment or the winding up petition of the employer through the court, and in the most serious cases, the contractor may determine his own employment [7].

Bear in mind that in the government contract, the decision made by the contractor to slow down the work due to late or nonpayment is no longer available

(the previous PWD Contract allowed the right for suspension due to late payment in Clause 43.1(g), but the current standard form has excluded this provision). In addition, in a situation where the contractor walks offsite when payment is not promptly made by the employer, the procedure to suspend the work somehow must be fully complied because the provision is available in the contract (Clause 55 (a) in the PWD Contract and Clause 30.7 of the PAM Contract). In *Kah Seng Construction Sdn. Bhd. v. Selsin Development Sdn. Bhd.* [1997] 1 CLJ Supp 448, the court affirmed that ‘in the absence of an express right to suspend the work, there is no implied right to do so for nonpayment’ [2].

The actions taken by the contractor such as claiming for interest and slowing down the work are, in fact, not expressly provided in the contract. Compensation with an award of interest can only be seen in the provision in PAM contract. If one looks at the common law practice, only if the court is able to prove there is a breach of contract made by the employer, would the court allow the award of interest (as held in *Lojan Properties Pte. Ltd. v. Tropicon Contractors Pte. Ltd.* [1991] 2 MLJ 70 and *Newacres Sdn. Bhd. v. Sri Alam Sdn. Bhd.* [2000] 2 MLJ 353). The right to be granted with summary judgment through the court is not provided in both contracts. However, the summary judgment under Order 14 of the Rules of the High Court was granted in *Pembinaan Leow Tuck Chui & Sons Sdn. Bhd. v. Dr. Leela Medical Centre Sdn. Bhd.* [1974] 2 MLJ 14. Whereas, for insolvency cases, again there is no express provision in both contracts that allows the party to issue a winding up petition. This right is only available outside the contract, which the aggrieved party can refer to the court to commence the winding up proceeding for matters associated with the debt for nonpayment by the employer (Sect. 218 of the Companies Act 1965).

2.6 Nominated Subcontractor/Supplier Issues

In a construction contract, there is no liability or privity of contract between the employer and the subcontractor; even the nomination is made by the employer (Clause 62 of the PWD Contract and Clause 27.1 of the PAM Contract). Responsibility of the main contractor is not only to pay the subcontractors, but also to suppliers which are directly involved with his project. In some cases, the sub subcontractor may also dispute for nonpayment by his subcontractor (*Syarikat Panon Sdn. Bhd. v. Platinum Best Engineering Sdn. Bhd.* [2011] 1 LNS 520). There would be a bad chain reaction if the employer failed to pay her main contractor because there is a direct chain of payment between one party to another [5]. In a situation where the employer is incapable to pay the main contractor, the liability to pay the subcontractor will then depend on the term incorporated in the subcontract.

There are a few current methods of paying the subcontractor such as direct payment and ‘pay if paid’ or ‘pay when paid’. The first method has to be read from the term incorporated in the contract, whether it is permissible for an employer to make direct payment (this provision is stated in Clause 27.5 of the PAM Contract).

Even though the purpose having this provision is sensible, which is to ensure that any payment due to the contractor will raise an obligation for him to make prompt payment to the subcontractor, but many times this kind of dispute is still being resorted to dispute resolution or litigation. There is a lack of security if this method is practiced in a construction contract especially if the employer is insolvent and therefore payment cannot be paid to the subcontractor. Now, the Construction Industry Payment and Adjudication Act (CIPAA) has been gazetted in 2012. This Act outlaws the ‘pay when paid’ or ‘pay if paid’ clauses contained in the construction contracts. It becomes one of the tools to overcome the security of payment issues especially amongst the subcontractors in the Malaysia construction industry [8].

2.7 Settlement of the Final Account

Final payment is the last payment and its certificate is considered as final and conclusive (Clause 30.12 of the PAM Contract). In contrast, the final payment for a government project will not be considered as final and binding, which means the court or arbitration proceeding can review, revise, or open up the certificate if dispute happens (Clause 32.0 of the PWD Contract). In *Thiam Electrical Construction Sdn. Bhd. v. Merino Odd Sdn. Bhd.* [2009] 1 LNS 645, it can be shown that the conclusiveness of the final payment is not similar to the progress payment, which the payment amount can still be adjusted. Therefore, it should be read together with Clause 28.4 of the PWD Contract that states progress payment is an ‘estimated’ value of work properly executed to get the clear understanding of the purpose of progress payment.

2.8 The Right to Set-off Payment

Set-off payment is an event where the employer may not pay the contractor in situations where there is a breach of contract (i.e., defective workmanship, delay, and others) [9]. Express provisions on the events and procedures that entitle the employer to set off payment are provided in the PAM Contract (Clause 30.4), such as compliance with the Architect’s Instruction, conforming to the statutory obligation, undertaking works, and many more. In common law practice, the employer is entitled to set off payment even if the set off amount is not agreed by the contractor [4]. In Clause 33.0 of the PWD Contract, it does not state the events that the employer would be allowed to set off payment, but the general provision to set off money due is provided. This means the contractor should be alert. It can be in any event that the employer may deduct some payments due to him, for example, in *Bukit Cerakah Development Sdn. Bhd. v. L’Grande Development Sdn. Bhd.* [2008] 2 AMR 597, where the damages claimed by the neighbouring owner became a valid event for the employer to set off.

3 Findings

From the reviews, many issues related to the cost-related clauses have been identified. Performance Bond is a guarantee that will take effect immediately after possession of the site. The process to release the Performance Bond makes the bulk of cases reported to the courts. From the cases reviewed, it can be summarised that a Performance Bond will become a Conditional Bond if the agreement states that a written demand is needed, which means the express condition pertaining to that is a must to be stated in the agreement. This is different from the Unconditional Bond, which means the bondsman will have to forfeit the sum of 5 % to the employer automatically. Hence, the express requirements in the contract provisions must be sufficient and the terms in the Bond contract fully described so that it will not be challenged later in the court proceeding. For the Retention Fund, it is normally being imposed for private projects through the deduction of monthly progress payments; therefore, the function is still similar to the Performance Bond.

The provision of variations is mainly to give fairness to the contractor, however, it is crucial that all proofs, regardless of whether the works are new or omissions from the original scope of works, need to be submitted in the variation claim. Failure to incorporate evidence will exclude the right to get the monetary entitlement. Notwithstanding, the variation instruction is not valid if it is issued after practical completion. However, only matters associated with the local authorities' requirements or service provider are valid and acceptable to be carried out by the contractor. Bear in mind, additional costs incurred might be higher than the original contracted costs because many limitations have to be taken into account in order to comply with such instruction. It can agree that the PAM Contract has improved many provisions related to variations, which give more opportunity for the contractor to claim more. The stipulated procedure must be strictly complied with to ensure the claimable amount is reimbursable.

Misconceptions about the loss and expense can be associated with the events related to delay, whether they are prolongation or disruption activities, which caused the contractor to incur more overhead losses. It is important to highlight that certain disruptions that are difficult to quantify might be regarded as having no direct relation with the extension of time. Therefore, many claims pertaining to this matter have been ignored by the employer. Both standard forms of contract have stated the events that will entitle the contractor for loss and expense. From the review, the PAM Contract provides more allocations related to this effect. The procedures for claiming the loss and expense are also described in its Clause 24.1. As long as all records are properly kept, it would be far easier for the architect/S.O. to assess and evaluate the amount to be reimbursed to the contractor.

It cannot be neglected that problems associated with payments are the most regular issues faced by both construction parties. Without payment, the contractor will suffer a lot, such as being unable to roll the money for the project and other associated matters related to the construction work. It can be seen that nonpayment will result in the slowing down of work, suspension of work, extra charge on the

interest, summary judgment, and winding up order through litigation or the contractor determines his own employment. Bear in mind, not all payment issues are due to a bad paymaster. There are also many situations whereby the employer, under the contract, still has the right to set off the contractor's payment for defaults caused by the contractor such as poor workmanship, poor site management, delay, and others.

On the other hand, late payment is another common issue that is normally suffered by the nominated or domestic subcontractors. Likewise, employer failure to pay his main contractor will cause chain effects to the other parties. Hence, reviews from the above cases have shown that all must turn back to the terms incorporated in the subcontract if this issue arises. Currently, CIPAA appears to be the most advantageous method of resolving the nonpayment or late payment issues, not only to the main contractors, but also to the subcontractors. The government ethos should be supported by all construction parties to materialise this effort.

4 Conclusion

It can be concluded that many issues and legal principles need to be observed to understand the obligations, rights of the parties, procedures, and effects of cost-related clauses of the construction contract. This is important to help reduce the problems or misconceptions amongst the contractual parties in the construction industry. For future research, in-depth studies will be carried out to investigate to what extent are these issues fully aware by the construction parties. This is very important to help improve the understanding of construction contracts amongst the construction parties.

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Appendix—List of Cases

Attorney General for the Falkland Islands v Gordon Forbes Construction (Falklands) Ltd. [2003] BLR 280

Bukit Cerakah Development Sdn. Bhd. v. L'Grande Development Sdn. Bhd. [2008] 2 AMR 597

Crittall Windows v T.J. Evers [1996] 54 Con LR 66

Cygal Bhd. v Bandar Subang Sdn. Bhd. [2004] 4 AMR 252 and *Bakti Insani Sdn. Bhd. v Pembinaan BT Sdn. Bhd. & Anor* OS D24 NCC 174-2011

Esal (Commodities) Ltd. & Reltor Ltd. v. Oriental Credit Ltd. & Wells Fargo Bank NA [1985] AC 546

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Gilbert-Ash (Northern) Ltd. Modern Engineering (Bristol) Ltd. [1973] 71 LGR 162
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Kah Seng Construction Sdn. Bhd. v. Selsin Development Sdn. Bhd. [1997] 1 CLJ Supp 448
LEC Contractors Sdn. Bhd. v Castle Inn Sdn. Bhd. [2000] 3 AMR 2625
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Lojan Properties Pte. Ltd. v. Tropicon Contractors Pte. Ltd. [1991] 2 MLJ 70
L' Grande Development Sdn. Bhd. v. Bukit Cerakah Development Sdn. Bhd. [2007] 4 MLJ 518
Nafas Abadi Holdings Sdn. Bhd. v Putrajaya Holdings Sdn. Bhd. [2004] 1 LNS 127
Newacres Sdn. Bhd. v. Sri Alam Sdn. Bhd. [2000] 2 MLJ 353
Pembinaan Leow Tuck Chui & Sons Sdn. Bhd. v. Dr. Leela Medical Centre Sdn. Bhd. [1974] 2 MLJ 14
Rayack v. Lampeter Meat Co. Ltd. [1979] 12 BLR 30
Syarikat Panon Sdn. Bhd. v. Platinum Best Engineering Sdn. Bhd. [2011] 1 LNS 520
Thiam Electrical Construction Sdn. Bhd. v. Merino Odd Sdn. Bhd. [2009] 1 LNS 645
Tuck Sin Engineering & Construction Sdn. Bhd. v. Tee Hen Manufacturing (M) Sdn. Bhd. [2007] MJLU 416
Wates Construction (London) Ltd. v. Franthom Property Ltd. [1991] 53 BLR 23). Clause 30.6 (c)
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Ablution Design: The Concepts and Design Criteria

Abu Bakar Abd Hamid, Mohamad Hanif Abdul Wahab, Aida Alias and Norashikin Rahmat

Abstract Ablution is one of the prerequisite activities to pray which consists of a procedure that involves water to a particular body to clean itself from small impurities. This is call *wudhu* in Arabic. In order to make the *wudhu* in the perfect order; it is required to perform certain actions in the correct sequence. The ablution area is very important to ensure the users' comfort and satisfied while taking the *wudhu*. Users often complain of the inadequate size of the ablution area and narrow space when taking *wudhu*. To perform a prayer in a comfortable situation, a good ablution's condition and space is also important because in Islam, cleanliness is a very important aspect especially when someone wants to pray. Therefore this research focused on the significance of concept and design elements in the ablution area. These elements of design and concept were discussed in this study to make sure that the right and suitable aspects of design of the ablution area can be designed and constructed according to the needs of the users. The design for the ablution area either in the mosque or prayer rooms in the shopping centers should take consideration of different types of users: the normal users, the elderly, and the disabled.

Keywords Design of ablution standard · Muslim prayer halls · Design environment · Ablution criteria · Wudhu

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1 Introduction

In the world population, Muslim people cover about 20–25 % of the world population and are the majority almost in 40 countries [1]. With the high percentage of ordinary Muslims practicing the Islam, including prayers, the need for Muslims is to design, build, and maintain the prayer space in the whole of the world. Some designers, either Muslim or non-Muslim, are interested to design either mosques or a praying facility in a shopping mall, an exhibition hall, an airport, or other public building [2]. *Wudhu* or ablution is one of the Islamic procedures for washing parts of the body using water for preparation of formal prayers (Solah).

According to Ref. [3], ablution comes from “Al-Wadha’ah” which means cleanliness and brightness. Although Ref. [4] defines ablution as an act that is physical and spiritual, ablution is a state that must be achieved as a prerequisite prior to Muslim prayer; in order to do so one must perform *wudhu* or ritual cleansing and purification. The ablution function involves cleaning with fresh water certain parts of the body in certain steps and according to right order. It starts with rinsing the palms, rinsing the mouth, washing the nose by sniffing, washing the face, washing each arm up to the elbow, wiping the hair with wet hands, rubbing the tears with wet hands, and lastly, washing the feet up to the ankle [5].

In order to make sure that the ablution process is perfect, the ablution design should be parallel with the need and requirements of different types of users. As Ref. [4] highlighted, the consolidation between the ablution ritual and product design is expected to facilitate the practical implementation of ablution.

2 Objective and Methodology

The objective of this chapter is to help the designer to design Muslim ablution in public buildings through the conceptual and design elements recommended by local authorities or the State Islamic Council. These conceptual designs irregularly differ from those of purpose-built ablution. The authors have developed several methods to support this research. Using the existing design, standards for ablution areas are looked at seriously and are used where suitable. The authors’ experience as designer, space user, and analytical observer of how the people use ablution are capitalized on so as to study well-designed spaces, identify their strengths, and incorporate with the design standard and the criteria of ablution function. This research is also to identify poorly designed spaces, analyze the weaknesses, and recommend their avoidance. The authors’ discussions with a few local authorities’ officer have revealed their requirement to understand the functions performed in these spaces.

3 Problem Statements

The ablution process is a very important practice in order for Muslim to pray. According to Ref. [6] without going through the ablution process, someone's or the Muslim's prayer is incomplete unless the Muslim takes "Tayamum" or dry ablution as another alternative for taking ablution [4]. Therefore, it is important to make sure that the ablution area can fit in all kinds of users with standard and suitable ablution design [6]. A good function of the ablution area is one of the fundamental elements for Muslims before performing "solah". In many Islamic countries including in Malaysia, there are no guideline designs for ablution criteria. Some of them just do and design based on other references but it is not enough to understand the elements and concept of ablution in Islam. The exact design and method for ablution design should be to refine and analyze the humanities aspects and to sustain the rule of Islam.

4 Literature Review

Muslims perform five prayers per day. These are at dawn, midday, late-afternoon, sunset, and nightfall [7]. A full conception of the ablution space requirements is complicated without shedding light on some indispensable concepts regarding the character of Muslims' prayers. These concepts are particularly important when the designer is involved in defining the area for praying spaces and relative to it the area for ablution spaces.

The ablution space is used optionally based on the religious rulings. If carried out, the ablution activity includes—among other requirements—cleaning the feet with water. Therefore, if ablution is not well designed, the ablution space will turn risky and messy. A range of issues needs to be considered when the space is designed. These include the provision of comfortable dimensions for various models of ablution unit (refer to Table 1), the selection of materials and finishes, and water conservation [2]. For further information on design standards for ablution spaces, there is also a video covering the same topic [8].

Reference books on architectural design standards, such as *Architectural Graphic Standards* [9], *Neufert Architect' Data* [10], and *Metric Handbook* [6], provide useful but basic data for some aspects of mosque design. *Architectural Graphic Standards* focuses on the space requirements for mosques in western countries. *Neufert Architects' Data* covers basic categories of mosque design as they have appeared historically in various regions of the Islamic world. The sources such as books and other references also provide some description of the design of various mosque components, but more from the points of view of history and traditions. The *Metric Handbook* suggests basic elements for the design of a mosque, focusing on the symbolic value of the elements. It also covers aspects of ablution space design.

Table 1 Three main designs of access to ablution space

No.	Description		
	Case one	Case two	Case three
1	The access to the ablution space is from outside the clean zone	The access to ablution space is from inside the clean zone and directly from the praying area	The access to the ablution space is from inside the clean zone, but there is a corridor between access to the ablution space and access to the praying space
2	A person who wants to perform ablution typically removes his or her shoes at the border of the clean zone, puts his or her feet in a slipper from a group of slippers available for ablution purposes, goes to the ablution area, performs ablution, returns back, takes off the slippers at the border of the clean zone, and enters the praying area	The access is from inside the clean zone, users have already removed their shoes at the border of the clean zone. It is therefore easier for them to go to the ablution space, perform ablution, and return for praying	The same advantage of eliminating the use of slippers with the existence of the corridor, the noise from the ablution space can be dissipated and the humidity transfer can be significantly reduced

Environment in the prayer room is essential to ensure acceptable prayers blessed by God. In the practice of Islam, environmental factors such as cleanliness, good hygiene, and maintenance are of most importance. A feeling of discomfort occurs such as bad ventilation, foul odor, dampness, and disarray arrangement of shoes or prayer attire if care and maintenance are not fully implemented [11].

4.1 Concept of Clean “Taher” Zone

In the possible relationships between the praying area and the ablution area, it is important in designing the circulation and access to mosques and praying areas to define what is design wise known as the “clean zone.” This definition aims at keeping the praying space free of organic traces, bad smells, and other things that either render the praying space unsuitable for the function or annoyance of those who are praying or sitting in the praying space [12].

Figure 1 indicates a clear clean zone. The clean zone includes the spaces in which the users are not wearing their shoes. Therefore, shoe rack space was provided to put the shoes outside the line separating the two zones. This separation line is typically defined by using different material which uses color coding or a door [13].

Figure 2 shows the ablution space inside the clean zone. Unfortunately, most all the designers design this space outside the clean zone. The implication is that the

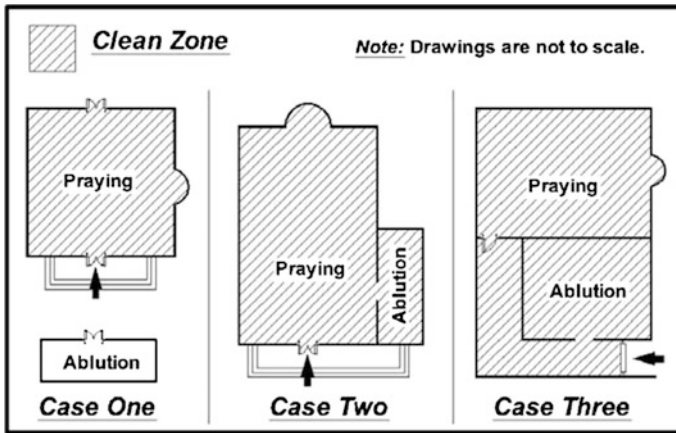
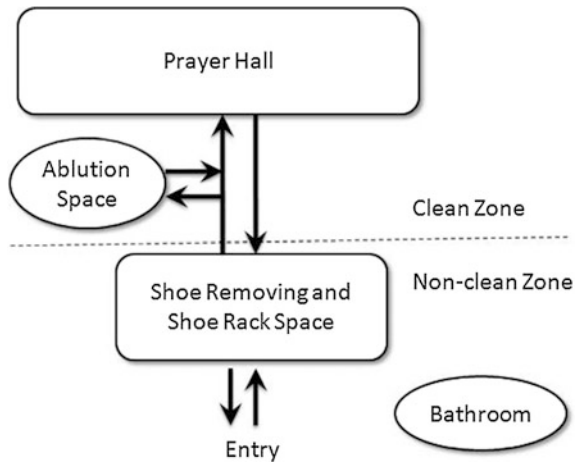


Fig. 1 Physical relation to praying space [12]

Fig. 2 Relationship between spaces in the prayer facility [13]



users have to take off their shoes and go on a public pathway to walk to the ablution space, perform their ablutions, and return to the line separating the clean and nonclean zones with wet feet. The wearing of the communal slippers, which become wet, not only makes the floor of the entry space wet and messy but also aids the spread of skin diseases [14].

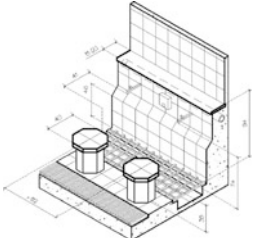
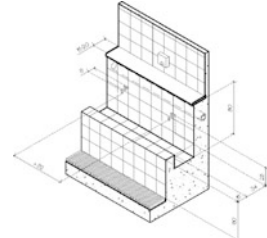
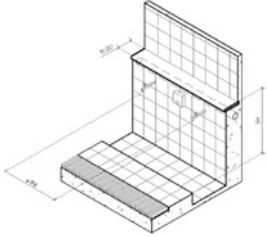
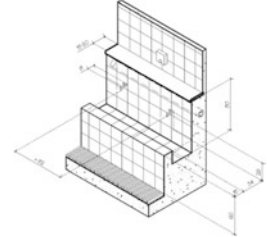
Some of the locations of the bathrooms were designed outside the clean zone and not coordinated to the entrance or the shoe removal space. Unfortunately, most all the designers design the bathrooms located inside or nearby the entrance and very close to shoe removal or even inside the clean zone. With this situation unhygienic conditions can be created. Certainly, communal slippers used in the bathrooms become mixed with those used for ablutions, a situation which works against religious rulings regarding purity [13]. The opening ablution area will make one's

wudhu into revocation and impurity when taking *wudhu* and will become doubtful. The hesitation while praying will make the prayer become forbidden in terms of the practice of worship in Islam practice.

Figure 2 also shows there is no direct access from the ablution space to the prayer hall. Rather, there is a lobby or a corridor that leads to the entrances of both spaces. This is important as it provides control over the transfer of water and humidity from the ablution space to the prayer hall. The floor of the lobby or the corridor needs to be provided with suitable finishing from the appropriate material that helps dry peoples’ feet as they move from the ablution space to the prayer hall. Moreover, the limited path at the peak hour will make around the ablution area more wet and smelly. The choices of materials also play an important role to make sure that the area that always been used will be not giving any inconvenience to the users.

Table 2 shows a very typical design unit for ablution design. With the standard design shown, several designs and characters were applied to current ablution in many countries especially Islam regions in the world. Model 1 shows that the ablution area has been provided with a sitting area to make the users more convenient to take *wudhu*.

Table 2 Models for the design of an ablution unit

No.	Description	
1	Model 1	Model 2
		
	Design guideline for model one—with seats	Design guideline for model two—with lavatory
2	Model 3	Model 4
		
	Design guideline for model three—without a seat	Design guideline for model four—with a barrier

Rubber foot pads are being used to prevent the water from splashing into the body. The seat's height is designed based on an ergonomic and stability when taking *wudhu*. For Models 2 and 4, these models have the same design and features. There is a barrier or sill between the spaces of the watersheds. The high water catchment area can prevent the water from splashing out into the space walk. Rubbery legs with liner are also being provided. In Model 3, no seats are provided as in Model 2 and Model 4. Besides that, the difference between Model 3 with Model 2 and Model 4 is that Model 3 has arranged three watersheds larger than Models 2 and 4. The sticky pads are placed at the back. The adequate size of the foot space also will bring more comfort to the users when taking *wudhu*.

5 Case Study

The purpose of this case study is to review critically the design of an ablution design and to identify issues that illustrate both good and problematic design decisions. This aids the better understanding of the design standards recommended in the chapter.

Ablution design is a component of the Muslim elements and spirit to certify the *solah* is great. The significant things of ablution design are the functions and how it works. The good quality design and material also take consideration in ablution design. A long time ago, people designed their own ablution but a more conventional design is shown in Fig. 3. They used a huge pond which is easy for them to take *wudhu* and the water is guaranteed clean and in good condition. The source of water is purely from the rainwater whereby no pipe systems are provided to take *wudhu*.

In Malaysia, the ablution design was more moves on and modern. The design used high specification materials in conceptual design, and the ablution condition in Malaysia is so good and nice. But there are a few or more ablutions in Malaysia that do not take consideration and alert the users, especially ablution in shopping malls, where some developers do not follow the specification from architect or designer. They just do and are not serious to follow some requirement from the architect or local authority.



Fig. 3 Conventional ablution in Yemen (Source Author 2011)



Fig. 4 Modern ablation in Malaysia (Source Author 2013)

If a comparison is made between the conventional and a modern design ablation, one of the most important elements is the design of the ablation area. As in Figs. 3 and 4, the provisions of facilities are slightly different. In fact, the use of materials and finishes are also different. Table 3 shows the comparison of the ablation area between the conventional and modern design. Compared between the conventional and the modern design, the environment and sanitation are also different whereby the conventional area is less attractive and less comfortable than the modern design.

Referring to Table 3, the comparison between conventional and modern design could be seen by observation when the research was conducted. Selection of a prayer room by some predetermined criteria is in accordance with specification and design elements. Based on this study, the most significant criteria are design and facilities. Otherwise, there are deficiencies and weaknesses in the following aspects. Ablution designed not according to specifications will lead to satisfaction and comfort cannot be achieved.

Table 3 Comparison between conventional and modern ablation

No.	Description		
	Criteria	Conventional	Modern
1	Design	Simply	Complicated
2	Spacing	Huge	Moderate/small
3	Water source	Natural, rain	Piping/air rawatan
4	Material	Rustic	Modern
5	Finishes	Small stone/cement render	Tiling; slate
6	Color	Natural	Mixed
7	Construction	Easy/Faster	Detailed
8	Cleanness	Not good	Better
9	Facilities	Less	More
10	Cost	Cheap	Expensive

6 Conclusions

In designing the ablution space, the functions and the roles of the ablution area must follow the need and requirement in the design aspect. Several aspects must be emphasized such as the selection of materials and finishes, the design itself, the selected location, and also sufficient budget. The ablution area must be designed based on the concept and design elements as well as the right specifications while designing the ablution.

Aspects of site selection are the most important thing for the selection of suitable locations and appropriate role in designing the ablution and prayer function itself. The design guidelines for ablution need to be created so that all prayer in the shopping complex can refer to the guidelines. The conclusion is enforcement in prayer and ablution design should be enforced in accordance with criteria.

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Perak Malay Landscape Furniture Design: An Overview

Ahmad Zamil Zakaria, Mohd Sabrizaa Abd Rashid
and Syazwani Ahmad

Abstract This chapter is a pilot study conducted to obtain preliminary data in connection with the landscape architecture of a traditional Malay community in the state of Perak. The purpose of this study is to provide awareness and promote the civilization of the Malay race. The objective of this study is to identify the elements of landscape furniture and their functions in the Malay community landscape design. The methodology of this study is through site observation on the Perak Malays hard landscape design at the present time, using data from past research and data from old Malay manuscripts as a reference. Lately, many people have questioned the civilization of the Malay community, and this has become a sensitive issue which also reflects the identity of the Malay community in Malaysia. Researchers expect to get valid information in the process of creating landscape design guidelines to Perak Malay.

Keywords Perak Malay garden · Malay landscape · Malay garden concept · Malay · Cultural landscape

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1 Introduction

The Malay history is very long and has undergone a process of high civilization down the ages. The Malay race as has been stated by the scholars is the original inhabitants of the archipelago (Nusantara). The greatness of the Malay race was recorded by the old Malay City-States leaders in stone inscriptions. Having been recorded in history, the old kingdom named “*Gangga Negara*,” “*Manjung*,” and “*Beruas*” exists in the state of Perak [1]. It has been proved that the Malay community in this state had reached a high civilization for centuries. However, the state became famous after the wealth of the land was known by the public. It began with the discovery of tin in the Larut in 1848 by Cik Long Jaafar [1]. With the high civilization that has been achieved, it would be impossible if the Malay community in the state did not have a design for the landscape. In previous research, researchers have managed to find the Malay hard landscape elements in general.

1.1 Scope of the Study

The scope of study is limited to the area of the house and the village of the Malay community in Perak. Researchers conducted a study of the hard landscape character, function, and the design arrangement. This study utilized several sources of data on the previous studies.

2 Literature Review

A literature review was conducted to identify some of the terminology that is seen associated with this research. Researchers have identified terminology to highlight in this chapter and it is shown below.

2.1 Design Concept

Generally, landscape furniture design in Perak closely resembles the design in other states. However, the traditional elements are currently unclear, and hardly reflect the social life of the community in the past. The concept of Malay traditional landscape design in Perak was influenced by the culture of the community. It can be known through the study of space and arrangement of plants in a residential area [2]. Landscape design influenced the activities of the Malays’ home environment. As shown in Figs. 1 and 2, normally the yard at Malays’ houses can be divided into four parts that are front yard, side yard (left and right), and back yard [3].

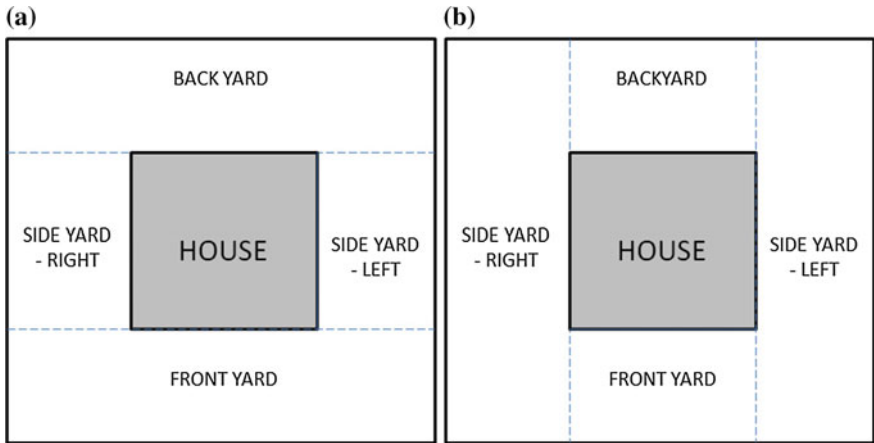


Fig. 1 a Common model 1. b Common model 2: the spatial distribution of landscape at the Malay community house

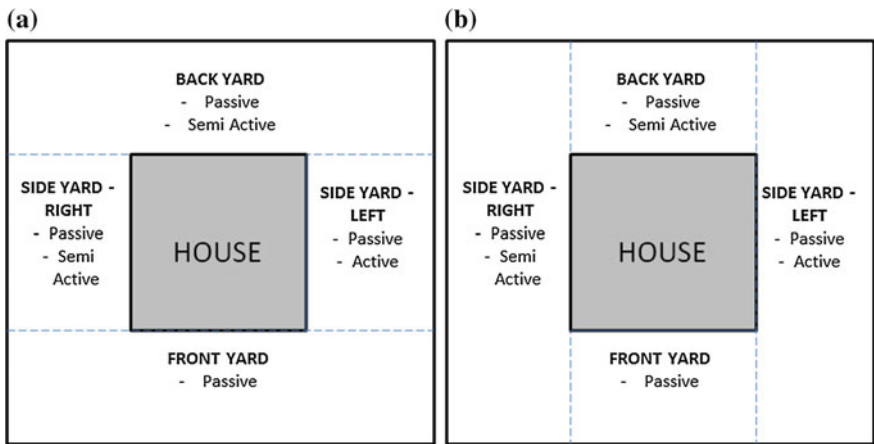


Fig. 2 a Common model 1. b Common model 2: the landscape activities distribution at the Malay community house

2.2 Cultural Landscape

As shown in Fig. 2, the character of the cultural landscape must begin with an understanding and mapping. A table was expressed that can explain the historical character of the area through the process and also its characteristics [4]. From Table 1, the researcher can explain the impact of a culture that can be seen with the collaboration between local culture and design/features. The cultural landscape is fashioned from a natural landscape by a cultural group of people [5]. Culture is the agent, whereas the natural is the medium, and the cultural landscape is the best result.

2.3 *Malay Traditional House*

The house is a status symbol for the residents. From a psychological standpoint, the house can provide a variety of instinctive needs, such as giving a sense of security, peace, harmony, a place of inner peace, and many others [1]. It shows that there are other elements that contribute to the needs of this instinct; it is a home environment that has elements of the landscape.

2.4 *Hard Landscape*

Landscape furniture is an important element in landscape design apart from soft landscape. It is composed of man-made elements or nonliving elements [6]. Through previous studies, researchers have found some landscape furniture elements in the Malay landscape. Table 1 shows the landscape furniture elements found during the site visit (Table 2).

Table 1 List of landscape furniture recorded by the researchers [6]

No.	Local name (as be called by local people)	English name
1	Ampaian	Suspension
2	Bangsalsulap	Bam
3	Buaian	Tree swings
4	Gerbang	Arch
5	Guri	Guri (smaller than common traditional Malay water vessel)
6	Jamban/tandas	Latrine
7	Jamung andang/kandil	Torch
8	Kepok padi/jelapang	Paddy store
9	Kolah	Water tank
10	Kolam	Pond
11	Pagar	Fence
12	Pangkin	Resting hut (usually without shelter)
13	Pasu bunga	Flower pot
14	Plantar	Open timber platform(usually for washing clothes)
15	Perigi	Well
16	Perun	Dump site
17	Reban	Hen coop
18	Tempayan	Water vessel
19	Titi	Log bridge(usually made from areca nut trunk)
20	Wakaf	Gazebo

Table 2 The list of landscape furniture recorded by Ismail [2]

No.	Local name (as be called by local people)	English name	Placement of hard landscape
1	Tempayan	Water vessel	Side yard
2	Guri	Guri (smaller than common traditional Malay water vessel)	Back yard
3	Pasu bunga	Flower pot	Front yard Side yard
4	Pangkin	Resting hut (usually without shelter)	Side yard
5	Perigi	Well	Backyard
6	Perun	Dump site	Side yard Backyard
7	Reban	Hen coop	Backyard
8	Jelapang/kepok Padi	Paddy store	Side yard

2.5 Old Malay Manuscripts

In this study, the researchers reviewed seven old Malay manuscripts to get a list of hard landscape elements listed in each manuscript. The manuscripts are Bustan al-Salatin—The Garden of Kings, Tale of Abdullah, Tale of Hang Tuah, Tale of Inderaputera, Tale of Merong Mahawangsa, Sulalatus al-Salatin—Malay Annals, and Traditional Malay Medicine. Through it as well, researchers were able to collect information on the hard landscape that exists and its function at that time (refer to Table 3). In Sulalatus al-Salatin, there is a story about an old Malay kingdom in the state of Perak.

... Hatta beberapa lamanya maka Sultan Mahmud menitahkan Paduka Tuan menyerang Manjung, kerana **Manjung** itu dahulu kala negeri besar, tiada ia muafakat dengan **Beruas** ... [7].

Below are some examples of hard landscape, which are mentioned in old Malay manuscripts.

... orang Kundur membuat balai apit pintu keduanya, dan orang Suntai berbuat balai kendi, orang Melai berbuat **pemandian**, orang Upang berbuat **bangsal** gajah, orang Tungkal membuat masjid, orang Bintan membuat **pagar** istana, orang Muar membuat kota wang. Adapun istana itu baik pula daripada dahulu. Setelah sudah ... [7].

... Menyuruhkan segala anak biduanda, Membaiki sungai pancuran yang ada. Sultan kembali bermain sudah, Bersiram ke Sungai Penjaring yang indah, Raja Muda membuat faedah, **Tempayan** dan **buyung** sekalian ditadah. Fakir pun ada masa itu, Ramai berhimpun semua di situ, Fakir pun membuat **pancuran** satu, Naik ke darat mengiringkan ratu ... [8]

Table 3 List of landscape furniture recorded in the old manuscripts [6]

Types of landscape furniture (as it appears in the manuscript)	Manuscripts															
	Bangsas/Sulap	Gerbang	Guri	Jamban/Tandas	Jamung andang/kendil	Kepok padi/klaoama	Kolam	Pagar	Pangkin	Pasu	Pelantar	Perigi	Reban	Temoyan	Titi	Wakaf
Buslan al-Salatin (The garden of kings)		X			X	X	X		X	X					X	X
Tale of Abdullah	X			X	X	X	X	X		X		X		X		
Tale of Hang Tuah	X	X			X	X	X	X	X	X	X			X		
Tale of Inderapulera		X			X		X	X							X	
Tale of Merong Mahawangsa	X	X	X		X	X	X							X		
Sulalatus al-salatin (Malay annals)	X	X					X	X	X	X		X	X	X	X	

3 Methodology

The method of this study was to focus on observation through site visits and also the references of previous research studies regarding the cultural landscape. Apart from that, the old manuscripts have also been used to get a list of landscape furniture elements that have been used in the past. The sample used in this study was 10 traditional Malay houses in the state of Perak. Sample selection was done randomly, and the method of obtaining data was through the technique of semi in-depth interviews and site observations.

3.1 Sample Criteria

The sample was selected according to the criteria that have been set as follows.

- Traditional Malay village
- Malay houses that still maintain the values of authenticity
- Having hard and soft landscape elements
- Age of the house more than 50 years
- Compound distribution, has a large yard.

3.2 Assessing the Cultural Landscape

Assessing the cultural landscape used the method introduced by Robert Z. Melnick. The researchers need to find relevant information in 12 features that have been mentioned by Melnick. This information can assist in making research more efficient. Researchers conducted the study of characteristics and elements of natural, cultural, visual, and meaning by using this method [9].

3.3 Assessing the Malay Landscape

Assessing the Malay landscape using the relevance theory by Dan Sperber and Deirdre Wilson included the fact of the constitution and the principles of selection and relevance of context. This theory also emphasizes oral conversation and speech acts [10].

4 Finding

Generally, the Malay communities in Perak at the moment no longer apply Malay landscape identity to their home's yard. There are several possible factors, discussed in the conclusion. Through the pilot survey, researchers found still fewer

hard landscape elements throughout this study (refer to Table 5). Lack of hard landscape elements was likely the cause of the sample not being large enough to represent the population. The findings of this study are summarized in Table 4.

4.1 Site Visit Observation

The state of Perak is divided into 10 districts, namely Batang Padang, Kinta, Kuala Kangsar, Larut, Matang and Selama, Kerian, Manjung, Hilir Perak, Perak Tengah, Kampar, and Hulu Perak. However, not all districts were visited by the researchers. Most of the houses visited by the researchers were adjacent to the Perak River as shown in Figs. 3, 4 and 5. It is because in this area there are still plenty of traditional Malay houses maintained in good condition.

4.2 Landscape Furniture Arrangement

As stated in Table 5, most of the houses visited did not show a strong identity of the Malay people. Furniture landscape is in no formal arrangement. There were houses visited by the researchers that had fewer elements of landscape furniture, but had a large yard and an old aged house. Layout of landscape furniture, mostly in accordance with the philosophy of the earlier Malay community, for example, guri/pond water for washing the feet, located at the entrance of the house. There is a shower and toilet at the back of the house and the paddy store was on the side of the house.

4.3 Materials

Mainly landscape furniture was made from wood material. The materials to make landscape furniture reflected the design of a building. Water vessels and guri are examples of using ceramics. In this study, there are several buildings that are seen as having a combined architecture. From a historical perspective, traditional Malay society in Perak is known for the manufacture of pottery. So it is not surprising that most of the hard landscape elements are made of ceramic.

4.4 Condition of Landscape Furniture

Most of the elements of landscape furniture were not in good condition. They looked poorly maintained, in addition to the materials which were mostly made of

Table 4 Findings of site visit

House no.	District	Age of home (as told by the owner/relative)	Landscape furniture arrangement	Landscape furniture materials	Condition of landscape furniture
1	Larut, Matang and Selama	>70 years	<ul style="list-style-type: none"> • Neatly arranged • No formal layout • Combining traditional features with modern style 	<ul style="list-style-type: none"> • Wood • Ceramic • Cement concrete 	<ul style="list-style-type: none"> • In moderate conditions • It needs to be repaired
2	Larut, Matang and Selama	>90 years	<ul style="list-style-type: none"> • No formal layout • Based on philosophy 	<ul style="list-style-type: none"> • Wood • Ceramic • Cement concrete 	<ul style="list-style-type: none"> • In moderate conditions
3	Larut, Matang and Selama	>70 years	<ul style="list-style-type: none"> • Neatly arranged • No formal layout • Traditional features • Based on philosophy 	<ul style="list-style-type: none"> • Wood • Ceramic • Cement concrete 	<ul style="list-style-type: none"> • Not in good condition • It needs to be repaired
4	Kuala Kangsar	>100 years	<ul style="list-style-type: none"> • No formal layout • Traditional features • Based on philosophy 	<ul style="list-style-type: none"> • Wood • Cement concrete 	<ul style="list-style-type: none"> • Not in good condition • It needs to be repaired
5	Kuala Kangsar	>100 years	<ul style="list-style-type: none"> • No formal layout • Traditional features but more modern • Based on philosophy 	<ul style="list-style-type: none"> • Wood • Cement concrete 	<ul style="list-style-type: none"> • Not in good condition • It needs to be repaired
6	Kuala Kangsar	>80 years	<ul style="list-style-type: none"> • No formal layout • Traditional features • Based on philosophy 	<ul style="list-style-type: none"> • Wood • Cement concrete 	<ul style="list-style-type: none"> • Not in good condition • It needs to be repaired
7	Perak Tengah	>100 years	<ul style="list-style-type: none"> • No formal layout • Traditional features • Based on philosophy 	<ul style="list-style-type: none"> • Wood • Ceramic 	<ul style="list-style-type: none"> • Not in good condition • It needs to be repaired
8	Perak Tengah	>100 years	<ul style="list-style-type: none"> • No formal layout • Traditional features • Based on philosophy 	<ul style="list-style-type: none"> • Cement concrete 	<ul style="list-style-type: none"> • Not in good condition • It needs to be repaired
9	Perak Tengah	>80 years	<ul style="list-style-type: none"> • No formal layout • Traditional features • Based on philosophy 	<ul style="list-style-type: none"> • Wood 	<ul style="list-style-type: none"> • Not in good condition • It needs to be repaired
10	Perak Tengah	>80 years	<ul style="list-style-type: none"> • No formal layout • Traditional features • Based on philosophy 	<ul style="list-style-type: none"> • Wood • Cement concrete 	<ul style="list-style-type: none"> • Not in good condition • It needs to be repaired



Fig. 3 a–b Shown the landscape furniture at District of Larut, Matang and Selama, Perak (Source Author, 2014)

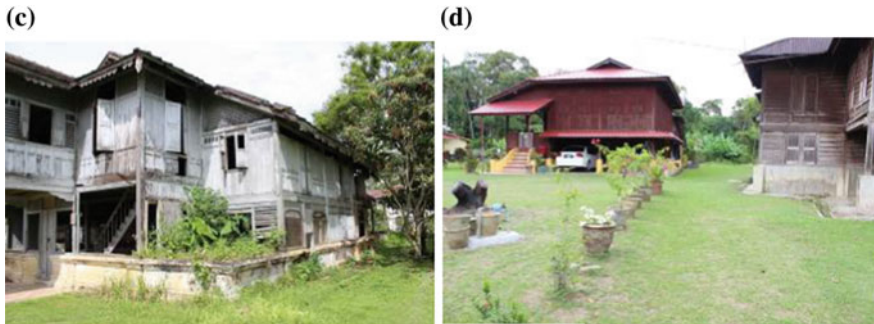


Fig. 4 c–d Shown the landscape furniture at District of Kuala Kangsar, Perak

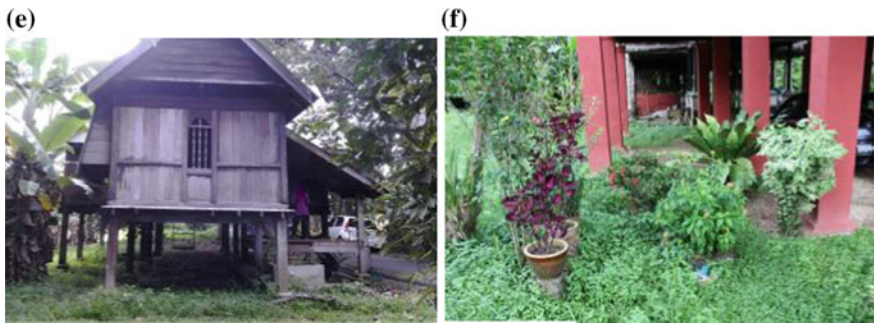


Fig. 5 e–f Shown the landscape furniture at District of Perak Tengah, Perak (Source Author, 2014)

ceramic and wood, allowing them to be less manageable. Maintenance of every element of landscape furniture is necessary to accentuate the identity of the Malay community which was known for preferring cleanliness.

Table 5 Landscape furniture found during site visit

No.	Local name (as be called by local people)	The function of each element of hard landscape, as it has been informed by the respondent
1	Bangsal/bam	The bam is a walled that ched building. It is also possible without high walls and floors. It can also be floored soil used for storing goods, such as rice store
2	Pasu bunga/flower pot	Flower pots have been used down the ages yet to be placed in the courtyard. Made of clay or plastic with various shapes and colors over time
3	Tempayan/water vessel	For the Malay community, water vessel usually made without caning and used for storing water and fermenting foods
4	Kolam/water feature	Is the place to store water, which was built next to the stairs. It also serves as guri, a place to store water for cleaning the feet be fare going up to the house
5	Pangkin/resting hut	Resting hut is a four-legged wooden building, or more (depending on size) and slightly lower than the table. Serves as a resting place, afternoon teas and daily activities eg; knitting: and repairing nets
6	Bilik mandi/bathroom	Bathrooms in accordance with customary the Malay community. need to be built outside the house with toilet. Toilets, showers and also an ablution place must be separated. Toilets also should not be located opposite the place of prayer
7	Perun/dump site	Perun is a hole dug, the location is in the back of the Malay house, and be a place to dump and bum rubbish
8	Jamban/latrine	A simple toilet such as a hole in the ground. A latrine is basically a simple waste collector
9	Reban/coop	Coop is hard landscape elements, which can be found in traditional Malay houses around a courtyard. Usually placed in the back or side of house courtyard
10	Guri/guri	Guri or pitcher has the same characteristics as a water vessel, but different from the size and smaller opening mouth
11	Perigi/well	Wells is a hole dug to obtain water resources (groundwater)
12	Ampaian/suspension	It is a place to hang washed clothes
13	Kerusi/bench	Seating in the yard which intended to leisure activities

5 Discussion

After conducting research on some samples of the traditional Malay house, the researchers found there were several difficulties to accentuate the identity of the Malay landscape. Following is a list of problems to be solved if the Malay community wants to see Malay civilization highlighted in the field of landscape architecture.

- *Landscape Furniture Layout*

Traditionally, the Malays did not practice a formal style layout to hard and soft landscape in their homes. However, the arrangement is in accordance with the philosophy and taboos of the Malay community.

- *Maintenance of Landscape Furniture*

Maintenance is necessary because without it something of high value will also be destroyed just like that..

- *Clean All the Time*

It needs cleanliness, and back to the basics of Islam that wants every believer to practice cleanliness wherever they are.

- *Knowing the Philosophy of Old Malays*

Old Malays have a variety of philosophies, taboos, and customs that are still relevant to our practice today.

- *Understanding the History of the Malay Race*

Each civilization must be recorded, or evidence of its own glory. If not kept up by studying and preserving it, it would disappear. Finally, the Malay community will lose its identity and end with the other races not respecting our future generations.

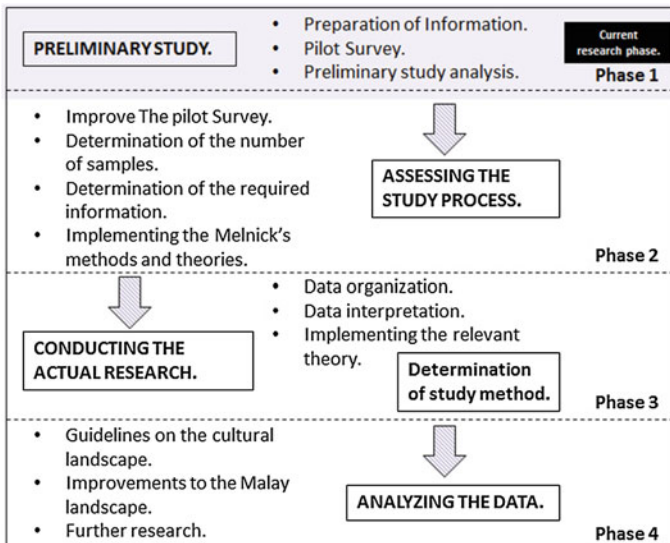


Fig. 6 Phase and involvement of the development of the research (Source Author, 2014)

- *Loved Our Nation*

A loving nation is not the same as loving a woman or a man. Loving nations will create a high spirit of patriotism, and increase the desire to promote and defend the religion, nation, and the country.

Figure 6 shows the phase and achievements of this research. For this study, researchers have placed it in the first stage. The phase is a pilot survey for the study of hard landscape character, function, and the design arrangement. However, this study will be a benchmark for studies in other districts throughout the state.

6 Conclusion

Malay landscape furniture can be developed with the conditions they want to change and no longer find any weaknesses in their nations. Researchers are very confident this study is due to the Malay race at a time that had a high civilization. The historical record shows that at times there were more than 20 ancient Malay kingdoms that existed in the archipelago. Every government had its own hayday. The paragraph below explains the existence of the ancient garden according to an old manuscript.

... Sultan hendak ke Tanjung Bemban? Tiadakah pelanduk dengan landak dengan kurungnya dan tiadakah ikan dengan **kolamnya** dan buah-buahan, bunga-bunga pun ada semuhanya di dalam taman. Mengapatah maka Sultan hendak pergi main jauh-jauh?" Maka sahut Sultan Seri Teria Buana, "Jikalau beta tiada lepas oleh bunda pun beta bermohon juga." Maka kata Permaisuri, ... [11]

The field of landscape architecture naturally began and grew in the palace. After that it was revealed to the nobles. Finally, the knowledge of this field came to the masses. The development of the Malay landscape is so challenging because the activity of this nation who liked migrating due to a variety of factors, including natural disasters, wars, and also migrating to other places, has made its growth stunted. However, the records of the society and other people in the past have recognized and show us the Malay community has a high standard of living.

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Designing ‘Embouchure Clay’ Parameter Formulation: Sabak Earth Ceramic Craft

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Verly Veto Vermol and Rasmadiyah Anwar

Abstract Clay is a deceptively simple material. It is beneficial to the entire world and was made an important commodity. Clay is an unpredictable material because it can be found in the earth already softened with moisture and ready to be worked. However, some of the clay needs modification before it can be used in ceramic manufacture. Malaysia has several ceramic craft entrepreneurs that purely use clay that is obtained nearest their location, for example, Sayong Craft Perak, Zultah Craft Kelantan, Termin Craft Pahang, and Bendang Studio Melaka. Currently, Sabak Bernam has developed a ceramic craft enterprise that was known as Sabak Earth craft. However, they still are not using local clay from Sabak Bernam. Through appropriate research and development on clay in Sabak Bernam, it will enable the artist, academician, and especially Sabak Earth to uncover new sources of clay for ceramic production. The objective of this research was to study the capability of clay at Sabak Bernam for Sabak Earth craft products in two different techniques, slip trailing and press mould. Due to this research Sabak Earth will enhance the manufacture of ceramic craft products with low-cost raw materials.

Keywords Clay · Ceramic · Craft · Sabak Bernam · Sabak Earth

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1 Introduction

Nowadays, Malaysia is one of the countries that are rich with pure clay materials such as kaolin, terra cotta, ball clay, and others. For example, Sayong Kuala Kangsar used their own clay that was taken from the banks of the Kuala Kangsar River [1]. Abundant quality clay for ceramic craft manufacture is not only found at Sayong but in all of Malaysia such as Zultah craft Kelantan, Termin craft Pahang, and Bendang studio Melaka. All of these areas used their own clay for ceramic production and their business performances have been very successful until now. Using their own clay can enhance the craft manufacture [2, 3] with a minimum cost for raw materials. According to this situation, Sabak Bernam or other ceramic craft areas can develop their own clay to be successful as well as Sayong Kuala Kangsar and others [4]. Currently Sabak Bernam has developed a ceramic craft entrepreneur called Sabak Earth [5]. This study was to discover the local clay at Sabak Bernam to be experimented with as material for Sabak Earth ceramic craft manufacture. This research focused on slip trailing and press mould techniques. Slip trailing is the identity of the Sabak Earth product because other manufacturers or crafters do not use this technique to produce their craft artwork [6]. Previous study of the clay at Sabak Bernam showed that the clay could be used for craft manufacture [7].

Clay is the product of geology surviving on the earth surface. Clay is an extremely common and rich material in the earth. Clay is produced by nature and no doubt, more clay is being formed daily than people are able to use up in ceramics [1]. Clay is the main material of ceramic production and is a raw material for some refractories. Clay is defined as an earth that forms a coherent sticky mass when mixed with water [4]. Normally clay is in a wet condition and soft; when heated it becomes hard. The term of clay used generally, referring to the mineral group, is a sedimentary deposit or rock, or grain size less than $2\ \mu\text{m}$ [7]. The characteristic plasticity, durability, and low cost made it an important commodity in the entire world. Clay was classified into six categories, which are kaolin, ball clay, fire clay, stoneware clay, earthenware clay, and bentonite. These clay formations contain different numbers of minerals. Generally clay consists of water, oxygen, alumina, and silica. The composition of pure clay is $\text{Al}_2\text{O}_3 \cdot 2\text{SiO}_2 \cdot 2\text{H}_2\text{O}$. The formula relative amounts of the oxides are stated as molecular [8]. Clay is categorized by composition, plasticity, shrinkage, color, absorption performance, and firing characteristic. Plasticity is the specialty of clay; this uniqueness makes it able to be formed in any shape and size, depending on techniques and making process [9]. The physical nature of clay is about chemical composition. It can be determined by a simple experimental test on clay.

1.1 Sabak Bernam

Sabak Bernam is one of the most important districts in Selangor. It has an area of 242,560 acres. It is located in the embouchure area, in the southwestern part facing

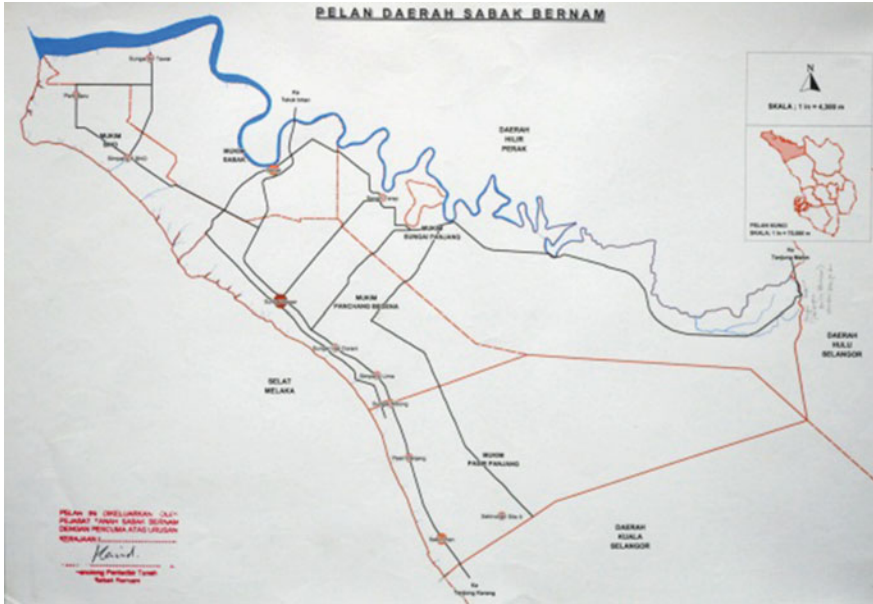


Fig. 1 Map of Sabak Bernam district area

the Straits of Malacca. Generally the Sabak Bernam district has three main important cities which are the focal point of the population in the country. The cities are Sabak Bernam, Sungai Besar, and Sekincau. People in this area consist of a multiracial society, however, it mainly consists of Malay people. From the past until now the area has been famous as a center of agriculture and fisheries in Malaysia [7]. According to Geo Science Selangor, Sabak Bernam is one of the peat soil areas in Malaysia. Therefore this area has a lot of paddy fields, coconut trees, and coconut palm. Accordingly these plantations are suitable for peat soil. Figure 1 shows the area of Sabak Bernam Selangor [8]. Therefore from the previous study and observation of this study, ceramic craft in the Selangor area was started after the Second World War and work of pottery at a small business at Kuala Selangor. History shows that all the raw materials used local clay from that area. Therefore Selangor according to V.N. Ramadass Selangor has the highest quality clay source as ceramic material based on their experiences. Ramadass Company is currently active in their business and several of their products were made by using local clay obtained nearest their business area [9–11].

1.2 Sabak Earth

Sabak Earth ceramic craft businesses in Malaysia started to bloom in addition to the famous Sayong Craft Perak, Termin Craft Pahang, Zultah Craft, and Bendang

Studio Melaka. Sabak Earth is starting to rise topping the current ceramic craft products in the market. From observation, the researchers noticed that 10 fresh ceramists have developed in Sabak Bernam areas. The objective of Sabak Earth development [5] is to enhance the income of rural people in the Sabak Bernam area. The name of Sabak Earth is taken from the name of Sabak Bernam and earth means clay [5]. Sabak Earth Craft produced ceramic products using two techniques, which are slip trailing and press mould techniques. Slip trailing is an identity for Sabak Earth Craft because there are no places in Malaysia that produce this product except Sabak Earth. The ceramists of Sabak Earth are from a rural people in the area of Sabak Bernam [5]. They were introduced to the ceramic process in a short learning process. Basically they learned a simple process of ceramic manufacture from raw materials till the end of the product. They also learned about the mould-making and firing process that they have been guided in for four months of the learning process [5].

2 Method

This research method was used by previous research results of the parameters of clay development [10]. The capability of Sabak Bernam clay use for ceramics was proved. The result shows that one of the clays from Sabak Bernam definitely has an equivalent result compared with existing Sayong clay. This clay was tested through several simple laboratory tests for identifying the characteristics of the clay itself. The clay was obtained in the Bagan Terap area in Sabak Bernam. It was through the basic procedure of clay processing which is digging, mixing, sieving, and drying [12]. The experiment was conducted in the ceramic department's laboratory under UiTM Shah Alam. The laboratory test was to investigate the physical properties of clay bodies such as color, strength, porosity, and mineral content [13]. By using a ceramic test bar parameters were constructed by laboratory test. The size for the test bar was $120 \times 40 \times 4 \text{ mm}^3$. The total test bar surface was 100 mm for an easier measuring process after it was fired. The test bar was tested on modulus of rupture (MOR), water absorption, and scanning electron microscopy (SEM) [11]. Finally the clay was tested practically by ceramic craft manufacture. The test results were shown by the performance of Sabak Bernam clay use for slip trailing and press mould craft products.

Figure 2 shows the test bar fired at 1000 °C. By using press mould techniques in test bar fabrication the result was evaluated at this stage. The first observation was on the clay body color; it merges a brown yellow color tone that is definitely a positive result. Fired clay bodies went through a physical properties experiment to investigate the physical performance.

Fig. 2 Fired test bar of Sabak Bernam



Table 1 Shrinkage and water absorption

Test bars	Shrinkage dried (%)	Shrinkage fired (%)	Water absorption (%)
Sabak Bernam	10	13	18.74
Sayong	6	10	19.95

2.1 Shrinkage and Water Absorption of Sabak Bernam Clay

Table 1 shows the average shrinkage analysis for the same fabricating time and firing temperature [14]. All the test bars were measured in green ware and fired condition to evaluate the shrinkage percentage (see Fig. 3). The firing was set at 1000 °C. This temperature was defined as suitable for a low glaze temperature. At this stage, the researchers observed a comparison between Sabak Bernam clay and Sayong clay that is not that much different, for example, the water absorption result, which only differs by 1 %.

Fig. 3 The graft of shrinkage and water absorption of the test bars

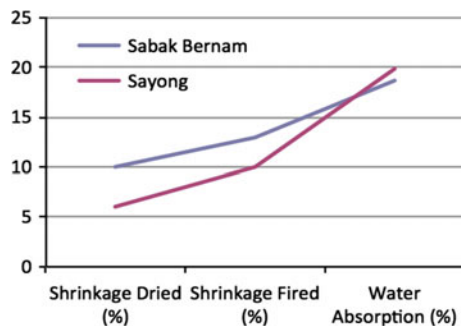


Table 2 MOR fired body strength result of Sabak Bernam and Sayong fired clay performance

Test bars	MOR (N/mm ²)
Sabak Bernam	14.64
Sayong	19.26

2.2 Modulus of Rupture

Table 2 shows the analysis result of data evaluation for the MOR test, which investigated strength of the Sabak Bernam clay test bar. The results shown in Table 2 proved that Sabak Bernam clay strength is 5 % weaker than Sayong clay.

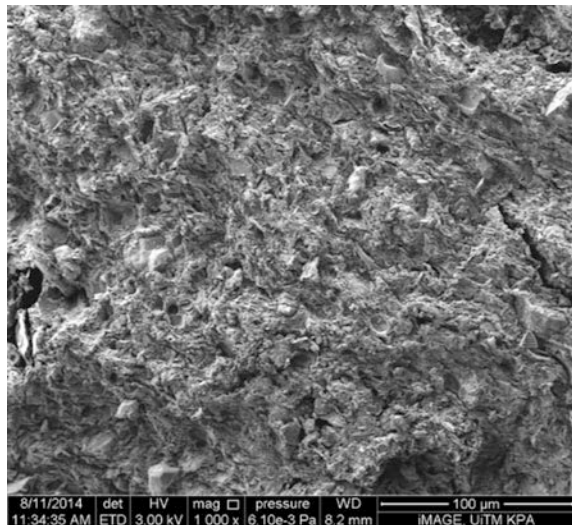
2.3 Scanning Electron Microscopy (SEM)

The SEM experiment was to identify the mineral contained in the clay body. Figure 4 shows the image result of microscopy. The experiment result showed the minerals in the clay body which were aluminum, silica, calcium, titanium, and ferum [15]. Based on Fig. 5, the result showed Sabak Bernam clay contained a higher amount of silica.

2.4 Forming Result

The clay was processed into two different conditions of clay, slip and plastic [15]. Both these conditions influence the making techniques of the craft product. The first

Fig. 4 SEM image of clay body



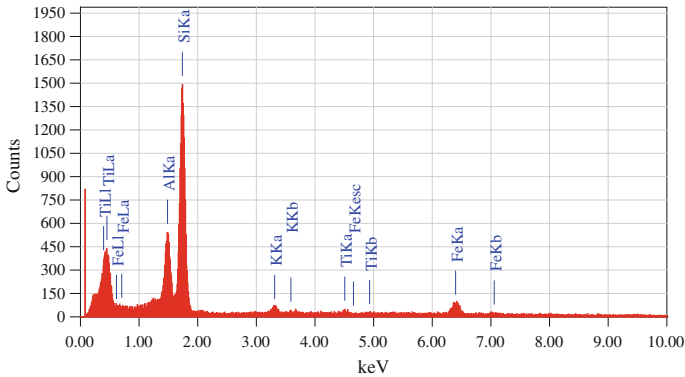


Fig. 5 Parameters of mineral elements contained in Sabak Bernam clay

practice of clay applied to press mould techniques. The clay has shown a successful result; the test used the press mould technique, which totally doesn't show any negative result. The clay was applied in different mould designs. Based on the figure of Sabak Bernam clay, it was able to be applied in various designs and curved edge of the mould.

The second test was applied by slip trailing techniques. This method has shown a positive outcome for the press mould result. The practice result showed that the clay can form the product by using a slip and the outcome is the same as the existing clay that was used earlier for the manufacturing [16]. Figures 6 and 7 show samples of press mould and slip trailing craft products that were made by using Sabak Bernam clay.

Fig. 6 Press mould fired ceramic bisque representing the craft of Sabak Earth



Fig. 7 Slip trailing technique through Sabak Earth



3 Conclusion

All the physical properties experiments and practicing on clay have shown that Sabak Bernam embouchure clay can be used to produce the ceramic craft product for Sabak Earth Craft. The objectives of this research were to study the capability of Sabak Bernam clay performance in slip trailing and press mould technique in producing ceramic craft success. The results are shown in Figs. 6 and 7. The physical performances of Sabak Bernam clay are definitely equivalent to Sayong clay. This result can help the Sabak Earth Craft in the Sabak Bernam area to enhance their craft product by using minimum cost. Moreover, Sabak Bernam clay can be commercialized by local ceramists and artists. It will help to generate income in the clay sector in Sabak Bernam. Previous research in Sabak Bernam doesn't show any attractive identity for tourism. According to this situation Sabak Bernam can be one of the tourism places and definitely will enhance Selangor tourism. Furthermore, Sabak Earth Craft embark their product and compete with other crafters in Malaysia especially including Sayong. The most important is the new strategy [17] and design model [18, 19] of designing ceramic production.

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Significance of Prayer Room Design Standards at Shopping Complex

Abu Bakar Abd Hamid, Mohamad Hanif Abdul Wahab,
Aida Alias and Norashikin Rahmat

Abstract Malaysia is one of the developing countries that is moving towards a developed nation. As a developing country, several aspects must be taken into consideration such as economic development, human capital, education, and transportation that co-operate in a crucial role in inspiring people to live more comfortably. Malaysia as an Islamic country has a majority population; Muslims have a dream to be a good nation and a vision country. However, there is still leaking and weak enforcement in Muslim prayer room (*Musholla*) guidelines. The specific guidelines to build and design for prayer rooms must have specific specifications. This study was to identify and emphasize the significance of design standards that influence the purpose of space. Therefore this research focused on the design standards that influence the function of space at a shopping complex. These design standards were discussed in this study to make sure that the right and suitable aspects of design of the prayer room can be designed and constructed according to the needs of the users. The design for the prayer rooms in the shopping complex should take into consideration different types of users: the normal users, the elderly, and the disabled. The information and data collected will be referred and reviewed by respected parties as an implementation guidelines design standard for prayer rooms.

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Keywords Musholla design • Muslim prayer rooms • Mosque design • Design environment • Space planning

1 Introduction

The population of Muslim people covers about 20–25 % of the world population which is Islam in the majority in almost 40 countries [1]. As one of the highest majorities in the world population, Muslim should be able to practice the Islam religion without any difficulty. The Muslim community needs a space where they can perform prayer either in the mosque or other space that is clean and able to pray. The requirements of the design space for a prayer room need strategic planning and suitable design that is following the right standard and the need of the Islam and the users.

Numerous designers are interested to design either a mosque or a praying facility in a shopping mall, an exhibition hall, an airport, or other public building [2]. Each design that has been proposed must get an approval from the local authorities to be evaluated and approved according to the right standard. Many aspects need to be reconsidered in designing the prayer room including the design, Qiblah direction, ablution design, sizes of prayer room, and the location of prayer room. Muslims pray five times a day; in dawn, in midday, in the afternoon, sunset, and at night. The requirement of performing prayer five times a day is not taking into consideration when we are at home only but anywhere we are: at the office, in the shopping complex, and even at the highways. Unfortunately, the architectural designs of prayer facilities are frequently deficient, which results in the spaces being uncomfortable and unsafe. Apparently, the reason for poor design is the lack of adequate standards that guide designers' decision-making [3].

2 Objective and Methodology

The objective of this research was to propose and review the guidelines design for a prayer room at a shopping complex based on existing guidelines and recommendation by local authorities and State Islamic Council. The author has developed several methods to support this research. These guidelines also take into consideration the views of the public through the survey and physical measurement. With the assistance of drawings using computer-aided design (CAD), the design of prayer rooms is being sketched. This research investigating how the people use prayer room is capitalized on so as to study well-designed spaces, identify their strengths, and incorporate with the design standard and the criteria of prayer room facility and also to identify poorly designed spaces, analyze the weaknesses and recommend their avoidance. A further discussion with some local authorities' officer has revealed their requirement to understand the functions performed in these spaces.

3 Problem Statements

Based on architectural design standards, *Architectural Graphic Standards* [4], *Neufert Architects' Data* [5], and *Metric Handbook* [6], provide useful but basic data for some aspects of mosque design. *Neufert Architects' Data* covers basic categories of mosque design as it has appeared historically in various regions of the Islamic world. The *Metric Handbook* suggests basic elements for the design of a mosque, focusing on the symbolic value of the elements. It also covers aspects of prayer room design.

Most prayer rooms in shopping complexes can accommodate a small congregation of worshippers. The small narrow space provided may cause discomfort and uneasiness when performing the prayers. During the peak hours, an overflow may result for those awaiting their turn. The congestion may cause unwarranted conditions such dampness, moist, and unpleasant odors. Furthermore, the location of prayer rooms is far thus making it difficult for visitors to locate. Standard requirements introduced by local authorities such as the spatial size and prayer facilities were not fully implemented [7].

4 Literature Review

The prayer room is an intervention, not an intrusion to its surrounding. The prayer room is also regarded as an “oasis”, a metaphor for a welcoming place to find shelter or stop briefly, as a place of transit in life. The prayer room or surau or *musalla* does not merely provide physical presence to a community; in terms of anchoring and strengthening religious beliefs, it also provides an opportunity for spiritual presence [8]. In order to provide further information on design standards for ablution spaces; there is also a video covering the same topic [2].

The other aspect of environment in the prayer room is essential to ensure acceptable prayer and blessed by God. In the performance of Islam, environmental factors such as cleanliness, good hygiene, and maintenance are of most importance. Feelings of discomfort occur such as bad ventilation, foul odor, dampness, and disarrangement of shoes or prayer attire if care and maintenance are not fully implemented [9]. There are three main aspects and interpretations of the surau that must be clearly understood and integrated (see Table 1).

According to Reed [10], spiritual aspects cover intra-, inter-, and transpersonal. Spiritual can also be interpreted as the core of who enters and affects human life and is manifested in the thinking and behavior as well as in conjunction with self, others, the universe, and God [11]. Religion is a system of belief and worship organization where someone can express his or her spirituality obviously.

Table 1 Three main aspects incorporating the truly functional Surau [2]

A Surau to an individual	A Surau to a community	A Surau to its environment
<ul style="list-style-type: none"> - A place of solace - A place to seek refuge - A place to find inner place - A place to rest - A place for physical and spiritual cleansing - A place of humility - A place for reflection of one's deeds 	<ul style="list-style-type: none"> - A place for gathering - A place for learning - A place to conduct discourse - A place to fulfill duties and obligations - A place to express - A place to celebrate and solemnize - A place to mourn and take heed 	<ul style="list-style-type: none"> - A place for shelter - A place to complement nature - A place to begin or continue a journey of righteousness - A place to balance the elements - A place of harmonious composition and tranquility - A place of serene juxtaposition between Creation and the Created

4.1 Conventional Prayer Room

A location for religious activity that is not included in an a priori construction plan, the prayer room is often placed in a vacant space in a building and is not integrated with other facilities. The conventional prayer room is a basic facility and has improper arrangement. Basically, this type of prayer room is inconvenient and uncomfortable for the users' accommodation. The issue occurring in conventional prayer rooms is there is no management and design standard. The facilities and comfort aspect cannot be provided to the users (see Fig. 1).

4.2 Modern Prayer Room

A location for religious activity that has been planned and included as an integrated part of a building, like other facilities such as the parking lot and restrooms, the modern prayer room provides convenience and comfort to the users. With proper



Fig. 1 Prayer room at Mall Ambassador, Indonesia [12]

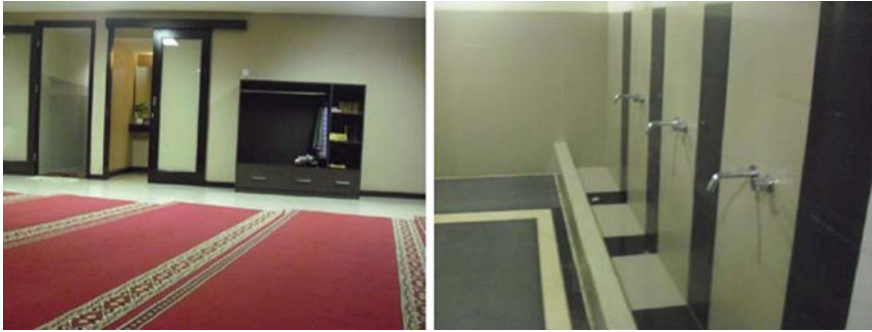


Fig. 2 Prayer room at SenCi Mall., Indonesia [12]

condition, arrangement, and design scheme, the users may feel welcomed and focused in their prayers (see Fig. 2). Using high-quality materials and finishes the prayer room creates a warm and inviting environment [9].

4.3 Design Aspect

The required elements in designing prayer rooms are as follows.

(1) *Space and Form*

In approaching the design of a sanctuary (*musolla*), the desire to achieve spatial equity and integration of a sacred space, it is helpful to depend on our knowledge of the first mosque built at Madinah in the seventh century CE as the fundamental historical precedent which in essence transcends through all mosque design. Because the principal function of the *musolla* is the performance of communal worship for both men and women, the designer would need to approach the composition of a plan for the *musolla* such that it fulfills its primary function: *social inclusion*. A well-designed plan can enhance the harmony, scale, balance, and composition of the *musolla* [13, 14]. The locally independent *musolla* is a provisional prayer room, typically attached to some other everyday function or use (offices, airports, hotels, hospitals, shopping areas, campuses, etc.).

(2) *Ablution Design and Concept of Cleanliness*

The ablution function involves cleaning with fresh water certain parts of the body in a certain order. It starts with rinsing the palms, rinsing the mouth, washing the nose by sniffing, washing the face, washing each arm up to the elbow, wiping the hair with wet hands, rubbing the ears with wet hands, and finally, washing the feet up to the ankle [14, 15].

Figure 3 shows the different designs of prayer rooms based on diverse conditions. There are three cases explained in this study. Based on Case One, the access

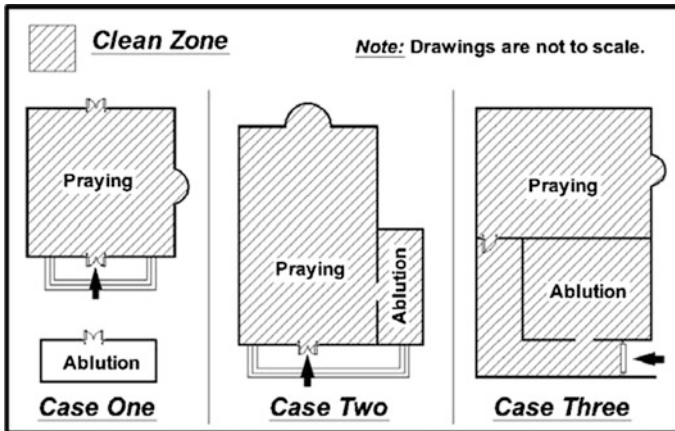


Fig. 3 Physical relation to praying space [2]

to the ablation space is from outside the clean zone. The user who wants to perform ablation typically removes his or her shoes at the border of the clean zone, puts his or her feet in slippers from a group of slippers available for ablation purposes, goes to the ablation area, performs ablation, returns back, takes off the slippers at the border of the clean zone, and enters the praying area.

Otherwise, according to Case Two, access to the ablation space is from inside the clean zone and directly from the praying area. The access is from inside the clean zone; users have already removed their shoes at the border of the clean zone. It is therefore easier for them to go to the ablation space, perform ablation, and return for praying.

Lastly, Case Three shows that the access to the ablation space is from inside the clean zone, but there is a corridor between access to the ablation space and access to the praying space. The same advantage of eliminating the use of slippers with the existence of the corridor, the noise from the ablation space can be dissipated and the humidity transfer can be significantly reduced.

5 Case Study

The purpose of this case study is to identify and evaluate the problems regarding the design and system in the prayer room at the shopping complex. The survey and physical measurement have been used in this study. It involved several prayer rooms that have been selected as case studies to be evaluated and compare the design standard. The case study covered the Klang Valley area and Johor Bahru district with the involvement of the local authorities and State Islamic Council.

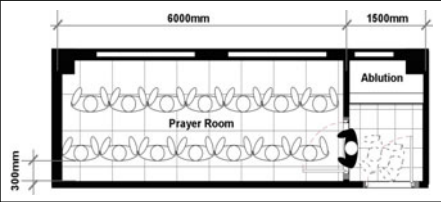



5.1 Case Study 1

Case study 1 covered the prayer room at Plaza Massalam, Shah Alam at Level 2. The physical measurement and photo were involved to get the result (see Table 2).

5.2 Case Study 2

Case study 2 was covered in the prayer room at KSL Mall, Johor Bahru at the parking area basement. This study was based on observation, physical measurement,

Table 2 Case study 1

No	Layout 1
1.	
Images	
<div style="display: flex; justify-content: space-around;"> <div>  </div> <div>  </div> <div>  </div> </div>	
	Description
	<ul style="list-style-type: none"> - Size : 2.4m x 7.5m - Prayer area: 2.4m x 6m - Ablution: 2.4m x 1.5m <p>Only 14 persons can occupied in one time. Then only 2 persons can take a wudu' in one time. From the image (b), the peoples line up outside to pray and take wudu'. This causes the users to queue for a long time during peak hours.</p>

and drawing illustration to analyze the accurate result and finding. Some of the drawings needed to be redrawn according to the existing building and spaces (see Table 3).

5.3 Case Study 3

Case study 3 covered the prayer room at Plaza Pelangi, Johor Bahru. It is located at the center of heart Johor which is crowded with the commercial and population in southern Malaysia and neighbors with Singapore. It is a very high-end place with the fasting development and good investment (see Table 4).

Table 3 Case study 2

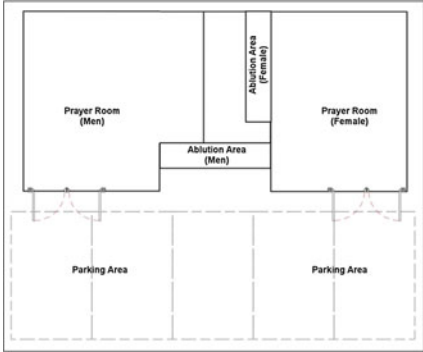
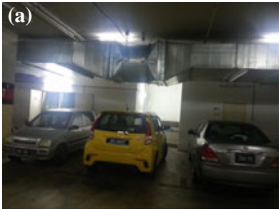

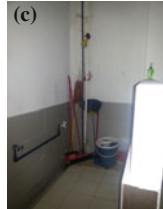
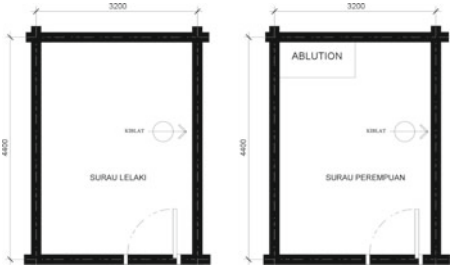

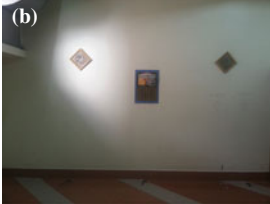
No	Layout 2
1.	
Images	
<div style="display: flex; justify-content: space-around;"> <div> <p>(a)</p>  </div> <div> <p>(b)</p>  </div> <div> <p>(c)</p>  </div> </div>	
Description	
<ul style="list-style-type: none"> - Men prayer room: 2.4m x 3.2m - Women prayer room: 2.4m x 3m - Ablution: 1.5m x 1m <p>The prayer room entrance is very close with the car park and sometime it block the users from entering the prayer room. No proper door using both prayer room only using curtain as barrier.</p>	

Table 4 Case study 3

No	Layout 3
1.	
Images	
<div style="display: flex; justify-content: space-around;"> <div> <p>(a)</p>  </div> <div> <p>(b)</p>  </div> </div>	
Description	
<ul style="list-style-type: none"> - Men prayer room: 4.4m x 3.2m - Women prayer room: 4.4m x 3.2m - Ablution: 1.5m x 1m <p>Image (a) show the women prayer room. The ablution was design inside the prayer room. Other wise, for men ablution was at toilet. There are no proper direction qiblat sign.</p>	

6 Conclusions and Recommendation

The design of the prayer room is one of the important aspects for Muslims to worship. There are several aspects that are important in designing prayer rooms at a shopping complex that are the location of prayer room, layout design, form and space, functions, material finishes, and facilities. Besides that, the local authorities and State Islamic Council need to be involved in the planning stage of designing and evaluating the design of the prayer room in the shopping complex. The design

of the prayer room in the shopping complex should be aligned with the standard guideline by the local authorities and State Islamic Council. Every change involving acts and standards should be coordinated together. This can avoid confusion in terms of the design and enforcement.

From the results of this study, there are some suggestions that can be applied in the guideline of standard design for a prayer room in the shopping complex. Among the recommendations from this study are.

6.1 Position of Public Space or Shopping Complexes

Referring to State Islamic Council, in the process of designing a new public space, the shopping complex should be built towards the Qiblah. This is to avoid errors in determining the direction of Qiblah. Local authority can propose and implement these guidelines to the architect and developer according to the compatibility of the location. With a proper guideline, the determination of direction of Qiblah is clearer.

6.2 Early Involvement in Design Process

At the present time, the local authorities and State Islamic Council are not involved in the designing stage. Therefore, the State Islamic Council suggested that they can be involved together from the early planning stage until the construction phase is complete. This is to facilitate the State Islamic Council in monitoring the prayer room design in terms of design, location, and the direction of Qiblah, ablution design, material, and provision of facilities.

6.3 Form and Space

According to the guidelines applied today, the minimum area of prayer room that has been proclaimed by local authorities at the shopping complex is only 6 or 10 m² excluding the ablution area. Therefore, it is proposed that the prayer room floor area ratio should be calculated according to the percentage of the overall area of a shopping complex. In this way, the problem of narrow and uncomfortable space will be overcome.

6.4 Ablution Area

The ablution area for women needs to be in a closed area and cannot be seen by men or the public. It should be inside a women's prayer room, and the men's ablution area should be located nearby the prayer room.

6.5 Code of Behavior

- Clean areas must be maintained by all users, including removal of shoes before entering prayer room. Shoes must be stored in areas provided for that purpose.
- Practice of Islamic principles of cleanliness should be followed in all parts of the Islamic prayer room.
- Room dividers in the prayer room will under normal circumstances remain closed and latched.
- Islamic conventions of modesty in dress should be observed in the prayer room at all times.
- Eating, drinking, and sleeping will not occur within the prayer room.

6.6 Noise Limitations

Measures have been taken in the refurbishment of the prayer room to minimize the impact on users of the space and the impact of the prayer room activities on the other tenants/users in the building.

6.7 Signage

The prayer room will be appropriately signposted as the Islamic prayer room. The men's prayer room and the women's prayer room will be identified by door signs or at the entrance. Directional signs from the main entrances will also be provided with suitable size, color, font type, and material.

6.8 Room Decoration

The prayer room can be decorated with Islamic religious motif, posters, artworks, and anything related to Islamic identities. Hanging hooks may be installed in the prayer room on request. Notice boards will be provided for notice matters. Any installation or changing must get approval from local authority.

6.9 Qiblah Direction

This is the important part. The Qiblah direction must get approval from Jabatan Agama Islam before deciding the direction. The officer of JAI will visit and decide the Qiblah direction. Qiblah will be established on the basis of exact and correct technical information. Qiblah will be indicated through directional lines on the ceiling or in the carpet.

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Development of Contemporary Painting in Malaysia

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Abstract Changes in Malaysia's cultural domain has been very significant after the National Cultural Congress in 1971. In recent years, the Malaysian art scene has become an ongoing and thriving art initiative that is constantly changing. There are some problems raised in this study which are related to the content in contemporary Malaysian painting. The main point needed to be pointed out is in the rationale, interpretation, characteristic, form and content, and the spiritual role of artworks. This study was conducted to investigate the content of Malaysia's contemporary painting that was produced by our local artists from 1971 to 2000. The objectives for this study were carried out to examine the characteristics of Malaysia's contemporary painting, in order to study the formation of content and to analyse the uniqueness through the content preferred artist. These objectives are intended to identify the element of the visual character that is represented through the identity of contemporary paintings in Malaysia. This research employed the tracing of each structure of the artwork and observation of NAG compilation books, journals, and the National Art Gallery. In addition, the relevant material that has been studied by previous researchers was included in this study. The theoretical methods by Edmund Feldman are needed in analysing the artwork. The finding of this research covered a wide spectrum of issues which are closely associated with the artist that covers the culture, philosophy, and social culture. The significance of this study is to create an awareness and deeper appreciation, and contribute knowledge to the audience in understanding the meaning and approaches that are employed in artistic works. This research can add value to the previous research. The local artists should improve in terms of producing artwork that is consistent with the education community, and the educational institution itself.

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Keywords Form · Content · Contemporary · Painting · Malaysia

1 Introduction

The contemporary painting in Malaysia has become increasingly well accepted by Malaysia's society today. The artwork has been produced to give an insight into the contemporary art world with a background of Malaysian society. It is one of the unique platforms for introducing art now that has long been established in the art world. Since 1971, the changes in Malaysia's cultural domain have been very significant after the National Cultural Congress [1]. In recent years, the Malaysian art scene has become an ongoing and thriving art initiative that is constantly changing [2]. Additionally, the advent of globalisation and cyber technologies, particularly the Internet, has influenced and directed the energies in the arts and the artists in different directions. Malaysia's contemporary painting has experienced displacement transformation until today. The use of approach in artworks has made a huge impact on the artists in terms on how they produced their works and the process involved to complete the artworks [3]. The Malaysian art scene is one of the most vibrant and dynamic ones not only within the Asian region but also around the world. Malaysian artists have widely exhibited their works in major galleries and museums around the world for decades while the local art scene continues to grow and develop with artists continuously showing their compelling artwork to the art enthusiast community. Throughout the history of Malaysian art, various groups and art movements have existed and played a major role in promoting and developing the local art scene, offering programmes and dialogues that help artists in their respective careers while simultaneously pushing Malaysian art to a higher level [4].

The positive developments in Malaysian artistic production, serious scholarly research, and analysis within the field of Malaysian art history and criticism have not developed as progressively and have not been regarded as important as the development of Malaysian art itself. The purpose of this study is to help find or suggest the solution of the study. The specific focus in this study is to investigate the content of Malaysia's contemporary painting produced by our local artists from 1971 to 2000. The term "contemporary" refers to the new wide range of styles and techniques in painting [5], including the making of the artwork through the traditional and mixed-media process, where the artists employed the strengthened brush stroke with the use of motif or metaphor images and applied a certain medium in producing the artwork [6]. In this study, contemporary also refers to the motifs and the design layout features that are used, new media, and the use of object in realizing their expression emotion. Malaysia's contemporary painting is still young but it has experienced major developments alongside the nation's 57 years of socioeconomic development.

The issue addressed by this chapter is important to understand Malaysia's artists and artworks. This research discusses the gaps in research that have not been

covered by prior researchers. There are a quite few research studies on contemporary view, symbolism, and approaches. It should be noted, however, that all the previous research studies are reported in the open literature through the field of research. To the best of the authors' knowledge, the case of this study has not been given great attention by researchers in the past and this motivated the present study for investigating to address these gaps [7]. Realising the gaps in the extant literature, more research is needed into the content of contemporary Malaysian painting. The problem is the content in painting that seems to ignore the rationale, interpretation, characteristic, form and content, and the spiritual role of artworks. But the National Cultural Policy always gave a guideline and the Congress shaped the direction of Malaysian art with its resolutions that led to the search for a national identity [8].

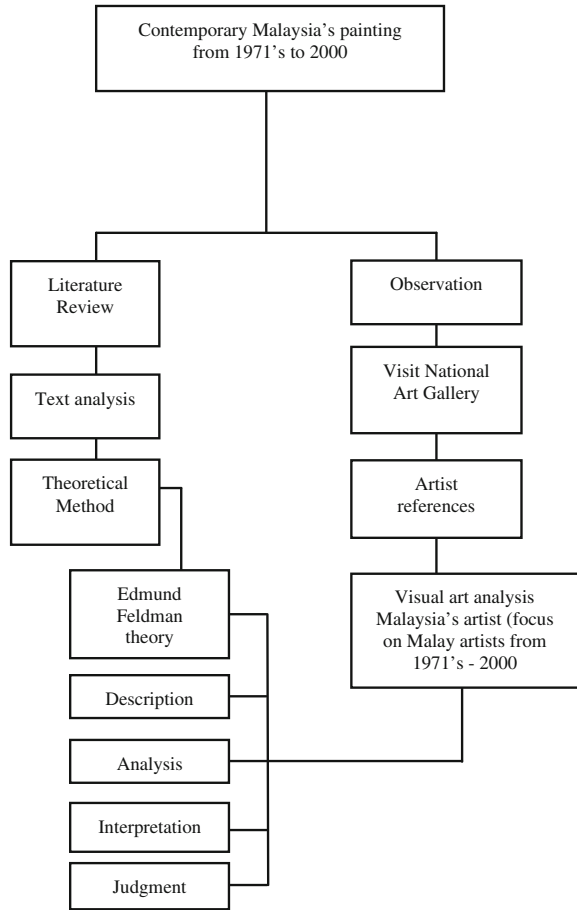
In this study, the analysis of contemporary painting is examined by the form and content in the painting. At the same time, the authors want to determine how it reflects the context of Malaysia's culture and traditional values. The specific characteristics of motifs, image, colour, and intrinsic meaning are explored in this research. The content in the painting is a rich form of material culture. The metaphor images that involve cultural values have been incorporated with art and tradition to create designs in contemporary painting based on unique traditional aesthetics to represent Malaysian culture [9]. In relation to Malaysian society, contemporary painting is Malaysia's need to be thoroughly documented in order to show how the artists approach realising the characteristics of images and motifs that evolved to reveal their complexity and development of art. This research also explores the interpretation and research about the uniqueness in artworks [10].

All the information and data collection from primary and secondary methods are needed to fulfil the analysis and find the relevant material that has been studied by previous researchers in this study. The process of analysing samples is through the books related to contemporary art from 1971 to 2000. Nevertheless, these analyses used a theoretical method that related to the study. This research also related to the National Cultural Policy to construct and cover the identity of Malaysia. This chapter was written to provide guidance to students and art enthusiasts to contribute a sense of awareness and appreciate the form and content in contemporary Malaysian painting. This study also links various features from the society background, history, and culture that have been incorporated into the development of contemporary Malaysian painting.

2 Method

In this study, the flowchart process illustrated in Fig. 1 explains several phases, which include the text analysis in observations and review of related literature as to established related theoretical approaches. Observations were done among galleries and libraries such as the National Art Gallery in reviewing the painting collection and catalogue. A review of the relevant literature, observation, as well as field visits

Fig. 1 The flowchart shows the process for this study



to sample collections from galleries support this investigation. This study selected artworks by artists consisting of 10 artists' and 12 artworks. In this research, the theoreticals that had been designed by Edmund Feldman were chosen, which had four stages in analysing the artwork [11] that follow the discussion on results and findings. The research consists of two main components: examining the characteristics and features of Malaysia's contemporary painting, and the second component of gathering the selected artwork from different ranges of contemporary painting to categorise and analyse the uniqueness through the content preferred by the artist. This study follows four segments: cultural and traditional motif, mythology, history, and abstraction concept. The sampled visual artworks were selected from year 1971 to 2000 as listed in Table 1.

Table 1 Research design for sampled artworks 1971 until 2000

Artists and artworks reference			
Cultural and traditional motif	Mythology belief	History/itself/memory	Abstraction concept
Syed Ahmad Jamal—“ <i>Sirih Pinang</i> ” (1982)	Syed Thajudeen —“Hanuman Visits Sita” (1972)	Zakaria Ali “Me And My Parents As Zapatistas” (1977)	Sulaiman Esa —“ <i>Nurani</i> ” (1983)
Fatimah Chik —“ <i>Gunungan</i> ” (1987)	Anuar Rashid —“Birth of Inderaputra” (1978)	Redza Piyadasa —“Two Malay Women” (1982)	Awang Damit —“The Belum Mnifestation” (1994)
Mastura Abdul Rahman —“House of Flower, House of Harmony” (1999)	Syed Ahmad Jamal —“ <i>Semangat Ledang</i> ” (1999)	Samjis Mat Jan —“Rendezvous” (1984)	Syed Ahmad Jamal—“ <i>Langit dan Bumi I</i> ” (1998)

3 Analysis and Findings

Based on the figures above, there are four examples of the chosen art works presented under four distinct categories which are (Fig. 2) cultural and traditional motif; (Fig. 3) mythology or belief; (Fig. 4) history, itself, or memory; and (Fig. 5) abstraction concept where each section covers the specific themes and issues of social culture, tradition, history, and cultural belief. Figure 2 shows the influence of western expressionist and abstract expressionist cubism is noticeable in the conscious structuring of geometric form in these artworks, also the founding of *pohon pinang* and wood carving motif (*bunga Ara*). Hence, Syed Ahmad Jamal was attracted to the triangular shape that can be described as a theme of identity in figurative form. Anuar Rashid explores Malay form and content in Fig. 3 by using analytical cubism and futurism [12]. These paintings are viewed as a pictorial narrative in monumental art and also depict various aspects of the symbolic meaning of surviving monuments in SouthEast Asia. This painting is a semi-abstract work that stresses Malay stories and myths as the key subject. The *Birth of Inderaputra* referred to the *Hikayat Inderaputera* story. In addition, the eagle or a giant peacock became the main subject in the storytelling of this artwork.

Figure 4 shows that this artwork is one of the Malaysian Series, which shines a spotlight on Malaysia’s multiculturalism and plurality. In terms of the style, the artist uses colour that resembles the style of pop art. Apart from that, the artist took photographs as a starting point in the effort to make the image on the artist’s work. The finding of jewelry as women’s accessories and traditional dress is a reflection of a woman who came from the nobility group. The traditional dress portrays Malay culture itself. Their eyes directly address the viewer as though wanting to tell us their story of a life that has now disappeared.

Figure 5 is one of the artworks that shows the abstract approaches on geometric shapes in the manifestations. The abstract approaches based on geometric shapes or

arabesques express the artist's deep commitment to Islamic art. The artist used spectrum colour in this artwork with the perimeter and octagonal shape. This artwork is a combination of traditional craft and contemporary aesthetic. The use of black that circulates the perimeter of the octagon also has meaning in Islam. The black colour is one of the family related to the blessed Prophet and the colour of the *kiswah*, the cloth that covers *Kaabah*, located at the centre of the holiest place of worship in Islam. In general, contemporary Malaysian art covers a wide spectrum of issues, which are closely associated with the artist's own experience. Indeed, the

Fig. 2 Syed Ahmad Jamal (1982), *Sirih Pinang*. Retrieved August 17, 2015 from <http://wargamarhaen.blogspot.com/2011/07/koleksi-tetap-karya-almarhum-datuk-syed.html>



Fig. 3 Anuar Rashid (1978), *Birth of Inderaputra*. Retrieved August 17, 2015 from <http://bekaswarna.blogspot.com/2009/08/karya-karya-seni-tempatan.html>



Fig. 4 Redza Piyadasa (1982), *Two Malay Women*. Retrieved August 17, 2015 from <http://www.arts.com.my/portfolio/redza-piyadasa>

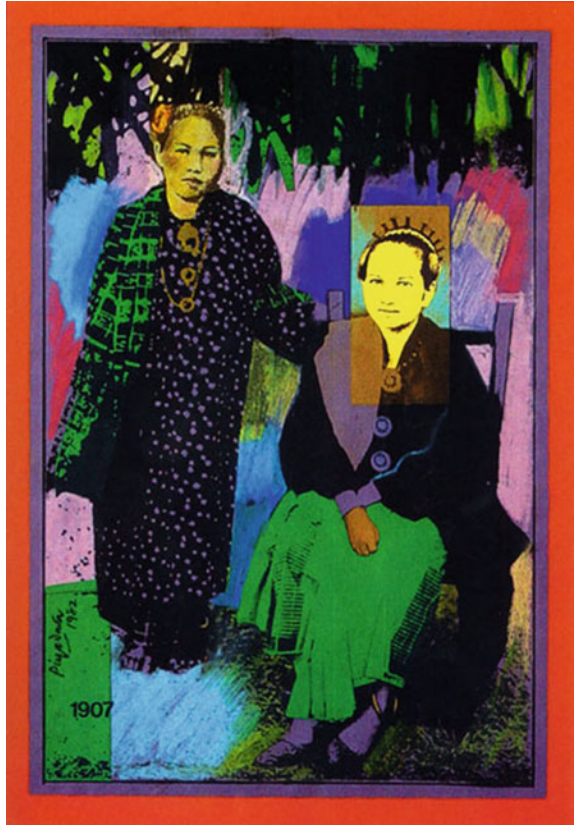
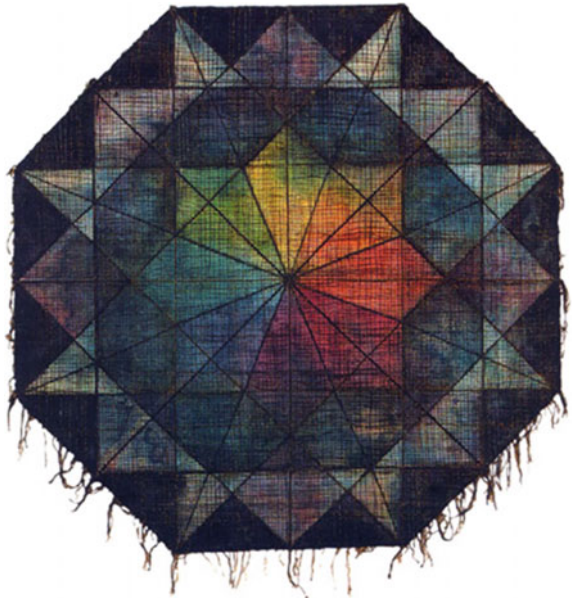


Fig. 5 Sulaiman Esa (1983), *Nurani*. Retrieved August 17, 2015 from <http://goodenei.com/2009/06/10/sulaiman-hj-esa>



artworks usually represented different kinds of artistic expressions, which sometime enclosed an ethos that was indigenous and linked with the symbolic from local traditions and culture. The other artworks also demonstrate any social concerns regionally or globally. The visual art scene in Malaysia has evolved, continues, and reshapes gradually with certain varied and complex influences [13].

This study has shown that each painting was categorised and divided into four categories, which are cultural and traditional motif; mythology or belief; history, itself, memory; and abstraction concept that as a whole represent a different story. It is about the traditional culture, mythology in people's way of life, about nature, environment, and feeling, abstract art, and perhaps as important, it projects the wealth and diversity of art in Malaysia [14]. The result of shifting the paradigm from different fields in art backgrounds to an essential Malaysia centric is the highlight for the major achievements made by contemporary Malaysian artists. The direction of these artists is essentially from within, inspired by a rich environment, tradition and culture, and mythology, rather than echoing trends from outside. The investigation in this research shows that artists in Malaysia used new approaches, technique, local media, and the inclusion of traditional themes based on Malay form and content in the eastern art, and must not be considered as the result of work by provincial artists, but should be regarded as the emergence of a new Malaysian art style [15].

The previous researcher also covered visual Islamic art in a contemporary view and the identification of the Islamic form in visual artworks. In the other studies, the use of morbid theme and imageries in contemporary art were made by Abdullah [16], similarly, the manifestation of the Malay symbol, which was established by the application of techniques and media that symbolised Malaysian pictorial art [17]. The aim of this study is to investigate the most established techniques and media used by Malaysian contemporary artists and their effectiveness to create visual effects in pictorial art especially in utilising Malay symbol expression. The findings show significant information that most artists were familiar with the use of mixed media in visualising the Malay symbol, compared to other conventional techniques and media such as oil colour and other material. Moreover, in Malaysia the art movement since the 1990s shows few artworks that mostly followed the thematic approach. The impact of thematic style practiced by Malay artists was recognised through their method, subject, theme, and medium. The outcome for this research will fulfil the formation of artistic forms that includes aesthetic principles, technique, and different sensibilities throughout the combination of Malaysia's aesthetic experiences, traditional art, and contemporary art by introducing craft into the realm of fine art.

4 Conclusion

To sum up, Malaysia is generously endowed with a rich historical background, harmonising with various multicultural environments and heritages. Hence, there are many influences that have been adapted in this country, which at the same time

inspired the ideation of certain artists. In this study, throughout the analysis, most of the artworks established a lot of elements that reflected the issues of social, culture, and subjects representing the region of Malaysia. This moment is in line within the function and the role of visual art realised as part of the national culture. The use of local motifs, such as *tumpal*, wood carving, and floral motif, together with canvas and mixed media in visual art is a healthy sign towards understanding the content of contemporary painting. In fact, the style also shows the combination of Malaysia's aesthetic experiences, social culture, traditional motif, myth belief, and the use of abstract concepts in the realm of fine art. Finally, in future, it needs to be stressed that this study has an important role in analysing the masterpieces of talented artists that shows artworks in Malaysia rank equally with international artworks. The importance of this study is to give deeper appreciation and knowledge to viewers in understanding the meaning and approaches of artworks. It is important to know the form and content behind the artwork and how the artists created their masterpieces through the manifestation in their ideas, subjects, motifs, and reasons for creating the artworks. This research project has directed further light on what has become distinctly Malaysia's in terms of contemporary painting. Last but not least, the National Cultural Policy always gave guidelines and the Congress shaped the direction of Malaysian art with its resolutions that led to the search of a national identity.

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Adapting Muwajjah Vector Analysis: Prominent Feature in Islamic Art

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Abstract *Muwajjah* is an Arabic word meaning front page which can be seen in Quran as a decoration chosen from the Islamic art museum. There are various types of Quran from different countries such as from Iran, Turkey, and India that are embedded with certain influences. This chapter discusses Muwajjah layout design from the Safavid collection using Adobe Illustrator by tracing the layout design pattern. The methodology of this research starts from overviewing the related literature reviews on Islamic art and the Muwajjah pattern using Adobe Illustrator. The discussion is supported with other relevant information through observation and visual analysis of the samples gathered that were captured with digital camera. The finding demonstrates how Safavid Muwajjah layout design was represented through the types of motif and the arrangement of pattern. Thus, the decorations represent the ownership of design and identity of Muwajjah from Safavid.

Keywords Muwajjah · Islamic art · Tracing · Adobe illustrator

1 Introduction

Muwajjah is a decoration that can be found in Quran which is drawn with full ornament and the idea of perfection {kamâl) as an aesthetic value has a significant importance in Quran [1]. The word of *Muwajjah* [2] is derived from Arabic words

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defined as front page and usually decorate the verse of Al Fatehah. There are certain influences in Quran in the Islamic Art Museum such as from Iran, Turkey, and India embedded with their own culture. Because of the flexibility of Arabic letter forms and the apparent desire of early Muslims to distinguish their culture from those of the people they dominated and from the beginning of the Islamic era, the decorative properties of Arabic script were appreciated and exploited [3].

This study focuses on Safavid Quran in the Islamic Art Museum which has the highest of artistic works in the sixteenth and seventeenth centuries [4] and contains the most magnificently decorated *shamseh* which means sun in Arabic [5]. The objectives of this research are to study the decoration in Safavid Quran and to identify the layout design using Adobe Illustrator. Figure 1 shows the examples of Quran from Safavid collections.

Furthermore, Muwajjah design may be comparable with other Islamic art such as geometric and calligraphy which have their own design pattern. Understanding what Islamic art is by understanding the essence of Islam [6] and balance between pure geometric form and the vegetative [7]. In order to elucidate the design pattern [8], the researchers use Adobe Illustrator to trace the selected design layout. Adobe Illustrator is a program used by designers to create vector images that can create illustrations, charts, graphs, logos, diagrams, cartoons, and photographs. Creating vector images allows the designer to create clean beautiful works of art that can be scaled up and down infinitely without ever losing their quality [9].

Apparently, there are no ends to the uncertainty that the word pattern engenders. Regardless of how the motifs of pattern originated it will be obvious that in the groups of patterns we just considered the entire structure of framework, motifs, and repeats are inseparable [10]. There are eight categories of pattern such as animal, enigmas, figures, floral, geometrics, novelties, scenes, and textures [11].

In the early historical period the ornamentation was based entirely on simple geometric forms, including circles, squares, and triangles from which ovals, rectangles, and lozenges were derived [12].

Fig. 1 Safavid Quran from Islamic Art Museum



2 Methods

For this research study, the researchers used computer design software to create vector images of Muwajjah design. In order to create the vector image, the researchers used Adobe Illustrator CS 5 to represent the types of motif and the arrangement of pattern in Safavid Quran. There are a few steps in using the Adobe Illustrator software. Firstly, is by opening the program as shown in Fig. 2a. Click file on the left menu bar as in Fig. 2b at the top of the left side to select menu. Figure 3 shows the symbols and tools mainly used in Adobe Illustrator as a guide for the researcher.

Then, click open to choose image of Safavid Quran as in Fig. 4a and on the left of toolbox click the tool to activate the default Fill and Stroke such as Fig. 4b;

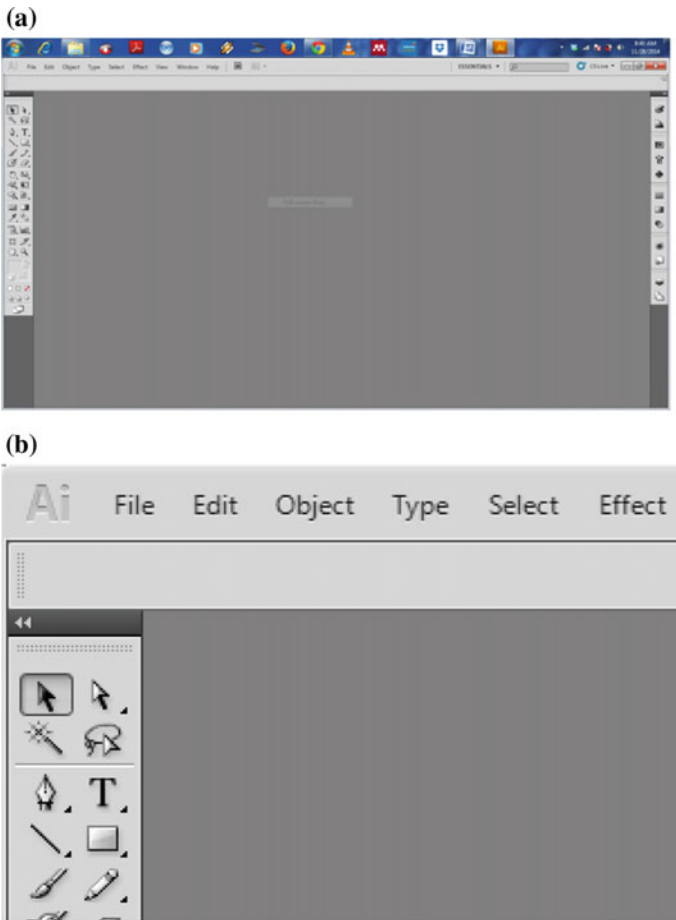


Fig. 2 a Adobe illustrator program. b Menu bar in Adobe illustrator

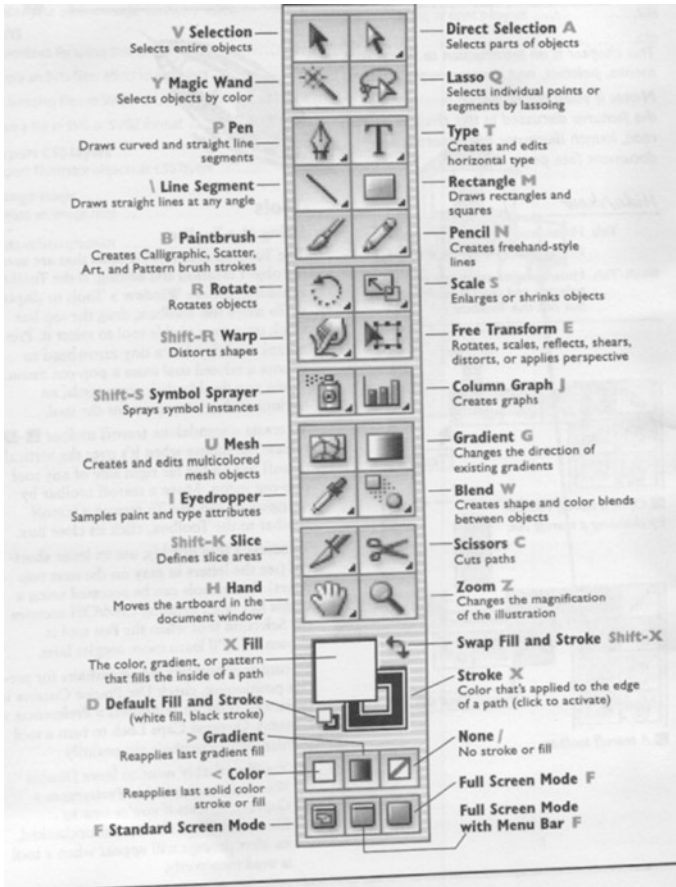


Fig. 3 Symbol of tools in Adobe illustrator from Illustrator CS for Windows and Macintosh

default fill is white and store is black color. Fill tool used for the color, gradient, or pattern as Stroke for color applied to the edge of a path. After that, select the pen tool in toolbox to trace the layout design pattern such as in Fig. 4c.

Before starting to trace the layout design it is necessary to zoom in and out of the image for a clear image. In addition, press (Ctrl) and (Alt) on keyboard and scroll up on the mouse to enlarge the image to see the details of drawing and scroll down to minimize the image such as Fig. 5a, b.

Lastly, trace every corner and curve of the pattern as shown in Fig. 5b step by step and it may take time to finish the overall pattern on the image which is full with details of ornament.

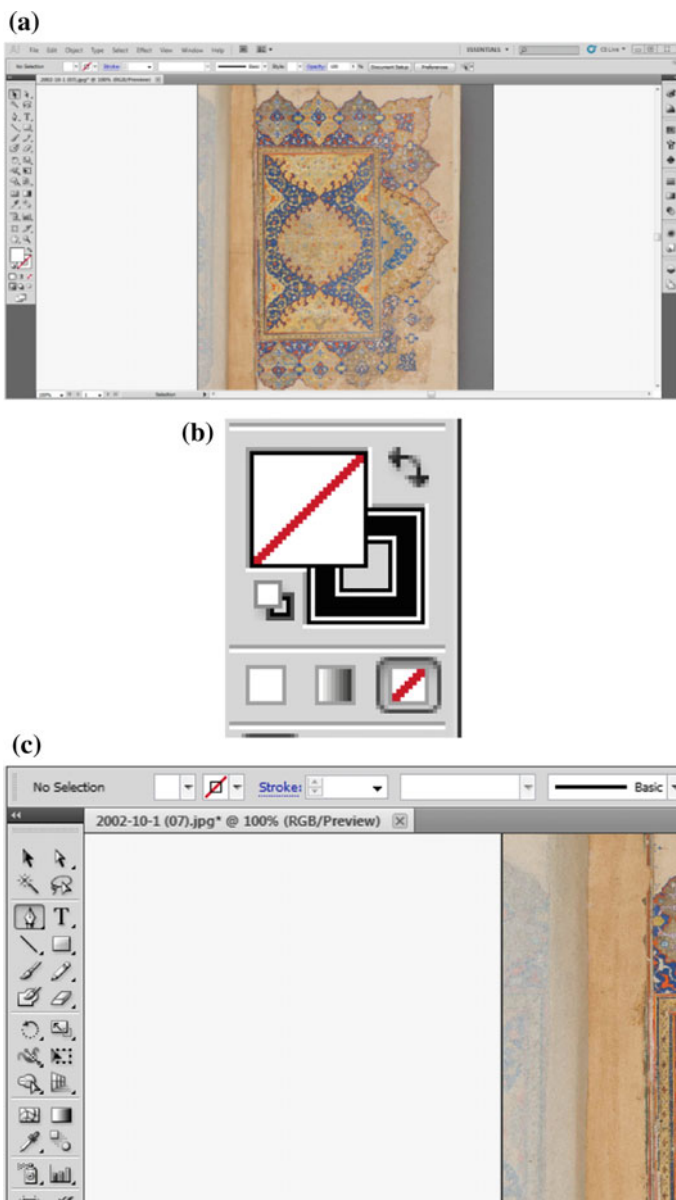


Fig. 4 a. Collection from Safavid Quran. b Default fill and stroke. c Pen tools to trace layout design

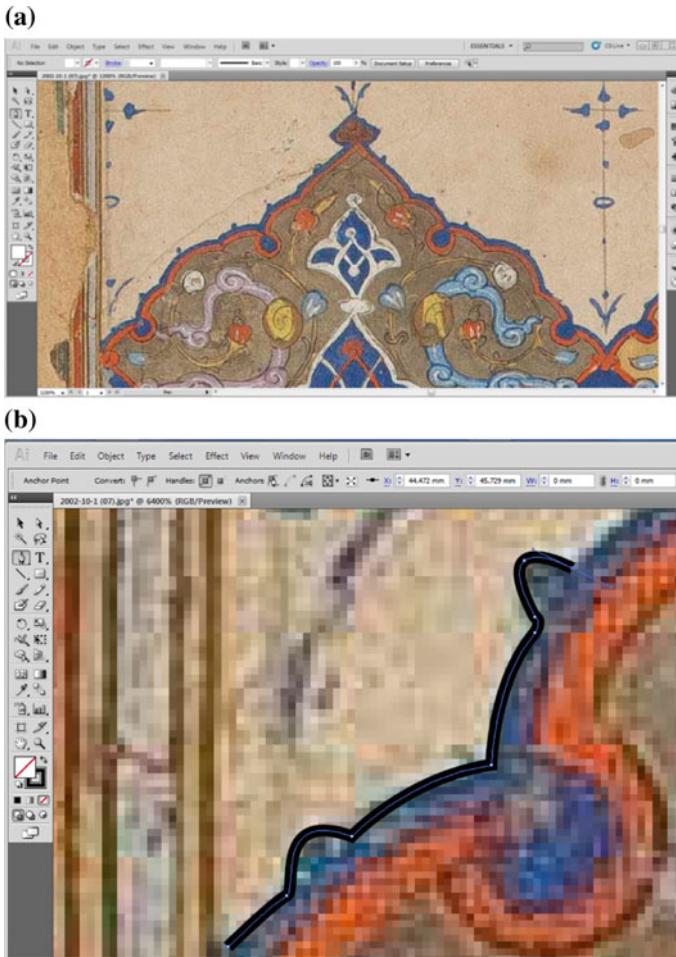


Fig. 5 a Enlarge image for details. b Tracing image using pen tool

3 Results and Discussion

In this stage, the researchers studied the result through analyzing the tracing image from the origin of Safavid Quran. The researcher also observed the pattern in Muwajjah design as shown in Fig. 6 through the types of motif, the arrangement of pattern, and the manuscript displaying significance and unusual qualities in every aspect of design and illumination [13]. Based on observation the entire structure being framework, motifs and repeats are inseparable. Organic patterns portray the natural forms of flora and fauna and fall into what is considered to be the most popular of the design categories [14].



Fig. 6 Progression from the origin image to tracing image

4 Conclusion

In conclusion, this research is to represent the identity of Muwajjah from Safavid through the study of the pattern's arrangement and motifs from the layout design as shown in Fig. 6. Furthermore, Adobe Illustrator is another alternative to create the replicate image from the origin rather than a manual approach. The result of tracing the image from the origin using Adobe Illustrator can demonstrate how decorations are representing the ownership of a design [15, 16].

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Printmaking Terminology: Correlation on Definition Study Between Matrix in Printmaking and Ready-Made Material Mould in Industries

Nur Adibah Nadiah Mohd Aripin, Izaddin Matrahah, Ishak Ramli, Ponirin Amin and Rahman Amin

Abstract Printmaking is fast developing and gaining more interest. Naturally the interpretation is actively discussed among artists and art activists alike. The new technology and methodology in printmaking are fast becoming the new mode in replacing the traditional printmaking techniques, reconstructing and extending the conventional definition of printmaking through the experimental usage of various materials. To identify and further understand and interpret what is printing, the printmaking definition is looked into in terms of matrix in everyday material application. Total understanding of printmaking's matrix will allow the production of printmaking to be clearer, simpler to grasp, and extended/advanced artwork of printmaking. This change provides a paradigm shift in the art of printmaking where it will continuously evolve and move forward to adapt to changing times and interpretations.

Keywords Component · Matrix · Printmaking · Materials

1 Introduction

Printmaking is one of the methods or activities in which artists express their ideas and visualize them onto media such as papers, canvases, and so on [1]. The art of printmaking has evolved in the past years and it reflects the direction and alternative approach artists have taken from the techniques or processes of artworks, three-dimensional (3D), and additional fixtures for hand printing. Printmaking has a

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fundamentally traditional tone as the voice for artists to build their reality and socials. The novice printmaking artists who are recently emerging have shown a convergence between traditional printmaking and media usage, thus providing a result of a new and modern approach in the art of printmaking. Printmaking gives the power to the artists to transcend borders and boundaries as well as sociopolitical issues.

There are variations in the methods in which printmaking can be produced. In many cases, the usage of complex materials and media are applied. According to Beth Grabowski and Bill Fick [1] there exist ways in printmaking that use daily material such as wooden blocks or excess materials from any discarded product waste. It is simple and provides no excuse as to why printmaking can't be produced. The printing medium in itself is constantly changing and evolving [2]. At first, printmaking is mere a communication tool but artists have taken advantage of the printmaking technology when it is no longer in used in any industry, or when the machinery and materials of printmaking are in excess. This goes to show that the progress in printmaking is moving in harmony and in accordance from the art industry to the machinery industry [2]. Technology has indirectly played an important role in extending the definition and characterization of printmaking. The conventional printmaking method still maintains its process definition, which is through the usage of a block/matrix that has images/designs on it and which is subsequently transferred onto a medium's surface. The changes in printmaking have evolved from the usage of two-dimensional (2D) paper as a surface to three-dimensional (3D) media and opened up new possibilities known as alternative printmaking.

1.1 Statement of the Problem

The understanding of the matrix concept and block can be formulated as follows.

- All printmaking is matrix.
- Block is matrix.
- Therefore, block is the by-product of printmaking.

The role of matrix usage or block is prevalent where problems will arise and it will indirectly cause either matrix or block a part of printmaking production. The preparation of the matrix or block can become the catalyst as to whether a printmaking production is successful or otherwise. In the attempt to gain further understanding of the printmaking definition, various methods and techniques were used. The main aspect that is required is the preparation of the block or matrix. Although the block or matrix presents the same definition, the understanding and its implication in certain technique differ. The application of printmaking in an academic aspect requires the basic need in the printmaking production that will be applied to the artwork.

1.2 *Objective*

The objective of this study is to correlate between the definition of matrix in printmaking and the ready-made material mould used in industries.

2 **Literature Review**

Motoe Kunio [3] stated that in creating a printmaking artwork, artists would indirectly ignore several mainstream processes that are important in printmaking. There are many ways that can be classified as printmaking, whether it is two-dimensional or three-dimensional, but there should exist a plate from previous printing or the remains of a plate in the creation of a printmaking artwork. Kunio also believed in the transition of intellectual conceptualism in printmaking to contemporary art. Printmaking artists face the challenge of understanding this concept for where this has never happened in a society whose life is dictated by the influences of today's information technology age.

This is seen as an attempt to understand the definition of printmaking. In order to extend the effort and achieve a mutual understanding of printmaking, a framework or an effective model needs to be constructed for the purpose of reference [4]. Having observed the growth and expansion of printmaking, Deborah Wye [5] stated that several methods and effective media have created new criteria in evaluating contemporary printmaking, including the repositioning part of the art of printmaking in the visual art field.

The expansion of printmaking does not only depend on its technique and materials alone, but it also develops in tune with the constantly evolving interpretation of printmaking's definition. Walter Benjamin's theory [6] stated that the changes in works of art are borne out of the relation and the fundamental connection of its productive society.

2.1 *Definition of Printmaking*

Printmaking is the process of producing an artwork through printing technique, that is, the process of transferring an image from a matrix surface, or a block of paper, or onto another medium's surface. This is the definition that is considered the "definition acceptance" that has been adapted by many artists. According to Michel Melot's statement [7], this plainly explained the definition and process of printmaking. The term "print" used by Melot is defined as the act of conveying an idea and "transferring" is the actual process of producing the artwork.

2.2 *Traditional Printmaking*

Traditional printmaking, or in another term, conventional printmaking, is the first step for artists to learn and understand the art of printmaking. The application of the printmaking definition is used in producing a conventional printmaking artwork. Generally, the conventional printmaking artists are interested and comply with the process and progression of printmaking and try to incorporate current issues into their artwork through various techniques and methods such as woodcut, etching, engraving, and lithograph [1].

2.3 *Conceptual Printmaking*

When discussing or talking about conceptual printmaking, there are many debates and opinions that arise from various sectors. The definition grasp and comprehension level are once again centered on discussing conceptual printmaking. Indirectly, this feud opens another opportunity for artists and art activists alike to further take a different approach and explore other methods in intensifying their skills and understanding the art of printmaking. Conceptual printmaking has a close correlation to alternative printmaking and extended printmaking.

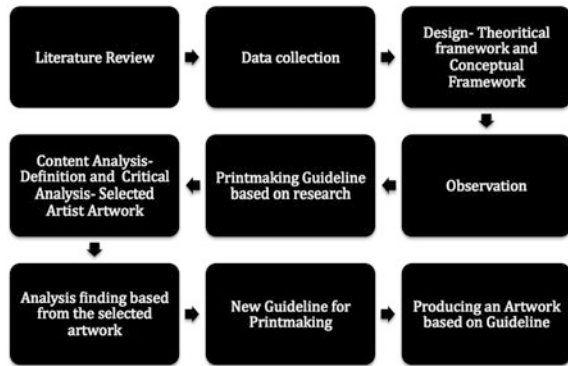
The terms “alternative” and “extended” have incited a paradigm shift in the printmaking community. It can be boldly classified as an immense change and offers a wider range of education on printmaking. Indirectly, printmaking is receiving the attention it needed in order to further expand the understanding and application of the printmaking definition.

In today’s time, it is the norm for society to visit the museum or the gallery to appreciate artwork. The artworks are of nonconventional materials made from discarded daily items and reconstructing those items into a novel piece of artwork.

3 *Research Methodology*

The prepared framework is the research process and is used for the purpose of analyzing data and using them as a guide in producing an artwork. Figure 1 shows the research process.

Fig. 1 Research process



4 Content Analysis

4.1 Content Analysis Based on Printmaking Definition

The definitions of printmaking were chosen from an extract of statements made by printmaking researchers or printmaking artists themselves so that they support and substantiate this research. Several extracts and definitions are focused and discussed the understanding of printmaking’s context (see Table 1).

The similarity in printmaking’s comprehension is also discussed and presented according to the categories identified. The statements were then grouped and categorized accordingly. Table 1 shows the list of sources in which the definitions were collected for this study. They were collected from books, printed catalogues, and websites, dated from 1935 to 2011.

Table 1 Printmaking definition from different sources

Year	List of printmaking definitions
1935	Walter Benjamin, <i>The Work of Art in the Age of Mechanical Reproduction Journal</i>
1988	Michel Melot
2001	Ruth Pelzer- Montada, <i>Authenticity in Printmaking</i>
2001	Didi Huberman, Ruth Pelzer- Montada, <i>Authenticity in Printmaking</i>
2004	Motoe Kunio, <i>Postwar Prints—With Focus on the 1970s in HANGA:Waves of East-West Cultural Interchange, Exhibition Catalogue, Tokyo</i>
2006	Deborah Wye, <i>Eye On Europe Prints, Books & Multiple/1960 to Now</i>
2009	Safrizal Shahir, <i>Wacana Seni Journal of Arts Discourse.Jil./Vol.8</i>
2009	Beth Grabowski and Bill Fick, <i>Printmaking: A Complete Guide To Materials and Processes</i>
2010	A. Rahman Mohamed, <i>PIPE’10</i>
2010	José Roca, <i>Philagrafika, The Graphic Unconscious</i>

Table 2 Mould definition from different sources

Year	List of mould definition
2015	Wikipedia
2014	Longman Dictionary of Contemporary English
2000	Federal-Chambers Advanced English Dictionary

4.2 Content Analysis Based on Mould Definition

The analyzing process was conducted in order to find out whether the existence of contemporary printmaking conforms to the basic form of printmaking. It was not intended to find fault or pinpoint any mistake or misstep by the moulding process. It is the basis of this study to see the effectiveness of printmaking's definition and medium in traditional printmaking in order to determine whether it was inclined towards alternative or advanced printmaking (see Table 2).

5 Result

Results were made based on the guidelines that have been constructed through evaluating all the definitions of printmaking in the selected definition in this research. It was found that there were 10 printmaking definitions obtained from the three selected mould definitions, evaluated using the guidelines. Table 3 shows the finding of content and critical analysis. Based on the result, the guidelines that were constructed by the researcher were inclusive of comprehension and literature reviewing. They were put to use together in the interpretation of printmaking.

6 Finding

Conventional printmaking methods still maintain the process definition, which is through the usage of the language of printmaking that has an image or designs on the block or matrix and which is subsequently transferred onto a medium's surface and becomes a by-product. When the modifications happen, there are some developments in the printmaking definition used. The development evident in printmaking is the usage of the matrix as a main factor in printmaking guidelines.

From the definition of printmaking to the printmaking guidelines, the researchers find there is a need and a new discovery to create new guidelines to combine these two aspects. Figure 2 demonstrates the definition and guidelines of conventional printmaking that have been extended.

Table 3 Result of content analysis based on definition

	List definition/guidelines	Block/matrix	Design	Duplication	Multiple	By product	Mass product
1.	Motoe Kunio, 2004	/	/	/	/	/	X
2.	A. Rahman Mohamed, 2010	/	/	/	/	/	X
3.	Beth Grebowski and Bill Fick, 2009	/	/	/	X	/	/
4.	Walter Benjamin, 1935	/	/	/	/	/	/
5.	Michal Melot, 1988	/	/	/	/	/	X
6.	Deborah Wye, 2006	/	/	/	/	/	X
7.	Jose Roca, 2010	/	/	/	/	/	/
	Pattern and ornamination	/	/	/	/	/	/
	Accessibility and dissemination	/	/	/	/	/	/
	Collaboration and community	/	/	/	/	/	/
	The authority of the print	/	/	X	/	/	X
	Craftsmanship and aesthetics	/	/	/	X	/	X
	The print in the public sphere	/	/	X	/	/	X
8.	Safrizal Shahir, 2009	/	/	/	/	/	/
9.	Ruth Pelzer-Montada, 2001	/	/	/	/	/	X
10.	Didi-Hubermann, 1999	/	/	/	/	/	X

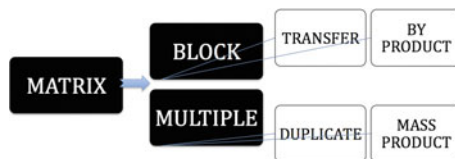


Fig. 2 Wall of Frame 1, photo printer, photo paper, and frame, 8' × 4', 2012

6.1 New Printmaking Guidelines

These new printmaking guidelines were constructed based on the new discoveries made in the course of understanding printmaking’s discoveries. It was simplified from the said new discoveries and the arrangements that are in tune with the current development in printmaking.

From the figure of new guidelines above, it showcases the existence of printmaking without taking into consideration the traditional aspect, concept, or material. It would have to be based on the definition and the attributed needs to interpret printmaking. In the context of the basic printmaking tradition, it needs to be where all printmaking artworks fulfill the requirement of printmaking.

In these new discoveries, matrix can be applied in all aspects of printmaking’s definition. Matrix is block, matrix is transfer, and matrix is also by-product. When a ready-made material or by-product is used as a block, indirectly the process of transferring happens, resulting in a new by-product. This can be proved with using printmaking’s character to come up with this production process of printmaking. The usage and application of matrix in the definition of printmaking provides another new shift in its view and this brings the art of printmaking further.

However, in order to create an artwork that is based on concepts, the printmaking definition that is used can be wider and open-ended but the main aspect that requires attention is the “definition” in itself, transference, and by-product. All three aspects stated above are fundamental and whether it is apparent or not, it depends on the extent of the definition being explored by the artists. An artist is able to choose one of the aspects or even all of them, as all three characters are related to one another.

Therefore, the new suggested guidelines were based on the study and analysis of definitions and the addition of variables through the research process of content and critical analysis. From the researchers’ observation, analysis, and application of printmaking’s definition, it was discovered that there are new ways to apply the definition of printmaking in the production of an artwork. These guidelines are used

Table 4 Analysis of artwork based on new guidelines

Style:	Photo installation
Form:	Based on guideline Block: Image Transfer: on photo paper By-product: a picture (6 × 4 in.)
Subject:	Participant
Content:	An image can claim as a “block” for producing printmaking

Table 5 Checklist for matrix

Guideline	Checklist	Remark
Block or matrix	/	The photo production is by using “image” block
Transferring	/	From “image” drafting process
By-Product	/	Every photo produced could multiply
Multiple	/	Could multiply/produce more photos
Duplication	/	Artwork could be duplicated
Mass product	/	Could be produced in mass quantity

Fig. 3 Wall of Frame 1, photo printer, photo paper, and frame, 8' × 4', 2012



in the process of producing the artwork. Based on the new guidelines, the researchers applied the guidelines into the arrangement of installation (see Tables 4 and 5).

The arrangement in this installation was based on the artist's work section and the relevant situation to show the process and the finding. This process was documented as the extension of advanced printmaking (see Fig. 3).

7 Conclusions

Printmaking has a strong traditional impact as the artists' voice to build their reality and social. However, there are still gray areas in the understanding of printmaking's definition and this causes a rift about the usage of material that is considered different from the ones used in conventional printmaking. Conventionality, as in any other aspect not just in art, limits the growth and evolution in the art of printmaking. The different type of materials used as matrix by-products raises many questions and conflicts. As a novice printmaking artist, it is essential to showcase where printmaking and media can start to diverge by preparing detailed research in order to bring the art of printmaking further into the art world.

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Printmaking: Mould as an Alternative Artwork

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Abstract Printmaking is conventionally known as two-dimensional art produced through varieties of media and technique to create multiple images. It is related with the matrix such as block, plate, and screen in order to make more than one production. The aim of this study is to produce artwork based on the exploration of three-dimensional elements and move away from flat two-dimensional prints. The images produced by using a cupcake mould in the food industry as the block to convey the idea as a dynamic medium in visual art where printmaking can be described by three-dimensional visual language, medium, and also techniques. Understanding the meaning of printmaking terminology will provide alternative ways to develop, explore, and create an artwork using various approaches by combining print technique and other art disciplines such as sculpture and ceramics by casting method using various types of cupcake moulds and displaying them in an artistic way.

Keywords Printmaking · Mould · Three-Dimensional · Alternative

1 Introduction

There is an effort from Malaysian artists trying to broaden the print definition towards making the artwork. In 1996, Juhari produced an artwork titled *Seniman yang dilupakan*; he brought the new approaches in wider print definitions. In the traditional context there are techniques of making traditional kuih using a mould such as kuih bahulu, kuih Loyang, and kuih kapit. Printmaking can be described in a variety of media, developed to create multiple images. The images can be produced by using the plate as a matrix and an intermediary to convey the idea. As a dynamic medium in visual art, printmaking can be described in three ways: visual language, medium, and techniques [1].

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“The technically precise formulas and rules of print production impede free expression” (Anne Kirker 1999). The format and method of traditional print cause the limited style of print artwork [2]. Public understanding towards the concept and disciplines of original printmaking is still unknown thus causing boundaries. Even though printmaking is part of the fine art disciplines, the existence of it is not recognized. Besides, the emergence of digital art based on developments in computer technology challenges the authority in printmaking across the development of visual art in the country. Coincidentally, the importance in defining the original printmaking has been questioned [3].

Print according to the Oxford Dictionary is to press a mark on a surface, the mark produced by applying inked type to a paper. In other words, the term print refers to a mould or a hollow container into which a liquid substance is poured to set or cool in a desired shape. Furthermore, the use of a matrix or mould in which a thing is cast or shaped can clearly relate to the print process itself. Meanwhile, the term “printmaking” refers to the process of making artworks by printing, normally on paper. Except in the case of monotypes, the process is capable of producing multiples of the same pieces, which is called a print. Each piece is not a copy but an original because it is not a reproduction of another work of art and is technically known as an impression.

Prints have been viewed as multiple images produced from a plate. The plate acts as an intermediary with many characteristics; a flat, hard, rigid surface contains the picture and message. The image receives ink and the inked image will be transferred to the paper by pressure. The process can be repeated many times with the same block or plate to produce almost exact copies, called an edition [4].

This definition remained valid until now, but contemporary development has stimulated the meaning of printmaking expansively. Today, a print is more likely to be defined as two-dimensional or three-dimensional images or forms. The artwork can be made by a process or combination of processes of printmaking that may be repeated to produce multiple copies or even unique pieces.

The definition of printmaking seems not to have arrived at its ultimate state. Nevertheless, the artist’s vision and technical innovation will definitely find their way into any attempt to define printmaking.

2 Printmaking: Idea and Concept

Although great advances have been made in the technology of printmaking, more efficient printmaking processes have not displaced older techniques. Despite the fact that photomechanical and computerized processes can guarantee exact duplication of images, artists still employ handmade techniques because these often allow a greater range of personal expression.

The basic range of the printmaking process had not expanded much beyond the relief, intaglio, planographic techniques, and paper stencil until the second half on the nineteenth century; these processes are still employed with vigor and variety today. Basically, a print is a piece of paper on which a design has been imprinted from a matrix made of a selected medium, usually wood, metal, or stone. In an

original print the matrix is made by hand, as opposed to a reproduction which is made by a photomechanical method [5].

Throughout the nineteenth century, from the basis of contemporary printmaking there has been a revolution in communication, the advent of photography, new media, and the computer. This revolution slowly affected the printmaking art thus the range and quality of visual media added many influences and variables in the making of art. The innovation spurred in terms of materials and techniques of making the printmaking artwork. The inventions of photography simulated monumental changes in art form, with printmaking more greatly influenced by indirection because photographic reproduction processes threatened hand printmaking methods. A combination of both techniques, utilizing the new potential of photography and handmade print process, it has remained the creative medium for artists in producing the artwork [6].

The arrival of television and the computer has enriched the artist's visual language and has been applied in the artwork. The ability of techniques makes several possibilities of making art in terms of medium, performance, and presentations. Additionally the application of print on fabrics and textiles inspired and influenced printmaking on paper. When fabric was first rediscovered as a print base, both material fabric and paper were treated the same way. The printmaking techniques have been executed either in two-dimensional or three-dimensional form and can be combined with other materials [7].

Printmaking artworks nowadays are no longer in two dimensions and printed on flat surfaces. By using a fabric and wet paper, an embossed piece can be made when placed under pressure and it creates a relief form. As paper has become more a part of the print, the new inventions have been involved in the process of creating it. The paper has been manipulated, controlling the paper casting and production processes to achieve some particular effects.

Furthermore, the paper can be images in producing the papermaking and paper casting also can be a medium as unique and responsive as any other. Paper casting can cast over three-dimensional objects or collagraph plates. This makes printmaking become sculptural in quality. Combinations between conventional print techniques with fragments of different media employ an expanded range of printmaking skills and technology. Print does not only use paper, but plastics such as acrylic, polyesters, metal, and clay which can be printed or embossed can still be classified as a print [8].

Moreover, printmaking also can be described as multiple either in its process or its product. The term "multiples" encompasses a three-dimensional edition of art objects that has been used in the making of printmaking artwork. The diversity and variation of new materials, for example, equipment, processes, and techniques, have expanded the scope of printmaking.

3 Printmaking: The Process Making

In this chapter, the researcher discusses the research findings. An original print or creative print is an image which is done by using a block or matrix. The differences can be seen through the techniques and the way of making the printing including

high disciplines. Furthermore, this study focuses more on making artwork by using criteria or a matrix in printmaking techniques as in mould making. In the tradition of making Bahulu, the researcher is referring to the technique to produce artwork by using a cupcake mould. A mould is interpreted as a shaped cavity used to give a

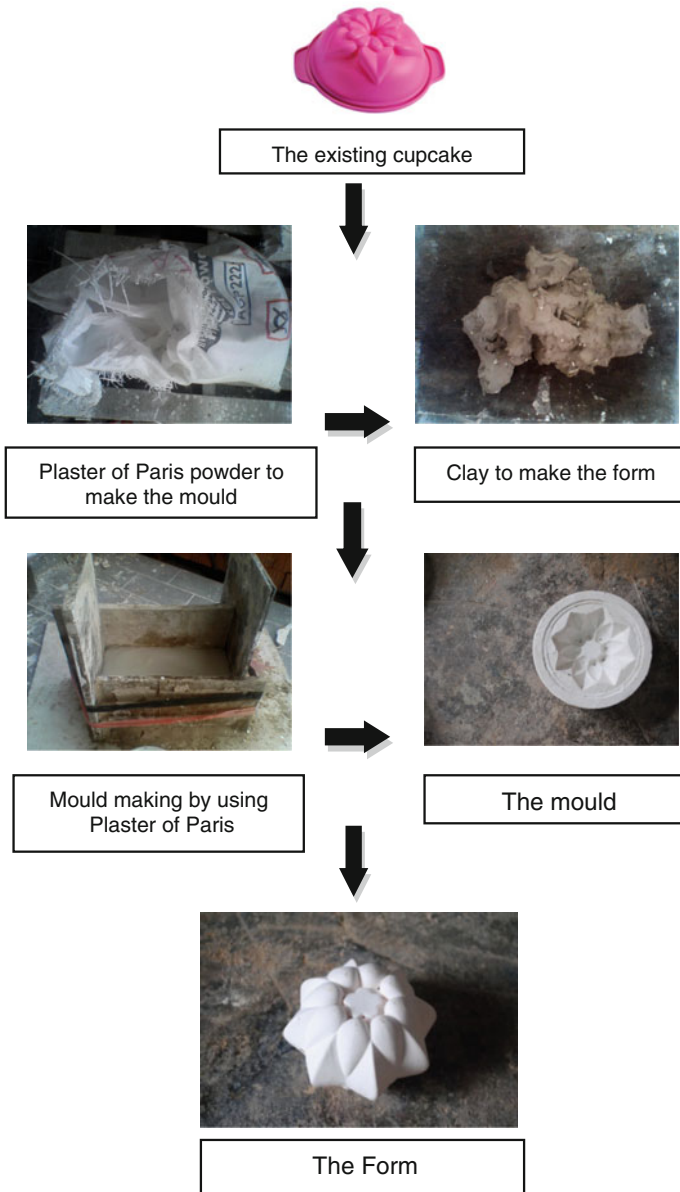


Fig. 1 A process of making the product/artwork

definite form to fluid or plastic material, also a container into which liquid is poured to create a given shape when it hardens (see Fig. 1).

A cupcake is being categorized as a small cake baked in a cup-shaped container or a small, individual-size cake that's usually baked in a muffin pan. Sometimes the cupcake mould is lined with a crimped paper or foil cup. After baking, the paper or foil is simply peeled off before the cupcake is eaten. Artwork may refer to a work of art in the visual arts or a piece of conceptual art.

In other words, the freedom provided by the medium of printmaking is extremely limited as a process of transferring the images by a printmaker. Most artists assume printmaking represents nothing more than a way to increase their creativity [7].

A. **The Matrix**

According to the Oxford Dictionary, a matrix can be defined as a mould in which something such as a gramophone record or printing type is cast or shaped.

B. **The Mould**

Mould can be defined as a hollow form or matrix for shaping a fluid or plastic substance.

4 **Discussion**

Printmaking is one method of making a visual expression utilizing tools and material. The basic process used in printmaking—woodcut, lithography, silkscreen, and intaglio—are the principles of making the artwork. Each method has its own unique qualities and possibilities. In the contemporary printmaking artwork, the explorations of new criteria evaluate the marginalized art form, exchanging ideas and actively breaking down the artificial barriers that so often divide these subjects from each other and impede the free flow of creative ideas.

A number of artists believe in conceptual innovations in presenting their print artworks. With instructive ways, they contribute to some of the debates, introducing fresh content and re-evaluation of the expressive potential of the techniques. By expanding the definitions for art, prints are being forged. Although the original edition multiple is still a central concern of many print artists, there is a growing tendency to extend their practice into the sculptural and installation realms. This does not mean that the essential properties of, say, intaglio and planographic printing are undermined, or that the qualities and seriality and replication are denied, rather that the print medium is given more freedom than the boundaries allowed by a single sheet of paper [8, 9].

The artists try adopting the techniques and modes of presentation in their artwork, where they extend their print practice in other directions. The developments such as in installations give means of re-examining printmaking in terms of process and as a sequence of events. They resolve to move the print medium away from conventional ideas of framed images and multiples serving the marketplace, where the expectation was that it would have a decorative purpose and provocatively to explore the innate character of the printed image.

The artworks by Prawat titled *Launching Station* (1981), a Thai artist, placed a series of large-scale copper plates approximately parallel to the wall with various chemicals and tools applied in his artwork. These plates served as an equivalent to canvas, where the act of etching and engraving resembled that of a highly charged expressionistic painting. In Prawat's artwork, the plates that have been displayed were cleaned and inked, and impressions taken in the usual manner producing the print technique. His artwork jolted printmaking out of being a passive contemplative experience into one that directly confronted the audience [10].

From an observation critic Ronny Cohen (1986), he stated that: "Freed by him from the structures of their traditional formats—and also form—and removed from the confines of the printing shop, the material and process of intaglio technique have been transformed into a sculptural ensemble, one that nevertheless retains the custom any usage of them" [11].

The artist has applied the principles of the print to a three-dimensional format. Postmodernism has challenged the concept of originality and connoisseurship, broken down barriers between visual arts disciplines, and allowed hybrid forms to flourish. In addition, they have moved away from perceiving print production solely in terms of limited editions and marketable commodities; their images command the floor as well as the wall, with print materials and techniques re-evaluated according to their essential properties.

The explorations of these artists did not so much subvert the field of printmaking as contribute towards rejuvenating and extending it into other dimensions. Acceptance from the art community towards the new dimension of printmaking was also needed to make it successful in terms of meaning and performance.

Juhari Said (1996) tried to prove that three-dimensional shapes can be printed repeatedly similar. The artist tries to make the art community and public remember the techniques of reproduction shape of traditional delicacies known in our tradition. He used all three types of traditional delicacies that have been preserved in his artwork, named "edible prints" [12].

Recently, there was an exhibition held at Petronas Gallery entitled "Go Block." The exhibition celebrated printmaking practices in Malaysia through new works by five artists, Juhari Said, Ng Kim Peow, Izan Tahir, Zulkifli Yusof, and Shahrul Jamili. They have been known by their significant contributions to the development of contemporary printmaking in the Malaysian art movement. The idea behind the exhibition was to redefine the idea of printmaking in various and whole new ways. The artists explored printmaking as a dynamic and innovative medium in presenting their artwork beyond the conventional traditions by using the techniques of casting or molding; the usage of various everyday materials has been used to produce the artworks.

The materials such as plastic, aluminum foil, concrete, wood, and soil have been used as a medium to replace ink. Moreover, the concept of the exhibition was to make the public understand that there are alternative ways to the conventional printmaking process. As usual, printmaking is only limited to the use of ink, block, and paper and with traditional techniques to a produced piece of artwork.

Go Block (2009) artists have an initiative and do a first step to push the boundaries of printmaking to its present-day relevance. The opportunity enables them to delve into their complex minds and thought processes that can be shared by others. Understanding the definitions and terminologies of printmaking can bring and widen the artwork in term of techniques, medium, and its performances [13].

5 Conclusion

As a conclusion, by using a mould, the same form can be produced repeatedly. Mould and block can be considered as a matrix in the printmaking artworks. By understanding the terminology of the matrix, it can be said that the concept not only can be used in the visual arts but also can be applied in other fields and areas.

In the future, more research, which involves the understanding of the terminology in printmaking, should be widened in other areas or fields. In order to open up the students' minds towards visual art especially printmaking, it should not only be limited to conventional techniques, materials, concepts, and terminologies. More research should be conducted, especially in the acceptance of the proposed ideas among the practicing artists or the patrons of the art.

Acknowledgment The Praise to the Al-Mighty Allah for His blessing, for this research was successfully completed within the time scheduled allotted. We wish to express our deepest gratitude to our adviser, Associate Professor Ponirin Amin for his patient guidance, unfailing support and encouragement throughout this long, challenging process to produce the research that was at first, nothing from the start. We also like to express our gratitude to the members of our committee for their guides and support. A special thanks to Rozana Musa for helping us to complete the research and our family for their patience, understanding and encouragement.

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Comparison of Chinese Calligraphy and Ink Painting Brushes with Western Water-Media Painting Brushes

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Abstract In the history of Chinese ink painting and Western water-media painting, there is a list of brushes developed over the years. The tools developed are highly related to the skill requirements, techniques developed, and the chosen painting surfaces. In this project, a comparison of Chinese and Western brushworks is made. Through the comparison of Chinese calligraphy and ink painting brushworks and Western water-media painting brushworks and their tools, the advantages of both brushwork application processes can be combined with minor sacrifice of their original capacity. After knowing the strength and weakness of these two categories of brushwork application, the results can be introduced to current commercial applications including animation, digital painting, and digital image processing.

Keywords Chinese calligraphy · Ink painting · Water-media · Watercolor · Brushworks

1 Introduction

Chinese calligraphy and ink painting use similar brushes because many Chinese ink painting skills, techniques, and materials are derived from Chinese calligraphy. These brushes are generally made of two main groups of animal hair, namely weasel hair, from its tail, and goat hair. Weasel hair is comparatively harder than goat hair. In order to achieve intermediate hardness, there are blended types too. In Chinese ink painting, the overall hardness of brushes such as the two main groups above, are generally regarded as soft. Otherwise, the requirement to form fluid turning and twisting would not be possible through the use of the wrist [1].

In Western painting, taking watercolor as an example, the watercolor paper is very tough. It allows application of thick paint and the painter is still able to push

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the paint around. This pushing of thick paint approach is adapted from oil painting technique. If it were to be used in Chinese ink painting, the rice paper would have been torn by this rigorous process [2].

2 Comparison of Brushes

2.1 Chinese Calligraphy Brushes

Chinese calligraphy brushes work well on a rice paper surface, relying on the high absorption character of rice paper. It easily achieves fluidity of brushwork with good wrist pressure control coupled with the fast absorption character of rice paper. However, it cannot move concentrated paint because of the very soft hair used to make the brushes. In addition, friction generated by thick paint and brush movement may tear the thin rice paper surface.

If it is used on a less absorbent paper surface such as watercolor paper, for example, the watercolor paper cannot absorb the paint “hiding” in the brush. Therefore, in this case, it works well only for large area washes or low to middle paint concentrations for nonabsorbent paper surfaces [3].

2.2 Natural Hair Watercolor Brushes

Watercolor brushes (Kolinsky, hog, or natural animal hair brushes) are able to hold on to a lot of both pigment and water, for release later on a watercolor paper surface. They are regarded as medium hardness (slightly harder than weasel hair Chinese brushes). Their capability in creating various textures could be slightly weaker than Chinese ink brushes due to their hardness. The harder the brush, the stiffer it is to allow flexible execution of brushwork.¹

2.3 Synthetic Brushes

Nylon or other synthetic brushes were invented to overcome the stringent requirement of hand feel and hand skills to achieve controlled brushworks in Western painting. They are commonly used in water-media painting today. They wield the hardest brush hair as compared to all the rest of the watercolor brushes. They are able

¹http://en.wikipedia.org/wiki/Paper_density: In the metric system, the mass per unit area of all types of paper and paperboard is expressed in terms of grams per square meter (g/m²). This quantity is commonly called grammage in both English and French (ISO 536), though printers in most English-speaking countries still refer to the “weight” of paper. Here a sheet of imperial size watercolor paper of 0.56 m × 0.76 m weights $[0.56 \times 0.76] \times 300 \text{ g/m}^2 = 127.68 \text{ g}$.

to push concentrated paint just like oil painting bristle brushes. However, due to their hardness, their fluidity is very much compromised. Therefore, I prefer to use them for smaller areas and adjustment of edge sharpness. Over-dependence on synthetic brushes can cause overly hard edges making the whole painting process look like a filling-in-the-blank exercise. The result is a complete loss of image fluidity.

3 Comparison of Chinese and Western Brushwork

3.1 Chinese Calligraphy Brushwork

Chinese calligraphy brushwork emphasizes *Jin* [劲, strength], the exertion of force within the structure of brush application, which is called the *Gu Fa* [骨法, bone structure].

Bone¹ in Chinese calligraphy is the firm structure of each type of brushwork such as horizontal or vertical lines, side strokes, or points, all of which require a certain controlled approach in execution in order to maintain the feel of *Jin*. In the Tang dynasty, Zhang Yan Yan's write-up entitled, "Historical Painting Record" or *Li Tai Ge Hua Ji* [历代各画记] states that: "Depicting object likeness is through depicting its form; while the feeling comes mainly from the use of brushwork. Therefore, to learn painting (regarding Chinese ink painting here), one must first master calligraphy." To interpret his concept, when the brushwork is applied, the inner structure of the perceived object needs to be understood thereby the decisive brushwork could depict the inner spirit of the subject matter. Here the inner structure may not mean very scientific building blocks of the object. It just refers to the viewer's understanding of how the object behaves or feels. For example, a tree grows from larger branches to smaller branches and gradually behaves softer towards the end of smaller branches.

Therefore bone structure means the depiction of a combination of the size, shape, and internal spirit of a perceived subject matter. Contemporary painting in Asia with the influence of both the East and the West is not restricted to the tight rules of calligraphy. However, the concept of simplification is evident. When we introduce this concept of simplification, we may further induce a strong delusive quality into the presented images. It enhances the visual results while being able to reduce the workmanship.

Based on the fundamentals of Chinese brushwork, the application of *Zhong Feng*¹ (中锋, centralized brushwork: Chinese calligraphy requires the brush to be held rather vertically so that the brush tip pressure can be felt easily. This allows better control of the thickness and shapes executed) emphasizes the hiding of sharpness by controlling the pressure at the tip of the brush firmly. It could be likened to "using a piece of heavy metal weight to draw firm lines on sand." It requires the starting position to be first in the reverse direction before moving towards the intended direction. For example, before moving down, the brush will be moved up slightly; and before moving left, the brush will be moved to the right slightly. This allows smooth and fluid execution of brushworks.

With the choice of generally softer brushes, coupled with rice paper's absorbent character and good wrist control through training of *Zhong Fang* application, the Chinese ink painter has the advantage of creating both ink wash and rough textures within one brushwork easily. It is done by varying the combination of brush speed, ink, or watercolor concentration and wrist pressure control. This flexibility forms the heart of visual simplification of Chinese ink painting.

3.2 *Western Water-Media Painting Brushwork*

In Western brushwork concepts, a painter has the full freedom to invent one's method of brush application.

The brushworks in water-media painting regardless of their approaches can be grouped into two major categories:

- (a) *Glazing*: The process of applying sheer layers of pure pigment, one over the other, to produce a desired color effect.² This layering process can achieve different paint or opacity, from transparent, semi-opaque to opaque.
- (b) *Scumbling*: The process of applying broken brush strokes to allow some optical mixture of paint layers between the lower layers and the top layer.

The two results above depend largely on the combination of three major factors, namely the friction between brush and painting surface, water content in the brush, and pigment concentration in the brush. A brush loaded with more water and with softer hair coupled with a smoother painting surface will tend towards forming evenly filled flat brushwork, the glazing. On the contrary, a drier brush generates more frictional force to the painting surface and will form scumbling results.

In Chinese ink painting, there are equivalences to these two categories above. Chinese ink painting depends on the absorbing nature of rice paper to create washes in multiple times which is quite similar to glazing. For rough textures like scumbling, with the quick absorbent nature of rice paper, when an ink brush has less water in it, the paper can absorb the water in the brush rather quickly, creating frictional force to the brush moving. That helps in forming rough textures readily.

3.2.1 **Combining the Strengths of Chinese Calligraphy/Ink Brushworks and Western Water-Media Brushworks**

To solely take advantage of Chinese calligraphy ink painting brushwork requires a lot of control of the painter that in turn requires years of regular practice. Practically, this is less feasible to most painters unless one has been practicing Chinese calligraphy skills or painting brushworks from a very young age.

Therefore, in order to take advantage of both Chinese calligraphy and ink painting brushwork and Western water-media painting brushwork, there are multiple factors we have to consider. These factors are brush hardness, paint

concentration (combination of water content and pigment content), speed of application, paper surface roughness, and paper absorbent character.

Paper roughness and absorbency are generally less complex factors that can be controlled by painters readily. A rougher or more absorbent paper surface generally creates rough textures. However, the other three factors are brush speed, hardness, and paint concentration. These factors are to be linked closely.

Tables 1 and 2 show the general combined results of these three factors.

Table 1 Brush movement and textures

Brush movement and textures			
Paint concentration		Water content in brush	
Dilute	Brush Types	Low	High
	Chinese calligraphy brush	Rough textures/medium brushwork control	Smooth texture/easy brushwork control
	Water-media natural hair brush	Rough textures/easy brushwork control	Smooth texture/easy brushwork control
	Synthetic brush	Rough textures/easy brushwork control	Smooth textures/easy brushwork control
Concentrated	Chinese calligraphy brushes	Rough textures/difficult brushwork control	Minor rough texture depending on friction of paper, brushwork control is between medium to difficult
	Water-media natural hair brushes	Rough textures/medium brushwork control	Smooth texture/medium brushwork control
	Synthetic brushes	Rough textures/easy brushwork control	Smooth textures/easy brushwork control

Table 2 Flexibility of brushes

Brush types	Flexibility
Chinese calligraphy brushes	High
Water-media natural hair brushes	Medium
Synthetic brushes	Low

4 Conclusion

4.1 Working Approach to Benefit from Advantages of Chinese and Western Brushworks

Western application of brushwork emphasizes final visual results. It allows complete flexibility in applying the brushworks.³ However, in Chinese ink painting, the calligraphy requirement is very stringent. The simplification process also emphasizes the control of calligraphy brushwork to depict *Jin*. The fragile character of rice paper makes this working process even more demanding.

In order to take advantage of both types of brushworks, a Chinese ink painting can be compromised slightly to allow more layers of application such as glazing and scumbling in the Western brushwork process. Therefore, the choice of paper has to be different. The thickness and toughness of paper have to be better than regular rice paper. Generally, 300 g/m² regular watercolor paper will be thick and tough enough to allow multiple layers of glazing and scumbling process.

With the slower absorption process of thicker and tougher paper such as watercolor paper, the brushwork can be done separately and be combined for a final visual result without very demanding hand pressure control like Chinese calligraphy on a rice paper surface. Therefore the speed of brushwork execution can be reduced slightly to improve the ease of controlling the brushworks. Hence, the visual result can still retain the beauty of Chinese calligraphy simplicity.

One additional advantage is the application concentration of paint can have a wider range with a thicker and tougher paper surface. With wider variation of paint concentration coupled with a slow brushwork process, the brushwork can be varied further through change of concentrations of paint or ink.

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Thematic Analysis as a Basis in Giving Meanings to Myths of *Nunuk Ragang* and *Huminodun* Folktales of *Kadazandusun* Tribe in Sabah

Chrisna Pindah, Mohd Ali Azraie Bebit and Halina Amin

Abstract *Nunuk Ragang* and *Huminodun* are the folktale oral traditions in the Kadazandusun community of Sabah. In the old days, these tales were a main medium to deliver information about the myth of existence of Kadazandusun society. Today, these folktales are in danger of being lost, because the young generation is less interested in them. In an effort to preserve these two mythological folktales it is good to do extraction on the meaning of its myth. So the depth research on transcribing is important. Therefore this research uses the thematic analysis as a basic model and approach to transcribe the meaning of these two prominent folktales in Sabah. This kind of research in the future also can help the artist or researcher to visualize these tales and also popularize these tales among younger generations and nations.

Keywords Nunuk ragang · Huminodun · Folktales · Thematic analysis · Myths · Meanings

1 Introduction

Huminodun and *Nunuk Ragang* are two different folktales. But they are tales about the mitoses of the Kadazandusun genesis. *Nunuk Ragang* folktales are told about huge trees called *Nunuk Ragang* or a *Red Fig Tree* which is belief in a land of paradise, native Kadazandusun. The same as *huminodun* folktales, it is told about the myth of a young girl who is willing to sacrifice herself to solve a famine of

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Kadazandusun natives. These two folktales were interesting literature entertainment in the past and known as an age-old belief. Around the eighteenth until the early twentieth century folk tales were the main entertainments of the Kadazandusun clump in Sabah and peoples all around SouthEast Asia. The modernization and development of modern technology such as radio, television, computers, hand phones, and the Internet have lessened new listeners' interest in the folktales. It is the result of the homogenization from globalization and the most affected are the local cultures such as storytelling of folktales [1].

2 Method

Basically folktales that had been told in SouthEast Asia have a relation to the beliefs and culture background of the community. Most stories use something imaginative and metaphors to represent a person. In addition, many myths represent a single action and have a cosmic or natural correlation for the human being. Thus it makes the listener more attracted to the characters and not direct into the specific meaning of the folktales. The lack of study of *huminodun* and *Nunuk Ragang* folktales makes it not improvised by the new generation. Therefore this effort of preserving the literature via transcribing the folktales into a simple meaning by using the thematic analysis method can help these tales be more prominent and interesting [2].

Riessman [1] stated that thematic analysis is the main reason the tales had been told. Therefore this method is very appropriate to a process of literature extraction. These methods include a coding process considered as a numeric system. That means this manner will classify all the folktales in a number of ideas that make them easier to be analyzed because *Nunuk ragang* and *Huminodun* folktales are formed in a dramatic storyline [2].

The possibility to use these thematic analyses as a medium to explore through it meanings behind the myth of Kadazandusun folktales are one attempt to rediscover the uniqueness and equalize it from other races' tales. It will be a good idea as part of adding an artistic value in Kadazandusun cultures. The objectives of this investigation are to study the possibility of these folktales to be analyzed and in order to develop a formulation of transcribing the local Sabahan folktales.

The basis method to analyze or transcribe all the Kadazandusun folktales is by using coding. In this investigation alphabets are used as a code for the theme of the folk tales. For example, the theme of devotion is coded as D, a theme of respect as R, a theme of love as L, and many more. This code is not specific because the character of thematic analysis is an open-ended answer [3].

3 Myth: The Giving Meaning

Through the thematic analysis method this research extracted *Nunuk Ragang* myth meanings that represent a value of love in family (F). Then the tale of *Huminodun* is about the devotion (D) to country and family. The code given was based on logical analysis and answered the question of why. It is vague on the myth's meaning but it still can help form a chart or connotation of code of each tale [4].

These two codes, (F) for value of love in family and (D) for devotion, can explain that these two tales bring a positive value. These meanings also can describe the height of loyalty and love that exists in the same family or community of Kadazandusun. Therefore this extraction of meaning can help other peoples fathom the beauties and the art of Kadazandusun folktales.

4 Conclusion

As a conclusion this thematic analysis reliability as a manner to transcribe Kadazandusun folktales is relevant even with a number of weaknesses in it. The idea in the analysis is wide and uncontrolled. But it should be expanded into another manner to help this folktale to add more great value. The idea of clarity of presentation, storytelling, and technical process, we hope will still be able to bring in scholars and contributions to the community in Sabah Kadazan based on the coding of the tales' meaning. In addition this research also can be used as references to interested future researchers, especially the scientist-artists dwelling in Sabah, and apply all the meaning through visual art work or an illustration.

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Method Design of Keris Pandai Saras

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Abstract Design of *Keris* can be obtained in various methods. This chapter presents the method of *Keris Pandai Saras* design in Malaysia. The objective of this research was to determine the method used in *Keris Pandai Saras* design. The data collection involved qualitative methods by using interviews, observations, review of the literature, potential locations of *Keris* artifacts, and visual research. Data collected were grouped according to the design features of *Keris*, which was the blade, sheath, and the hilt. The significance of the research was to introduce the design of *Keris Pandai Saras* and to give knowledge about the differences of *Keris Semenanjung* and Javanese *Keris*. This research only discovered the method used in determining *Keris Pandai Saras* design.

Keywords Method · Keris pandai saras design · Interviews · Observation

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1 Introduction

Keris was unique in the Malay world and can only be found in the Malay population, such as Malaysia, Indonesia, Singapore, southern Thailand, southern Philippines, and Brunei [1]. In Malay culture, *Keris* is a special cultural artifact with a specific role [2]. The early functions of *Keris* are as a weapon to defend oneself, to preserve one's life, and to function as a close-range weapon [3]. In recent developments resulting from various factors such as the influence of geography and the natural environment of Malaysia, the different forms and functions of *Keris* have arisen.

Appearing in the Malay *Keris* world simultaneously for each province and territory, has its own characteristics either from the native land of Java or peninsular Malaysia, but the shape, design, form, and accessories of the Malay *Keris* is different from *Keris* which were created and designed in Indonesia, Southern Philippines, and in Borneo [4]. *Keris* were made from a strong iron dug from the bowels of the earth. Allah says, "And we've created a situation which set to strength steel with a reliable as well as many benefits for mankind, and that the knowledge of God appears on the vertical and defend the religion of God and help His messengers, though unseen, showing Allah All-Strong, All-Mighty" [5]. In the Malay tradition, a *Keris* must be made at least two kinds of iron, and a good *Keris* of seven kinds. In *Keris*, there is an element known as *pamor*. *Keris berpamor* means a *Keris* that has a damascened blade. In society, there is the belief that the *pamor* pattern has magical properties. There is also a view that the *pamor* pattern represents the expression of the maker [6].

There are two types of *Keris* blade which are straight and *lok* (curve). For a *lok* (curve) blade always *lok* in the odd numbers such as three, five, seven, or nine. The amounts of *lok* (curve) have their own meaning. The sheath was made from wood, and had many carvings. In Malaysia, there are many *Keris*, and one of them is *Keris Pandai Saras*. *Keris Pandai Saras* immortalized the name of its maker (*empu*), a blacksmith who came from Java and migrated to Pattani [7]. The creativity of the blacksmith in making *Keris* produces many weapons such as *parang*, *klewang*, *tombak*, *badik*, and many more. This research focused on the method to identify the design of *Keris Pandai Saras*.

2 Methodology

2.1 Review of the Literature

The literature review provides significant information to determine the history of *Keris*, the origin of *Keris*, and the designs related to the traditional element of *Keris* in Malaysia. The literature review also identifies other findings in the same field so as to connect with and update the literature on this area of study.

2.2 Potential Location of Keris Artifacts

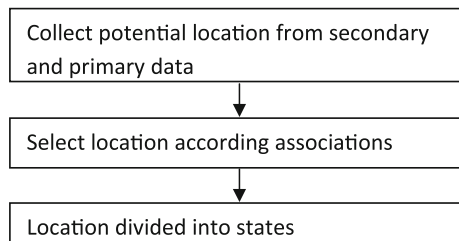
Potential location was collected from literature review, martial arts associations, books, museums, the Internet, and friends. From this collection, the potential locations were divided into associations, which are museums, *Keris* collectors (*Senjata Warisan* and *Ahmad Toko Antik*), sellers (*Al-Hadid Keris Malela*, *Keris Ibnil Ratura* (*kesenian kraf melayu dan antikuiti, Amcorp Mall*), blacksmiths (*Bengkel Pandai Besi*, *Keris Kraftangan*, *Pandai Keris*), *Keris* experts (*Pak Tenas @ Effendy Tengku*, *Mohd. Noordin Ab. Hamid*), and the MHDC (*Malaysia Handcraft Development Cooperation*).

After all, the potential locations were recorded. The next step was all locations were divided into states: Kuala Lumpur, Selangor, Johor, Melaka, Negeri Sembilan, Perak, Kelantan, Terengganu, Pahang, Kedah, and Pulau Pinang (see Fig. 1).

2.3 Interviews

Interviews take a constructionist perspective on the interviewing process and interview products (in ethnographic research). Interviews are the social productions [8]. In this research, interview sessions were conducted with various experts such as coaches of traditional Malay martial arts, lecturers and professors from local universities, curators from museums, *Keris* makers, *Keris* collectors, and *Keris* sellers. Unstructured interviews were conducted. The same questions were not asked of each applicant [9]. The questions were tailored based on the background of the participant, such as questions for the blacksmith were more to the process of *Keris* making. The interview questions were more to the history and origin of the *Keris*, the function of *Keris*, *Keris* manufacturing, the characteristic design of *Keris*, and the documentation of *Keris*. To gather information from experts in the field, interviews are consultations useful to understand consumer perceptions, motivation, opinions, and behavior concerning products or services [10].

Fig. 1 Steps of potential location of *Keris* artifacts



2.4 Observations

Observations are helpful to understand phenomena, influential variables, or other elementary interrelations [11]. Observations are conducted based on the potential location such as martial arts association, museums, and *Keris* makers. Observation skills are to enhance the imagination and to pay greater attention to visual details [12]. The observation was divided into three sections which are design, manufacturing, and seller. For *Keris* design and the form of *Keris Pandai Saras*, it is made on how the *Keris* were described based on the parts of the *Keris* (the sheath, hilt, and blade). However, manufacturing observes the process and equipment of making *Keris*.

2.5 Visual Research

Methodology of visual research proceeded by making visual representations, studying the society by producing images, and studying images to get information about the research [13]. For this process, images and photos from the cataloguing department of museums, archives, UNESCO-bank images, and private and personal collections were captured and compiled. Photographs were also purchased when possible. Photography was also employed as a “visual notebook” by anthropologists to document aspects of material culture produced by a particular society [13]. A digital camera was used to photograph [14] and record [15] the selected samples of *Keris*. The *Keris* blade was divided into two types, which is *lok* (curve) and straight. Figure 2 shows the photo of a straight blade 2.6 *Keris Pandai Saras*.

All photos were then transferred to the computer to enable design classification processes. Suitable software was used to draw the shape and traditional form of the



Fig. 2 Straight blade of *Keris Pandai Saras*

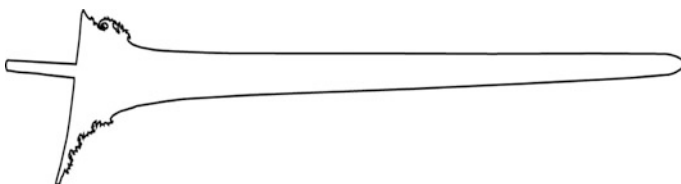


Fig. 3 Outline shape and form of straight blade of *Keris Pandai Saras*

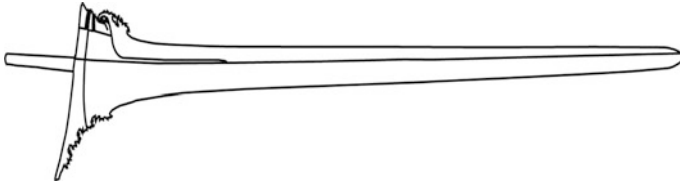


Fig. 4 Full shape and form of blade of *Keris Pandai Saras*

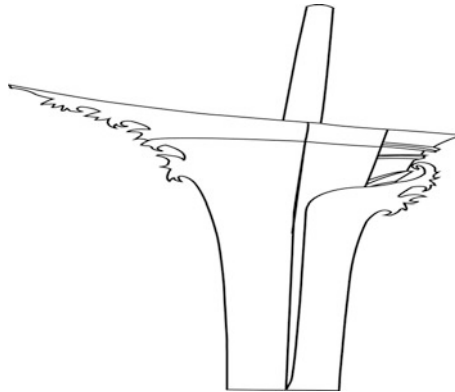


Fig. 5 *Aring/Ganja Keris Pandai Saras*

blade, sheath, and hilt. The first step of the illustration was focused on the outside design, shape, and form of *Keris Pandai Saras*. The outside straight blade design of *Keris Pandai Saras* is shown in Fig. 3. The second step focused on the full shape and form of *Keris Pandai Saras* as shown in Fig. 4. For the last step, the illustration zoomed in and focused on design *Aring/ganja Keris Pandai Saras* as shown in Fig. 5.

2.6 Analysis of Data and Samples

The *Keris* samples were grouped according to the design features of the blade, hilt, and sheath. In the later stage of analysis, the discussion dealt with the evidence from the literature and the visual documentation of the *Keris* samples. Then, from the samples of *Keris*, the analysis illustrated various designs that showed the continuity of decorations, motifs, and functions.

3 Conclusion

Based on the current work, this chapter highlights the methods design of *Keris Pandai Saras*. From the visual research, the researcher will be able to identify the structure design of *Keris Pandai Saras*. These structure designs were important in which to introduce the designs of *Keris Semenanjung* and to give knowledge to the people to know the differences between *Keris Semenanjung* and *Javanese Keris* or any other *Keris* in Nusantara. Further research will be focused on the characteristic design of *Keris Pandai Saras* according to the blade, sheath, hilt, and the *Pendokok* (accessories of *Keris*).

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Islamic Features Adaptation in Songket Design

Norakmal Abdullah, Nani Hartina Ahmad, Norwani Md Nawawi and Rafeah Legino

Abstract The Malay Peninsula is located in a strategic location where it is situated in the middle course of trade between the East and the West. The attraction of the location became a major transit for foreign traders. The traders brought not only merchandise but also can be viewed as a small delegation that brought together cultures, beliefs, and religions. Various effects can be seen in the pattern of Malay's life from the beginning of migration between regions in the archipelago up to the western colonial period. Among the obvious influences that have been profound and lasting until now is the influence of Islam. Islam gave much influence and encouragement towards the development of artistic activities of the Malay people in daily life, especially in the handwoven fabric which is songket. Islamic effects can be seen through songket designing that oriented features from Islamic characteristics. This chapter investigates how the Islamic view influences the form and content of its artistic element in Malaysian songket design, to discover the correlation of Islamic art with Malaysian songket, and to serve as evidence of the existence of evolution factors of Islam on Malaysian songket designs. Based on the result, several designs such as motifs and patterns of songket were identified and classified as part of Islamic art.

Keywords Songket · Islamic art · Islamic geometric patterns

1 Introduction

Songket is symbolized as smooth Malay handwoven fabric which is inherited through the ages. The skills and creativity of the weaver have shown through various indigenous traditional patterns which are very beautiful and extremely

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varied. Until now, songket is still carried out in the east coast of Malaysia such as Kelantan, Terengganu, and Sarawak. In the olden days, kain songket was only used for royalty and people of the palace. The most popular handwoven fabrics which were often woven for the imperial family were *Tenunan songket benang emas* and *kain limar bersongket*. But nowadays, the *kain songket* are being worn from the ordinary people to royalty.

The migration of Islam in the Malay Peninsula has contributed to the changes in practices and lifestyles among Malays. Islam is believed to have debuted in the early fourteenth century and continued to grow and affect the life of the Malay community in all aspects. Islamic art is values based upon the teachings of the essence of Islam. Islam is a religion that brings and teaches humans to think something good, true, lovely, smooth, orderly, and useful. This is also shown through the expression of Malay design such as songket. The skills of selection and enriching design appeared with the maturity of the weaver's expertise in adapting traditional elements and applying them with elements of Islam. Before the advent of Islam, there are so many decorative motif Malay textile patterns featuring animals such as birds, butterflies, fish, and so on. When Islam came to the Malay Peninsula, the use of human figures and animals as elements in art were prohibited. However this chapter only concentrates on the influence of Islam in terms of elements and characteristics of the Islamic concept in songket.

2 Songket

Songket weaving is the process of an extra weft weave where gold threads are inserted into plain weave to create motifs and patterns on the woven fabric. Malay weavers used to weave songket with gold, silver, and metallic colored threads as the additional weft threads. There are 10 steps in making songket. The processes of songket start with *mencelup warna pada benang* (dyeing), *menerai*, *menganing* (warping), *mengulung* (roll the warps), *menyampak* (inserting warp through the reed), *mengarat* (making of shafts), *meneguh* (tension the warps), *gigi belalang* (making of *tekat* 3 or 5), *menyongket* (uplifting warps for songket pattern), and finally *menenun* (weaving) [1].

The structure of songket patterns (Fig. 1) is created by the six basic textile patterns, which consist of full-patterned songket (*corak bunga penuh*), isolated pattern (*songket bunga bertabur*), stripe patterns (*songket corak jalur berdiri* and *corak jalur melintang*), zig-zag patterns (*songket corak siku keluang*), checkers (*songket tapak catur*), and the triangle shape of bamboo shoots (*songket pucuk rebung*). Mostly, motifs of songket weaving are sourced from plants, cosmos, earth, animals, and nature and the design is mainly concentrated on geometry, abstract style, and realistic [2]. The structure of the *songket* fabrics is mainly in *sarong* and *kain lepas* (shawls). Therefore the structure of *sarong songket* consists of *kepala kain*, *badan kain*, and *Kaki kain* which include the *mengapit kepala kain* and the

Fig. 1 Structure of *Kain Sarong Songket*: **a** Kepala kain, **b** badan kain, **c** kaki kain dan, and **d** pengapit kepala kain

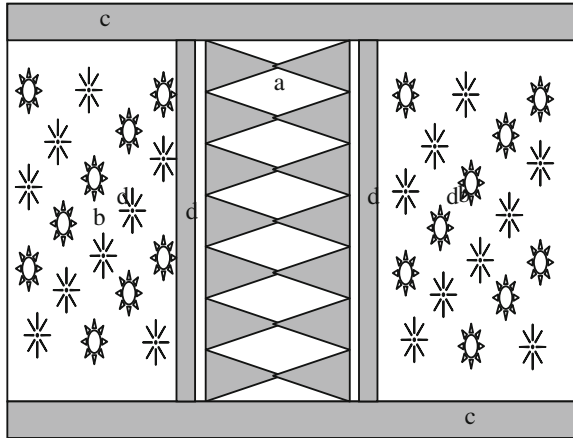
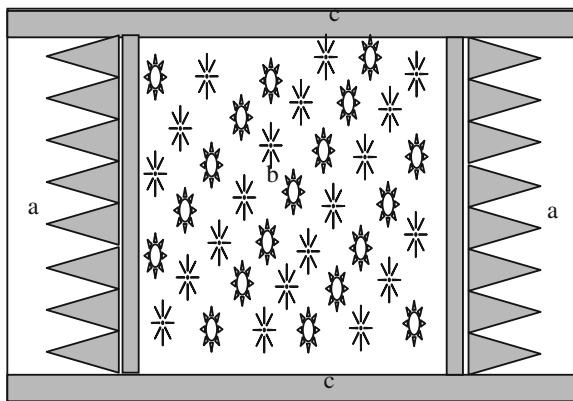


Fig. 2 Structure of *Kain Lepas songket (shawl)*: **a** punca kain, **b** badan kain **c** kaki kain, and **d** pengapit badan kain



kendik. The *kendik* is the smaller board pattern (Fig. 2) where it is placed at the *pengapit kepala kain* or at the border of the *kaki kain sarong*. Meanwhile the structure of *kain songket lepas* consists of *punca kain*, *badan kain*, and *kaki kain*.

3 Islamic Art

Islamic art is the creation of art that was formed in the mould of Islamic teachings and reveals or discloses the message of Islam. It is different from non-Islamic art because it has a “body” and “soul” of its own. “Body”, shape or form (external) of Islamic art has to do with the teachings of Islam, whereas the “soul”, meaning or name (internal) is much more closely related to the teachings of Islam. The soul of Islamic art is the essence of the teachings of Islam, which is the main mission of each object of Islamic art produced. The body and soul of Islam are needed to meet

the requirements of Islamic revelation, which together contribute to the formation of artistic identity [3].

Islam's artists need to say the creed which is *syahadah* and assume responsibility for discharging the *syahadah* to manifest their actions only for God's oneness *mentauhidkan*. Al-Quran and Al Hadith will be the main references in producing their art and thus they should see the statement is true that Allah SWT has shown to his servants, namely the existence of this semester. Islamic artists learn both, what is contained in the Bible and what is stated on the environment. Appreciation of both these aspects encourages it to look at nature as a real example that is given by the owner's knowledge [3].

Islamic art can be understood from the four basic processes in art work. First is from the imitation process through nature. Imitating something from the nature of God's creation admired Islam's artist to understand, learn, and appreciate the beauty of God's creations. Directly, the artist will feel self-realization in the forthcoming and make it feel inferior because no matter how, he could not compete with the greatness of God. Then, the work will only become illusory gains from the natural beauty of God's creation according to his own evaluation and not absolute. Second, the artwork is not natural. Here, Islam artists refer to nature and the process of artwork will be denaturalized. The artwork becomes unrealistic and does not resemble the real world. The work of art is merely conceptual only. Third is the process of stylization. Artists produce work based on the unnatural subject. This process allows a form of art to be produced with full styling. This means that the real object of nature has become stylized to suit the artist's need. Characteristics of natural origin have been eliminated and the work is merely a conception of beauty. Fourth, the artist needs to abstract the works that have been worn. This stage requires the highest skill of thinking. A description of nature is being analyzed and assessed to produce an abstract work. Here, natural objects have totally turned into floral patterns and geometry [4].

Most of the Islamic geometry patterns are based on geometric shapes or polygons. The patterns of Islamic geometry are classified into three types. The first type is the pattern made up from a small number of repeated geometric elements. The basic patterns are the circle, square, and straight line. These simple forms are combined, duplicated, interlaced, and arranged in intricate combinations. This type of pattern is named "regular tessellation" where one regular polygon is repeated to tile the plane. The second type of Islamic geometry is two-dimensional patterns. The designs of patterns often have a background and foreground pattern. This type of pattern is called "tessellation". Finally, the third patterns are not designed within a frame [5].

There are three modes to Islamic decoration. The first mode is where each repeating geometric form has a built-in symbolism ascribed to it [6]. For example, the concept of the triangle is the embodiment of the teachings of Islam which teaches "*hablumminallah*", "*hablumminannaas*", and the relationship with the natural environment. The triangular shape is also a symbol of the cycle of the triangular space and time. It is divided into three parts: the top one is the Lord, in the bottom of the left and right triangle are Semester and Human. The triangle is the

most stable form in mechanics. The use of the circle is a way of expressing the unity of Islam. The circle and its center are the point at which all Islamic patterns begin. The circle is a symbol of a religion that emphasizes one God and the role of Mecca, which is the center of Islam toward which all Moslems face in prayer. The square in the Islamic view symbolizes the equally important elements of nature which are earth, air, fire, and water. Without one of four equilateral sides, the physical world represented by a circle that inscribes the square would collapse upon itself and cease to exist. The second mode is based on the nature of plant forms. A third mode is the mode of Arabic calligraphy [6].

Al-Ghazali in his aesthetic theory said that the concept of beauty is spiritual. The spiritual feature is applied in one of traditional Malay carvings [7]. By the understanding of the Malay people with the correlation of ontology and axiology between human, nature, and creator, there is a phrase that shows the spiritual expression: *“Tumbuh berpunca, Punca penuh dengan rahsia, Tumbuh tidak menunjak lawan, Tumbuh tidak memaut kawan, Tapi berlengkar dengan penuh mesra.”* The first sentence of the phrase means by the process of creation of human being and universe by God as the Creator. The second sentence is that God has an unknown substance and it is beyond human ability to manifest. Because of that, it was regarded as “full of secrets”. The last phrase epitomizes the concept of the universe that reflects the character of God, the Most Loving, Most Gracious, Most Beautiful, Exalted and Most Perfect [8]. The spiritual foundation gushed physical symptoms manifested through moral values and reflected the diversity of nature oriented to the aesthetic principles of Malay as refinement, functionality, unity, contrast, symbolism, and meaningfulness [9].

4 Islamic Features in Songket

Islamic art has its own meaning and form. In the form of Islamic art, it is determined in accordance by *syariah* principles that have been set. In Islam, God is eternal and the impression is affirmed in the concept of Islamic art form where the design has no beginning and no ending. The designs are seen as a highest Islamic aesthetic value of art. Through the contemplating of designs, the artwork reminds us of the power of God who is transcendent [10]. Figure 3 shows the motif of *Awan Larat*. The meaning of motif *Awan Larat* in the concept of Islamic art is the design has no beginning and no ending. This is a concept of Islam that glorifies God’s features as *Badim dan Baqa*. The composition of *Awan Larat* in the songket pattern implies that knowledge of God is endless and the end. The design of songket is characterized by the essence of Islamic elements’ correlation between spirit and body, meaning and form, and name and face. It is clear that truth and beauty cannot be separated in Islamic art [11]. Paragraph 43 of Surah An Nur said that.

Tidakkah kamu melihat bahwa Allah mengarak awan, kemudian mengumpulkan antara (bagian-bagian)nya, kemudian menjadikannya bertindih-tindih, maka kelihatanlah olehmu hujan keluar dari celah-celahnya dan Allah (juga) menurunkan

Fig. 3 Border pattern at the tengkolok with motif of awan larat dandan



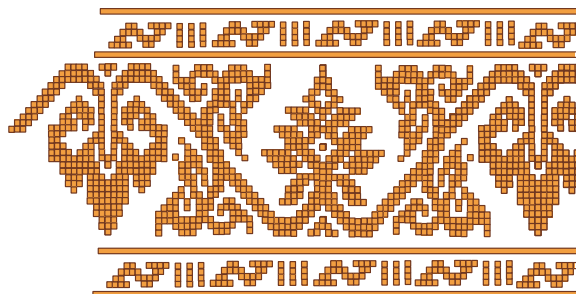
(butiran-butiran) es dari langit, (yaitu) dari gumpalan-gumpalan awan seperti gunung-gunung, maka ditimpakan-Nya (butiran-butiran) e situ kepada siapa yang dikehendaki-Nya dan dipalingkan-Nya dari siapa yang dikehendaki-Nya. Kilauan kilat awan itu hampir-hampir menghilangkan penglihatan.

This surah is also proved the incidence of cloud formation that became evident oneness of God as a reference and reflection of artists to produce work includes the creation of the *Awan Larat* motif [12, 13].

In Islam, besides palm fruit, the pomegranate is one of the fruits that come from heaven. Pomegranate is a fruit classic and has many benefits in terms of health. In Islam, the pomegranate has its own meaning, which is to show honor, respect, and priorities as contained in the features of God. In the olden days, songket was only used for royalty and people of the palace [14]. Here, Fig. 4 shows that the selection of the pomegranate as one of the motifs in songket conforms and coincides. The motif symbolizes “honorable” where songket weaving appointed as royal was woven to be dignified and have its own status.

Tauhid is abstract. In Islamic art, *Tauhid* is translated into geometric forms of expression. “Geometry expression” happens to be one of the simplest of unity in the cosmos. In other words, Islamic art is purely in mathematical features especially involving the field of geometry [15]. Islamic art is more abstract in accordance with the abstract idea of unity. It is an intellectual teaching of Islam that emphasizes the sense of growth rather than following their desires. Based on the sign of geometry pronunciation, Islamic art emphasizes beauty and truth. *Tauhid* refers to the truth

Fig. 4 Border pattern at the tengkolok with motif of delima in paling patung arrangement



and Islamic art is inseparable from beauty. Plato said that beauty is the splendor of the truth. One way of beauty is expressed through mathematical expression. When the object is defined as beauty by a mathematical view, automatically the object has mathematical properties. There are five elements of mathematical beauty such as its pairing, symmetry, balance, repetition, and its determination. Symmetry is part of the concept in mathematics. Basically symmetry produces beauty. An object that is symmetrical will appear beautiful. Figure 5 shows the symmetrical concept in songket. The pattern is stated on the structure of kaki kain songket. In songket, most of the patterns are symmetrical [3].

Fig. 5 Symmetry concept: songket pattern on kaki kain

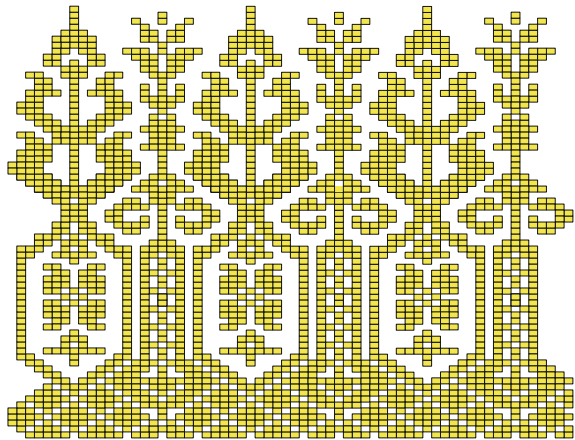
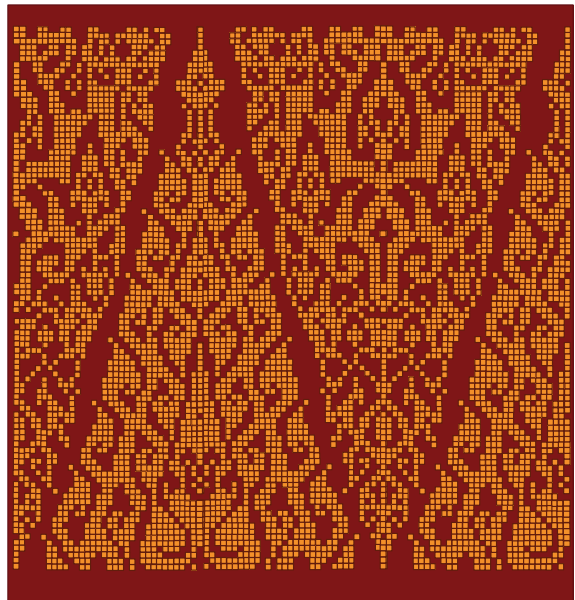


Fig. 6 This is an example of tolerancy concept on motif of Pucuk Rebung tepi gigi yu and another pucuk rebung



In songket, the famous motif made up from the triangle is *pucuk rebung* (Fig. 5). Figure 5 shows two different types of *pucuk rebung* in one kepala kain. “*Wahai umat manusia! Sesungguhnya Kami telah menciptakan kamu dari lelaki dan perempuan, dan Kami telah menjadikan kamu berbagai bangsa dan suku puak, supaya kamu saling berkenalan. Sesungguhnya semulia-mulia kamu di sisi Allah ialah orang yang paling takwa di antaramu. Sesungguhnya Allah Maha Mengetahui, lagi Maha Mendalam Pengetahuan-Nya*” is from paragraph 13 of surah Al-Hujurat. Through the surah, we can see the tolerance concept in songket is adapted (Fig. 6) where in Islam tolerance is strongly encouraged although human beings have differences of religion, ethnicity, race, or others [13].

5 Conclusion

Based on the analysis of songket design is proved the existence of elements of Islamic art such as the meaning of design on songket motif: *awan larat* (Fig. 3) and tolerance concept *pucuk rebung* (Fig. 6) and songket pattern (mathematical concepts: symmetry (Fig. 5), balance, repetition, and determination). The analyses of songket patterns had shown the existence of evolution factors of Islam on Malaysian songket designs. Songket especially in geometric patterns are mathematically precise, aesthetically pleasing, and symbolic. In Islam, all forms of art, the natural world, mathematics, and science are all creations of God. They are reflections of the same thing which is God's will expressed through His Creation. Man can discover the geometric forms that constitute the design, but these forms always existed before as part of God's creation. Therefore, the outcome of this chapter verified that songket design is mainly an Islamic concept. It is interesting to identify the Islamic influences in the form and content of its artistic elements in Malaysian songket design which very few researchers had studied on local textiles especially in songket. Therefore, it is essential to fill the gap lacking in the correlation of Islamic feature adaptation particularly on the elements of songket design.

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Kufi Lari: The Hybrid of Khat Kufi to Uphold the Malays' Identity in Digital Art Application

Mohd Amin Mohd Noh, Mohd Fauzi Harun,
Nik Narimah Nik Abdullah, Nor Fariza Baharuddin
and Zahara Ramli

Abstract Islamic calligraphy known as Khat was first introduced by the Arabs. There is a variety of Khat including the Kufi, Tuluth, and Nasakh. Each type of Khat has its own identity based on several influences such as ornamentals from flora and other nature elements. It influences Malays' culture from centuries ago. The identical influences can be found on wood carvings especially from the Malays' traditional houses and palaces. Therefore, the initiative to combine the traditional wood carving motif which is Awan Larat and Larik, a polishing process in wood carving and with the development and improvement of Kufi Fatimi has resulted in a new hybrid of Khat Kufi known as Kufi Lari'. The results have revealed that Kufi Lari' in general has an aesthetic value with the influence of ornamental elements even though there is a confusion to identify specifically if the Malays' identity was embedded based on the ornamental elements due to the close similarities that have been shown between the Malays' identity with the Arabic and Islamic influences.

Keywords Kufi lari' · Calligraphy · Wood carving

The original version of the chapter was revised: The previously given contributors of this chapter are changed to "Mohd Amin Mohd Noh, Mohd Fauzi Harun, Nik Narimah Nik Abdullah, Nor Fariza Baharuddin and Zahara Ramli". The erratum to this chapter is available at [10.1007/978-981-10-0237-3_67](https://doi.org/10.1007/978-981-10-0237-3_67)

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1 Introduction

Art exists in the form of literature, music, writing, sculpture, and architecture [1]. Islam not only allows art that comes with a variety of ways, but it encourages the development of art itself. Islamic calligraphy that was introduced by the Arabs is the primary and has the most pervasive element in Islamic art and it is a culture that symbolizes beauty, unity, and purity. This chapter looks into the Arabic calligraphy that reflects the beauty of Islam itself. It possesses high aesthetical value when it is decorated with various types of calligraphy such as Kufi, Naskh, Riq'ah, or Tuluth. The beauty of the Islamic calligraphy is not only recorded on paper for writing the Al-Quran, books, and letters but also on fabric, leather, metal, pottery, glass, stone, wood, and pulpit. In addition, calligraphy is also recorded in the form of embroidery, weaving, and painting [2].

Here, the expansion of Islam throughout the world brings together the cultures including the writing system within the archipelago [3]. The Jawi writing system was once the sole instrument in the Malays' written language until European and British colonization introduced the Rumi words and since then it has been widely used [4]. The development of the Malays' culture, religion, and language are influenced by the Arab civilization [5]. Basically, Jawi script in the Malay writing system was derived from the Arabic characters that have replaced the Hindu writing system with an introduction of several characters to suit the phonology of the Malay language such as 'Cha', 'Ya', and 'Nga' [1]. The introduction of Arabic letters called Jawi is a part of the writing development in the archipelago, hence the influences of Islamic calligraphy have then improved the uniqueness of this written form towards the writing system.

Nevertheless, Khat has been applied in wood carving for architecture such as in houses, mosques, and palaces. It has been proven that the development of Islamic art did undergo several changes to suit the places and cultures [6]. The implementation of Khat remains until today particularly in traditional houses and mosques. In fact in the modern era, Khat is widely used for book publication, corporate design, and displays. Nowadays, the public's choice of calligraphy is the Kufi Murabba. The design looks neat, in a form of geometry and it coincides with the current trends of a flat design resemblance. It is widely used for wall decoration and logos pioneered by the FoKS (Friends of Kufi Square) community [7]. Therefore, this study observes the use of Kufi in digital art application especially for the design of banners in conjunction with Islamic events such as The International Al-Quran Recital Competition. This study also involves interview sessions on a focus group in running a design test to compare the hybrid design of Kufi Lari' to Kufi Muwarraq and Kufi Muzahhar applications used on banners in terms of readability, legibility, motif, and pattern, and its implementation. The design objectives for Kufi Lari' is obviously to expand the variety of Khat Kufi with the influences of the Malays' identity and the motif embedded in it.

Thus, in this era, with the use of fast wireless technology and a wide acceptance of graphic design applications among the youth, the introduction of a new Khat

known as Kufi Lari' in the digital art application is a way to offer a variety of Khat for the purpose of designs alongside promoting the use of Islamic calligraphy in digital art. The focus of Kufi Lari' is not merely for digital media purposes. It can even be used in printed materials such as for art decoration, wall design, and corporate design.

The study shows that calligraphy is one of the most practiced cultures, a medium that was born from religion and social obligations. These days, this form of art is practiced and understood by people from many different countries and cultures [1]. The Islamic calligraphic is the best word to be used as it has been adapted to suit various races and cultures that have been influenced by Islam [6]. In addition, it is one of the means of information and has a valuable branch of aesthetic value, which indicates the evolving process of Arab calligraphy that was adapted to changes without losing its characteristics and its Islamic value. Similarly with the Jawi writing system, it is Malays' identity and it is related to the religion, or Islam to be exact [2]. The adaptation of the people in the archipelago can be seen in the Arabic letters, the Jawi writing, and also looking into the effect of the Arabic calligraphy. It has been used widely in the region since then such as for government official documents and letters as well as architecture.

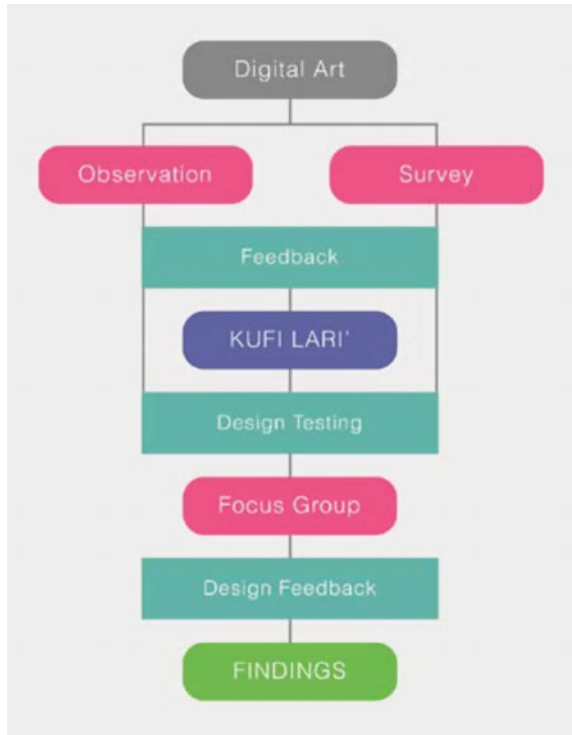
The relationships between the Arabic, Islam, and Malay elements not only occurred in the use of calligraphy but also existed in the Malays' architecture. The Malays' architecture was prominently known with the art of woodcarving and one of its popular motifs is "Awan Larat". It is one of the productions among works of art that has dominated the Malays' carving. It is an art that reflects reaction and character of ideas, cultures, and civilizations [8]. Moreover, the philosophy of carving itself is often accompanied by Islamic values such as "Awan Larat" that gives meaning in terms of courtesy and manners in the Malay community. This motif also symbolizes the nature of Allah which is infinity. Whether it is Islamic calligraphy or the Malays' woodcarving, both are embroidered with the Islamic value that indicates the Malay culture and civilization [9].

However, the application of Khat and wood carving has been isolated and was rarely seen around us anymore unless it appeared on several occasions or places such as in some of the Islamic events that have taken place or in certain buildings. This study is to focus on the application of those elements in a single design for a different platform, in digital art. This is to show that the design of Khat Lari' has contributed to the longevity of calligraphy and in the Malay architecture elements (Awan Larat and Larik carvings) as well as to promote the variety of Khat for design purposes.

2 Methodology

Figure 1 indicates that the study has been conducted with the use of a pre-post research and the design process of Kufi Lari' whereas in the pre-design process, the observation method was used to look into the current trends of digital art which is

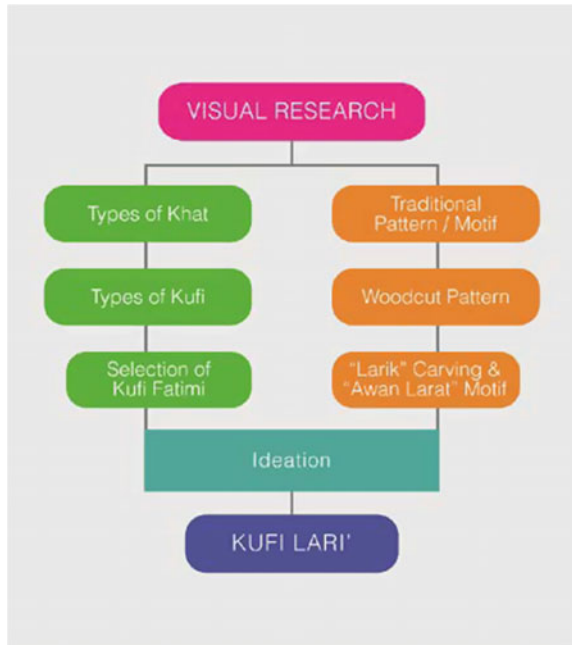
Fig. 1 Pre-post research model



the design of banners especially used for The International Al-Quran Recital Competition. Direct observation was to record the types of Khat used to design banners or to look at if there were different types of Khat used in each year or otherwise. This method also shows that all information gathered was direct, in addition to using a simple application. The validation of the data can be evaluated from the functions indicated by the use of Khat and its implementation can disclose if it has influenced the Malays' identity or otherwise [10]. A descriptive survey is also applied in this study with the purpose to collect the professional feedback among academicians and practitioners in the field of graphic design concerning this matter. Informal conversations and interview sessions are also conducted to generate the information needed.

Once all the information is obtained and gathered, the design development of Kufi Lari' is then conducted as given in Fig. 2. Kufi Lari' was originally developed from Kufi Fatimi and it has been combined with the use of traditional motifs and patterns of wood carving which is the Larik carving and the Awan Larat motif before going through the process of designing. The motif and pattern of those Larik carvings and Awan Larat were then implemented on specific areas with the Khat characters to add up to the aesthetic values of the Malays' identity. The design

Fig. 2 Design process of Kufi Lari'



process was carefully developed to ensure that the characteristics of calligraphy letters are still easily identified.

Furthermore, this study also uses the survey method. It is a system for collecting information to describe, compare, or explain knowledge, attitudes, and behaviors. It is divided into two broad categories: descriptive and analytical research. This research applies a descriptive survey method to seek points of view and comments from two different categories of respondents: the academicians and practitioners in the field of graphic design. Informal conversational interviews are conducted to obtain relevant information on the use of Arabic calligraphic, Khat. This method relies on the spontaneous types of questions as in the interview sessions. While carrying out a survey, interviews were conducted with the academicians to observe this particular respondent's knowledge in terms of typography and calligraphy especially in Khat [11–13]. Apart from that, the designers who were also practitioners in the field of graphic design substantiated this by providing information on the application of Khat in the form of digital art for commercial purposes. Various views were given by the respondents based on the existence of Khat and its application. All the knowledge and suggestions were recorded for compilation.

The interview session is the most logical research technique and it involves conversation between the respondents and researchers. There are several different types of interview and this can be achieved depending on the aims and objectives of

the research. In this study, during the post-design process of Kufi Lari', the approach of having interview sessions has been applied to selected focus groups to identify the appropriateness of Kufi Lari on the design of the banner used for The International Al-Quran Recital Competition. In this stage, a design testing of the banner design has produced three exact designs but with a different implementation of Kufi Khat which are Kufi Lari', Kufi Muwarraq, and Kufi Muzahhar. These two types of Kufi (Muwarraq and Muzahhar) were chosen rather than Kufi Lari'. This is because of the similar characteristics; the influences of decorative and ornamental elements were subjected more to the uses of Muwarraq and Muzahhar. To complete this research, questions prepared for the interview sessions are parallel to the objectives of this study. Semi-structured interviews are nonstandardized and are often applied in qualitative analysis [14]. This has proven to be suitable for this study. The duration of the interview session for this study has taken about 90 min and it was located at UiTM Melaka with 10 respondents involved. The respondents involved in this focus group are from various backgrounds and experiences but they all have similar criteria which is they do have knowledge of Jawi or are well versed in Arabic calligraphy. The set of open-ended questions is given to respondents based on the existing Khat and to find the types of Khat suitable to apply in digital art and the effectiveness of each type of Khat. In this session, the respondents are given questions based on a design proposal to find solutions that is the main concern for this study. Four stages of open-ended questions are implemented in this interview to identify the types of Khat: the comparison between the existing Khats with the Kufi Lari'. The comparison shows focus on the aesthetic values, readability, legibility, and the implementation of Khat in the application of digital art.

3 Results and Discussion

Three banner designs were involved in this study from each year of the event of The International Al-Quran Recital Competition. Based on the observation, most of the designs used various types of Khat including the Kufi, Tuluth, and Nasakh. There were no preferences in choosing the types of Khat because of the dominant use of Roman type for the banner especially to deliver the importance of the information and the appropriate messages regarding this event. In the year of 2014, the banner design used Khat Kufi and Nasakh, whereas in the year 2013, Khat Nasakh and Khat Tuluth were used. Besides that, in the year 2012 only Khat Tuluth has been used. Most of the words and sentences that were using these types of Khat were from the Arabic language. This is due to the fact that the contestants and audiences of this event were predominantly from the Middle East countries and a majority of them were fluent in the Arabic language. Various elements that were implemented in the banner included the arabesque pattern and decorative ornamental. It suits the design concept of the banner in conjunction with this Islamic event.

3.1 Aesthetic Values

In addition, based on the interview sessions with the focus group regarding the banner design that includes Kufi Muwarraq, Kufi Muzahhar, and Kufi Lari', most of the academicians mentioned that the application of these three Khat Kufi can contribute to the aesthetic values within the ornamentals in the Malays' culture. However, none of these types of Kufi is strong enough for the academicians to agree that it portrays the true Malays' identity. Similar opinions were shared by the practitioners' perspective regarding the ambiguity between the Malay's and the Arabic's identity. The study shows similar influences from the flora and ornamental elements among these three types of Kufi. Whereas the connection and similarity of aesthetic values within these three Kufi are related to each other because of the Islamic and the Arabic elements they were seen as major influences in the early development of the Malays' identity centuries ago. Kufi Muzahhar was developed based on the leaf motif, whereas Kufi Muwarraq was developed based on the flower motif and the design of Kufi Lari' is a combination of the Malays' carving motifs called Awan Larat. Thus, the name Lari' was taken from the word Larik (polishing process in carving). Therefore, academicians and practitioners have agreed that Kufi Lari' has an aesthetic value with the implementation of the Awan Larat motif even though the Malays' identity was a bit blurry at that moment of time compared to the Islamic and Arabic identity that was clearly shown on Kufi Muwarraq and Kufi Muzahhar.

3.2 Readability and Legibility

Most of participants in the focus group agreed and were convinced that Kufi Lari' has more advantages in terms of readability based on the decorative implementation that appeared simpler, easier to recognize, and was higher to recall compared to Kufi Muwarraq and Kufi Muzahhar. Kufi Lari' is easier to recognize without the use of too-complicated motifs and decorations on its characters. This contributes to the neatness of Kufi Lari' as compared to Khat Kufi in terms of appropriateness to be used in the application of digital art due to its simpler yet decorative characters.

3.3 Implementation as Digital Art

Moreover, most practitioners agreed the application of Khat Kufi is more suitable for any digital art based on its functions. Kufi is suitable and most appropriate to be used in terms of delivering information in the form of digital art that requires the characteristics to be read easily and the arrangement is suitable for the target audiences. However, if Kufi were intentionally applied for art decoration, then there

would be no arguments from these academicians and practitioners. Therefore, the academicians and practitioners believed that Kufi Lari' is useful to be applied in digital art nonetheless to deliver clear messages or as art decoration. The introduction of Kufi Lari' has enriched the variety of Kufi Khat in addition to its contribution to prolong the influence of the Malays' identity in the decorative and ornamental elements ranging from the traditional ways of wood carving to the current trend in digital art.

4 Conclusion

There are 10 types of Khat in the Arabic version of calligraphy. Each type has its own uniqueness and characteristics. At times, there were similarities between several types of Khat that might confuse the participants in identifying them. Therefore, it is important of each developed Khat to ensure that they are easily recognizable and relatively easy to read without any hassle. The implementation of the Malays' identity based on the "Larik" carving and "Awan Larat" pattern is ambiguous to the readers because of the similarities between the Arabic, the Islamic, and the Malay elements that have existed for centuries. The lack of knowledge among participants regarding the form of the Awan Larat pattern and Larik carving caused them to fail to identify the differences between Khat Lari', Kufi Muwarraq, and Kufi Muzahhar. However, the participants agreed that Khat Lari' is easier to read compared to the others because of its simpler ornamental pattern. Because of its higher readability and recognition level compared to other similar Khat characteristics, Kufi Lari' has the potential to be used in signposts to symbolize the Malays' identity rather than to be replaced by Roman characteristics because of the limited understanding among the public in Malaysia to read and to understand Jawi or the Arabic language.

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Representing Women: The Portrayal of Coloured Women in Malaysian Magazine *WANITA*

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Abstract In Malaysia, there is unity in diversity, in terms of language, religion, and ethnicities; Malaysia has three major groups, Malay, Chinese, and Indian. Each of these ethnic groups has different skin complexions where Chinese are fairer than Malay and Indian whereas the Indian has a darker complexion compared to Malay. Portraying well-known or popular celebrities in whitening advertisements is common. In Malaysia, celebrities are well accepted due to their popularity amongst society. Advertisers tend to use these celebrities such as actors, actresses, and singers because they have a huge following of fans. Hence the impact they have on a product is huge. This research focuses on the issue of colored women models that appear in Malaysian advertisements. There have been numerous confusing women images being portrayed in Malaysian magazines. In particular, it examines the use of fair-skinned women over dark-skinned women. It also looks at the frequency of white women over nonwhite women in these advertisements. By looking at a lot of whitening cream advertisements, Asian women still regard fairness as ideal beauty and refuse to accept the fact that many Asian women have a dark skin complexion. This research argues why Asian women prefer to be fair-skinned to be beautiful so that they will be accepted by society. It also discusses the use of celebrities in the whitening cream advertisements.

Keywords Skin complexion · Whitening products · Coloured women · Ideal beauty · Celebrity endorsements

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1 Introduction

This research chapter discusses the colour of women in advertisements, paying attention to skin tones. Here, it specifically examines whitening cream advertisements published in six editions of *WANITA*, looking at advertisements featuring women with fair skin. It also discusses the use of celebrities in whitening cream advertisements and the importance of being fair in Asia. It looks too at why whitening creams are so popular with women in Malaysia and elsewhere such as India. In particular, it looks at the popularity of *Fair and Lovely*, a whitening cream, in Malaysia. *WANITA* magazine is a monthly magazine which was first introduced into the Malaysian market in the early 1980s. It is one of the most popular women's magazines amongst Malaysians. This monthly magazine provides readers with many diverse issues, such as teenagers, marriage problems, economy, fashion, and education.

2 State of the Art

This section examines the use of fair-skinned female models in advertisements. The issue of colour is important in this research because of the many different ethnicities and races in Malaysia. This is in relation to the research by Ref. [1] who observed that dark-skinned women are considered by society as 'invisible'. Women with dark skin are also portrayed less in magazines in Malaysia. References [1] and [2] argue that coloured women are often seen as models promoting products that are only used by their own respective races. The same situation happens in the Malaysian magazine *WANITA*.

2.1 Coloured Women

Advertisements in Malaysian magazines also feature Caucasian women. In particular, many Caucasian models are used to promote international brand names. Reference [3] argues that being white has many advantages; white equates to power and influence. White people, for example, show their dominance around the world, particularly in education and intellectual life. Reference [4] found that fair-skinned women experienced greater exposure in magazines, and also argued that for many Asian countries, light-skinned people are associated with wealth, a higher education, and part of an elite circle, whereas dark-skinned people are always associated with those from uneducated lower social classes, such as labourers and farmers. In Malaysian society, skin colour is associated with working conditions. For example, those who are dark-skinned normally labour in the sun whereas those with fair skin usually work in a protected office environment. For this reason, many Malaysian

magazines publish many whitening cream advertisements. The importance of colour can also be seen outside Malaysia, for example, in India. According to Ref. [5], fairness equates to beauty thus acceptance in society. There are many advertisements in the magazine perhaps because producers of whitening creams want people of all ethnicities to buy their products. One or two advertisements in the magazines are definitely not enough.

It is also noted that a lot more whitening cream advertisements are being advertised in India compared to any other advertisements [6]. Whitening cream advertisements frequently appear on television compared to other grooming products such as hair styling, lotions, skin care products, and lipsticks [6].

Likewise in Malaysia, there are many whitening cream advertisements featuring brands such as *SK-II*, *L'Oréal*, *Ponds*, and *Christian Dior*. Advertisers here tend to use fair-skinned models to promote their products. This can be seen from the whitening cream advertisements that are advertised in *WANITA*. However, there is also a tendency to use a mixture of fair and darker-skinned models. This is perhaps because Malaysian is multiethnic with Chinese, Malay, and Indian peoples.

Normally, fair-skinned or lighter complexion people are always associated with high status, wealth, and education. These people do not toil in the fields as do those from the lower social class such as labourers and farmers who are exposed to the sun and thus have darker complexions [7]. Even with whitening cream, there are class distinctions with international brands marketed to the higher class and cheaper (local) brands marketed to the lower class.

There are many international and local brands of whitening creams which are available in the market and advertised locally. Surveys in Malaysia show that there is a great demand for these products. One survey conducted by Synovate, a market research company, found that 4 out of 10 women in Malaysia, Hong Kong, the Philippines, South Korea, and Taiwan now use skin whitening creams [8]. Local skin whitening creams include *Felisa*, *O'Lynn*, *Sirna Sari*, *Safi Balqis*, *Zai*, and *Lafique*.

Whitening cream is widely used by women in Malaysia. These products are promoted and advertised by using fair-skinned models in order to promote the products as widely as possible. Many fair Chinese and Malay models are used in the advertisements because they are said to be attractive and appealing. *Garnier*, *SKII*, and *Nouvelle Visages* whitening creams are very closely associated to Chinese ethnicities whereas *Sendayu Tinggi*, *Sirna Sari*, and *Fair and Lovely* are associated with the Malays and Indians, respectively.

2.2 *Celebrity Endorsements*

Portraying well-known or popular celebrities in whitening advertisements is common. In Malaysia, celebrities are well accepted due to their popularity amongst society. Advertisers tend to use these celebrities such as actors, actresses, and singers because they have a huge following of fans [9]. Hence the impact they have



Fig. 1 Lisa Surihani in *Garnier* advertisement

on a product is huge. Lisa Surihani is one of the Malaysian celebrities that are being used in whitening cream advertisements. She is a spokesperson for *Garnier Light* (Fig. 1). Local singer, Datuk Siti Nurhaliza, for example, advertises local and international whitening products such as *Oil of Ulay*, and others such as singer and actress, Umie Aida, is spokesperson for *Sirna Sari*, and singer, Liza Hanim, for *Lafique*.

Datuk Siti Nurhaliza is a very popular singer, beautiful, attractive, and charismatic with fair skin and is an icon amongst Malaysian women. She uses the whitening product, *Oil of Ulay*, in her daily life as can be seen in the advertisements published in *WANITA*. In this particular advertisement, she is portrayed as the user of the whitening cream products. As she is very busy with her outdoor activities as a singer and involved in other engagements, she is seen in the advertisement as protecting her facial image by using the whitening cream. Thus the whitening cream she uses has somehow made her attractive and beautiful in the eyes of the audience.

Another celebrity that is being portrayed in the whitening cream advertisements in *WANITA* is another popular actress, Vanida Imran. She is a spokesperson for a popular brand, *Fair and Lovely*. Being of Malay-Indian parentage, she has a dark skin complexion. Because of her popularity and mixed blood, *Fair and Lovely*, an Indian product, used her as the model in the advertisements. In this particular advertisement, she is portrayed wearing an Indian costume, sari, in order to attract the dark-skinned audience. She is not only popular among the Malays but also the Indians.

Reference [9] finds that the target market for *Fair and Lovely* is predominantly women aged between 18–35 years. Unilever, the producer of *Fair and Lovely* has the same marketing strategy for their product. The whitening cream company uses beauty queens to become their spokespersons. For example, in India, *Fair and Lovely* uses actress and model, Aishwarya Rai, once Miss World 1994 and actress Vanida Imran was Miss Malaysia 1993.

Other countries such as India use celebrities in their whitening cream advertisements such as Miss Universe 1994, Aishwarya Rai, and Miss Universe 1994,

Fig. 2 Aishwarya Rai in whitening cream advertisement, L'OREAL



Sushmita Sen. Both Aishwarya Rai and Sushmita Sen are samples of the many Indian beauties who are considered fair amongst the Indian population. Aishwarya Rai is a spokesperson for *L'Oréal White Perfect* (Fig. 2). In the context of rapid economics and cultural transformation, the beauty queen has become an icon in India. The idea of using these celebrities in advertisements is to increase their sales of whitening cream and other beauty products worldwide. Corporations push mass manufactured cosmetics into the untapped South Asia market [10].

3 Research Design

This research uses textual analysis and breakdown as its methodology. It examines the placement of public figures such as actresses' and singers' images in advertisements, particularly in the *WANITA* magazine. It concentrates on where and why they are being portrayed and exposed in a magazine, particularly with the whitening creams. It also investigates the intention, purpose, and the use of women's visual images in the classified ads. Articles and academic journals were collected from various online databases including IEEE Xplore, Science Direct, SAGE, Springer, Scopus, and Thomson Reuters.

4 Conclusion

Malaysian women are exposed to many advertisements in *WANITA* especially whitening creams. This is seen in the amount of fair models and celebrities used in the advertisements. They use this cream regularly in order to look fair and beautiful, due to the influence of the celebrities who promote the whitening cream products.

Malaysian women are now very concerned about their health. As observed by Ref. [11], Malaysian women are now very worried about potential health risks such as skin cancer and skin problems from using these whitening cream products.

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The Exploration of Vegetable Dyes in Fibre Artworks

Faiizah Ahmad Shobri and Norwani Md. Nawawi

Abstract Natural dyes are made from natural sources such as plants, minerals, or insects. The use of natural dyes in the textile field was discovered during the late Bronze Age and Iron Age. Today there is consciousness about the friendliness of natural dyes for the colouration of textile art. By experimenting with various materials in the production of natural dyes, it has triggered a highly variant development of dye that brings benefits in the textile art industry. This research objective was to identify the types of local vegetables suitable to produce dyes for fibre artwork. This study was conducted using a qualitative research design also involving studio experiments. The purpose of the experiments was to produce the dyes from vegetable extracts and to apply them into an artwork base on landscape scenery. The exploration of techniques determines the colour of the artwork. Generally, this research can produce special aesthetic qualities in Fibre Art which is significant for a product that is environmentally friendly. This study could add value to textile design, craftwork, and the Fibre Art industry.

Keywords Natural dyes · Textile · Fibre · Artwork

1 Introduction

Historically, natural dyes were used to colour clothing and other textiles. By the mid-1800s, chemists began making synthetic dyes in order to substitute natural dyes [1]. During the 1800s, only a small percentage of textile dyes were extracted from plants. However, at present there has been increasing interest in natural dyes. The public has become more concerned and aware of ecological and

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environment-related issues regarding the use of synthetic dyes. The usage of natural dyes is believed to be able to cut down significantly on the amount of toxic effluent which results from synthetic dyes [2].

Natural dyes are dyes made from natural sources such as from vegetables, minerals, or animals. Natural dyes have been processed without the use of chemical material. The use of natural dyes in the textile field was discovered in ancient art history. The art of making natural dyes on textiles is one of the oldest traditions and unique since the beginning of world civilisation. In India, for example, vegetable dyes have been widely used in the dyeing process in the textile industry and the needs of others. By experimenting with various materials in the production of natural dyes, it has triggered a highly variant development art and brings benefits in the textile industry.

In recent days, due to the advantages and increasing demand for natural dyes, this led to the resurrection and reuse of natural dyes. This study is about an application of vegetable dye extract in producing fibre art. The researcher has decided to use a source from nature because natural dyes offer soft, soothing, and uncommon shades. The researcher also wants to apply the dyes in Fibre Art.

2 Literature Review

2.1 Introduction

The ability of natural dyes in the textile field has been known since ancient and prehistoric times. Nowadays there is also the development of natural dyes, but it's decreased because the presence of synthetic dyes is more effective and accessible. Natural dyes can also be classified as natural pigments and natural dyes.

2.2 The Dyes

Colour is very important in the textile industry worldwide. Since ancient times, society has attempted to produce a colour based on the world surrounding them. Archaeological records and historical records show that early humans developed methods for the fabric dyeing process and they learned how to use it in the production of fabrics for clothing and goods for daily rituals [3]. Since 1856, plants, insects, and minerals have been used as source material and dyes.

2.3 Development of Natural Dyes

Since prehistoric times, the dye from natural materials were used for various purposes such as dyeing on cotton and silk and wool and other materials from the bark of trees [4]. In the Bronze Age, humans discovered a new material for their textile

field from natural materials. Based on the records of an early history, the use of natural dyes was first discovered in China, dated 2600 BC. In addition, textiles that have been dyed by using natural substances were also found in Egypt, dated 3200 BC and in India, dated 2000 BC [5].

Until the end of the nineteenth century, natural dyes were used as the main ingredient and as a textile dyeing procedure before synthetic dyes were introduced. References [6, 7] stated that from the beginning of the Bronze Age, there have been many discoveries of natural dyes especially from plants and animals.

2.4 Taxonomy of Natural Dyes

The term *natural dyes* refers to dyes obtained from plants, insects, and mineral substances. These dyes are used for a variety of activities and the most common and significant of which is dyeing of textile materials. The main natural substances used were extracted from roots, the bark of trees, flowers, and fruits of dye-producing plants.

2.5 Fibre Art

The tradition of textile culture is part of this universe, and Fibre Art, the contemporary textile art, cannot be separated from it, as it stands at the confluence between the values of the past, and the trends of the present. This connection represents a beneficial encounter which has created a fertile ground for contemporary textile artists, embracing with its creative force, every aspect of the textile art, and which has come to be known as Fibre Art, in just a few decades.

2.6 Forms of Fibre Art

Today, we can distinguish the following major categories: Fiber Art—wall hanging/spatial art (tapestry, wall-hanging panel, installation, unique textile objects); wearable art or accessories—unique pieces, limited editions and textile design (interior design, unique accessories/limited editions); and textile miniature. These are only a few directions where we can find a variety of tendencies characteristic of Fibre Art, art forms such as textile bands, of flag-experimental forms.

3 Research Methodology

The main purpose of this study was to identify the type of vegetables, material, and techniques that will be used to produce the final product thus providing appropriate answers to the research question. This chapter describes the methods of the study conducted by researchers to collect data. This study was conducted by using a qualitative research design [8] also involving studio experiments (see Fig. 1).

3.1 Studio Experiments

This research involved a studio experiment. Part of the experiment was conducted by researchers, such as in the process of making dyes. The researchers also conducted an experiment in order to achieve the objective of this research to produce a vegetable dye extract to obtain a color that was needed.

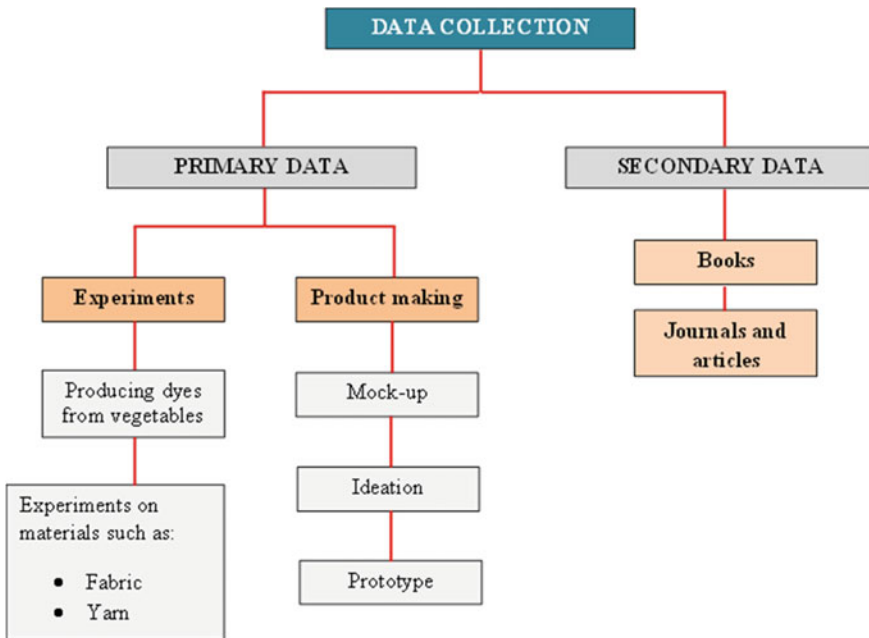


Fig. 1 Data collection.

4 Data Analysis

The research conducted a few experiments by exploring different methods to complete this study. The experiments were conducted to collect the best possible result concerning the material, techniques, and design. The process identified whether the type of fabric or materials used was suitable for the final product of the study. All material was purchased and some of it was from natural resource materials (see Fig. 2).

4.1 Phase 1 (Analyze the Material)

In phase 1 the researchers analysed the material that would be used and identified appropriate types of vegetables that can produce a colour and also identified the types of fabric and yarn suitable to be used.

4.2 Phase 2 (Analyze Experimentation)

Experimentation is important in this research to obtain natural coloured dye from vegetables. The experimentation began by finding the material and the technique in the application of vegetable dye into fibre artwork.

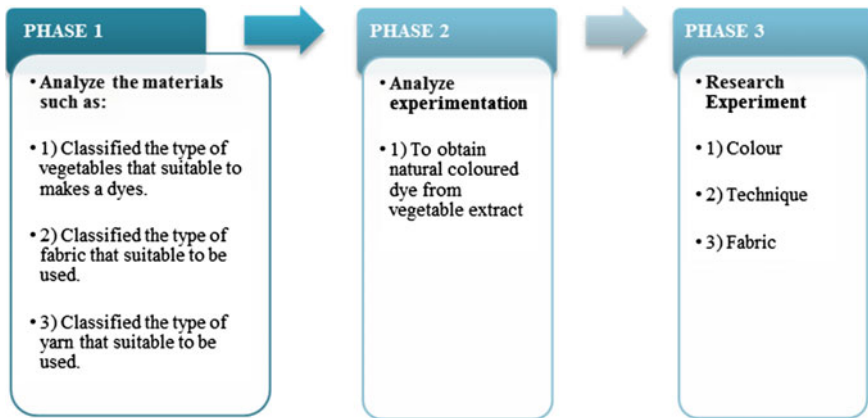


Fig. 2 Flowchart of analysing data.

4.3 Phase 3 (Research Experiment)

Experiments were conducted by using different types of vegetables that could produce a colour that was needed. This process depends on the type of vegetables used. The research also used different types of fabric and yarn to see the different shades of colour that would be obtained on different types of fabric and yarn.

5 Findings

This stage of findings describes and explains the experimental results. The results obtained were different because the materials used in each experiment were also different. The experiment was conducted to achieve the main objective of this study, which was to identify the types of local vegetables suitable for producing dyes, to examine the approaches to sustain the dyes from vegetables and to apply the dyes from vegetables into Fibre Art. Before that, there were several aspects of the design process involved in this research, such as design consideration, aesthetic, technical, artist statement, design influences, and conceptual idea.

5.1 Design Consideration

In this research there were two main factors that could be identified as a design consideration in the process when producing a product or artwork. It can be classified in terms of aesthetics and techniques of an artwork or product.

5.2 Aesthetic

The researchers chose the art from natural dye with the concept of a design “inspired by nature” [9] as the main theme. The chosen theme was about the issue of the consciousness about environmental preservation. This research was artwork based. It’s to be displayed in art galleries and intended to give awareness to the community about the issues that have been studied.

5.3 Technical

In this research, the researcher had decided to use textile technique to construct an artwork. The researcher had also merged the elements of fine art into artwork. The

Table 1 Designing art works

Factor that influenced design consideration	Description
Aesthetic	Inspired by nature
Technical	Merge the elements of fine art into artwork

selected techniques and idea developments were to be created separately and the artworks were in serial form (Table 1).

5.4 Artist Statement

The researcher wished to produce a series design of the Fibre Art landscape painting by using natural dyes and varying types of fabric and yarn. The textile and fibre techniques are used to construct the artworks.

5.5 Design Influences

This artwork was inspired by nature. The researcher focused on the process to obtain natural colored dyes from vegetable extracts in producing Fibre Art landscape paintings.

5.6 Conceptual Idea

In this section the researcher went through the process of making a Fibre Art painting from the beginning of stages until the last stages to produce final artworks.

5.7 Making Process

The research used local vegetables that were selected in the process to obtain the dyes. Only selected material such as fabric and yarn and Fibre Art techniques were used to produce the final artwork Fibre Art landscape painting (Fig. 3).

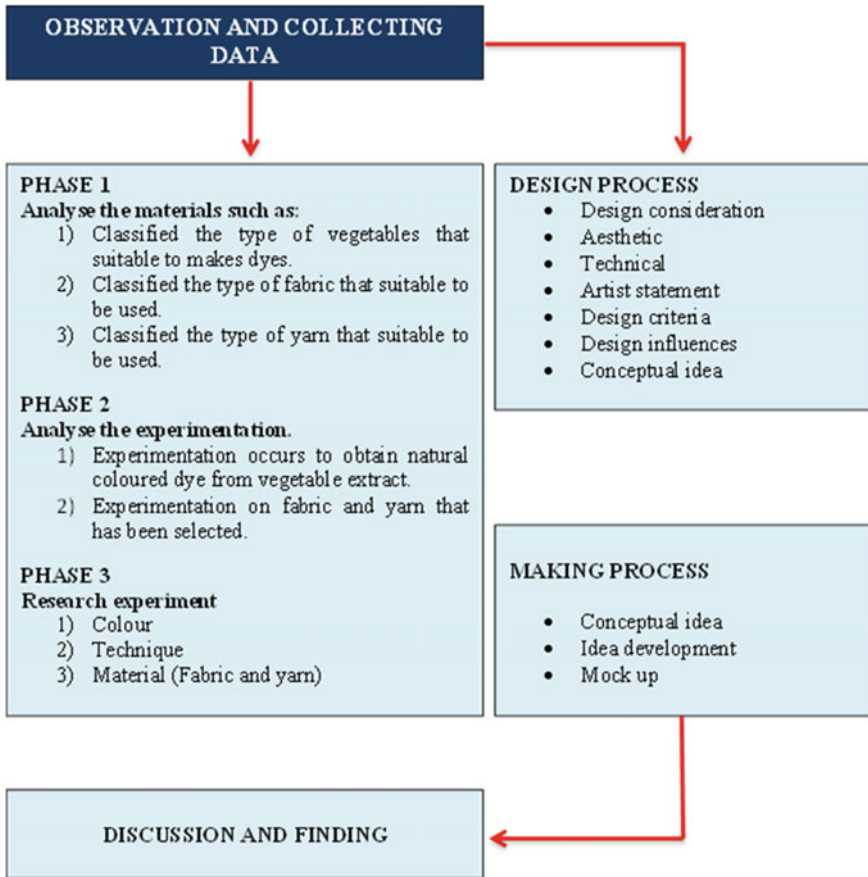


Fig. 3 Flowchart of observation and collecting data.

5.8 Final Artwork Process Discussion

The final artwork began after the result of the experiment was obtained. For the final product, the researcher came with an idea to produce an artwork of Fibre Art landscape painting. This artwork used dye produced from a variety of types of vegetables that were selected. The researcher dyed the fabric and yarn using a colour scheme that was selected. The researcher then prepared the tools to create the artwork.



Fig. 4 Hill views at Broga Hill.

5.9 *Artwork Inspiration*

This study was inspired by the nature scenery view at Broga Hill (Fig. 4).

5.10 *Dyeing Process*

The following process was carried out by using layers of onion skin in the process of obtaining the colour (Table 2).

5.11 *Final Artwork Presentation*

Vegetable dyes on fabric and yarn

Type of dye material:

Red cabbage, tomato fruits, and red chilies

Type of fabric and yarn:

Silk, habotai silk, cotton, flannel, and jute rope

Size:

64 × 81 cm

Technique: Collage technique

Table 2 Process of making the art work

PROCESS	PROCESS
 <p>Step 1 Layers of onion skin which have been peeled.</p>	 <p>Step 5 Put the mineral salt</p>
 <p>Step 2 Heat the water</p>	 <p>Step 6 The fabric and yarn are well stirred in the dye solution. The fabric and yarn and dye solution are boiled together.</p>
 <p>Step 3 The boiled layers of red onion are stirred to obtain a thoroughly mixed solution.</p>	 <p>Step 7 The fabric and yarn are rinsed with water</p>
 <p>Step 4 The solution is left to simmer until it changes colour.</p>	 <p>Step 8 Preparation of materials such as fabric and yarn. The variety type of fabric and yarn was selected to be used in developing the final artwork. The type colour of fabric and yarn that has been dyed also has been selected according to the suitability</p>

6 Conclusion

With the research and experiments conducted, this research concluded that natural dyes can provide an eco-friendly, efficient alternative route for colouration of textiles. Natural dyes also have a long and rich history in almost every human civilisation’s culture. It is important because they utilise naturally occurring materials to create colour without the use of chemicals. This research could give awareness to the public on how to sustain natural dyes. Complementing this approach, the research conducted experiments and obtained positive results. It is possible to be applied and benefit artists in the future.

This research underwent some experiments and showed positive results, which are capable of use by artists to make artworks. Natural dyes can produce special aesthetic qualities which, combined with the ethical significance of a product that is environmentally friendly, gives added value to textile artwork, craftwork, and the Fibre Art industry (Figs. 5 and 6).

Fig. 5 Artwork 1.



Fig. 6 Artwork 2.



7 Recommendation

Referring to the issues that have been studied, this research has provided a few recommendations for future researchers who have a similar interest in this subject. Many areas concerning the issues of natural dyes need to be looked seriously. The recommendations are that the public and artists need to play their roles to protect the environment from any damage by exploring the natural dyes that are really beneficial to use. The artists or designers are able to contribute by using natural dyes for their artworks and help save our environment. The public and artists need to identify the best materials, technique, and possibilities to continue to produce products using natural dyes.

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Uniqueness of Malay Traditional Embroidery: *Kelingkan*

Rose Dahlina Rusli and Norwani Md. Nawawi

Abstract Throughout history and due to its location, Malaysia has been a point of multicultural and rich history which promotes the development of traditional crafts and embroideries. Focusing on the Malay traditional gold thread embroidery known as the *Kelingkan*, this research investigates the subjects, motifs, stitching styles, materials use, and the applications of the embroidery. The research reveals that the *Kelingkan* embroidery took place from the periods of the Malacca sultanate and expanded through the different cultural backgrounds that developed a diversity of styles and characteristics. By field study and historical data collecting, the aim of the research was to investigate the development and to innovate Malay traditional embroidery especially the *Kelingkan* gold thread embroidery by interview and observation of the embroidery and the embroiderer which helps to build the data of embroidery originality and its innovations. Furthermore, through the data of the historical and the present *Kelingkan* embroidery, the research made a few improvements and experimentation of the tools and style of stitching for the benefit of its techniques and time consumed and to generate interest amongst young generations towards the traditional embroidery.

Keywords Embroidery · *Kelingkan* · Gold thread · Innovation

1 Introduction

Embroidery in the Malay culture was inherited from the period of the Malacca Sultanates in the fifteenth century. According to Richard Winsted, the traders from China, India, and Middle East are the major influences of the beginning of the art of embroidery to the locals. During the era of trading in Malacca, varieties of luxury fabrics were brought along and many new embellishments and embroidery

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techniques were introduced to the locals. Delicate embroidery techniques especially the silk thread, gold thread embroidery by the Chinese and beads by the Europeans during the colonial era were learned and adapted by the locals to create their own styles and uses as A. Aziz Deraman stated that they (the locals) were known for their nature to modify foreign culture and skills [1].

Generally the Malay art of embroidery refers to the use of motif, colour, material, techniques, and its use. The art of embellishment is to enhance with a variety of other materials such as sequins and beads, gold and silver thread, and so on. As stated by Syed Ahmad Jamal [10], embroidery is a traditional Malay art of ornamentation on fabrics using threads of various colours. Mainly, there are three major embroidery techniques in Malay costume which are the art of *Tekat*, *Kelingkan*, and the embroidery of *Sulam goyang* especially on the *Nyonya kebaya*. However, in this research chapter only the art of *Kelingkan* is discussed [2].

2 Kelingkan Embroidery

The *Kelingkan* or known as *keringkam* in Sarawak is an art of embroidering flat gold thread onto a fabric and it was believed to be well known since the end of nineteenth century. As mentioned by Puan Zubaidah Shuwal, Malay clothing in the nineteenth century was embellished with gold thread embroidery known as *Kelingkan* (Fig. 1) and Songket cloth. The art of *kelingkan* embroidery was once popular in almost all states in Malaysia but today it is only known and produced in a few places such as in Kelantan, Selangor, and Sarawak.

Fig. 1 A Malay woman wearing full embroidered kelingkan scarf (Source Textile and Costume Muzeum, Sarawak)



Fig. 2 Margaret Brooke with the locals wearing *kelingkan* scarf (Source Textile and Costume Muzeum, Sarawak)



According to Toh Puan Azah Aziz [3] the word *Kelingkan* was adopted from a French word *clinquant*, which meant glittering with gold or silver. Although the word maybe came from the French, the technique was maybe thought and modified from the Chinese, Indians, or the Middle East where they are famous for the gold thread embellishments either from their luxury fabrics or their varieties of embellishment materials. As stated by Margaret Brooke [4] ‘... a gauzy scarf of white gold, obtained from Mecca, covered my head...’ where she refers to a scarf that she got from Haj (Fig. 2). From the statement, there is no doubt that the technique was influenced by the Haj pilgrim where the same technique could be obtained in other nearby countries that have an Islamic society such as in Indonesia and the Philippines [5].

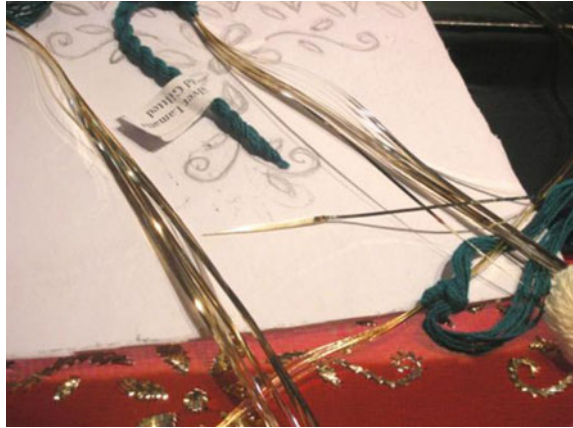
The *kelingkan* embroidery was admired amongst the ladies of the royal court especially in Selangor and Johor. In the past, Tengku Ampuan Jemaah was the well-known *kelingkan* embroiderer in the 1940s in Selangor who practised the art as her Highness’s favorite pastime. The late Royal Highness was known to be skilled in producing *selendang* and *kelingkan* embroidered clothes that are still kept today.

Nowadays, this art of embroidery is mostly found in Sarawak and less in Selangor and Kelantan. There are only a few surviving and practicing *kelingkan* embroiderers in Sarawak and even less than a handful in Selangor as well as in Kelantan [6–9].

3 Material and Tools

The main material and tools used for embroidering *Kelingkan* or *Keringkam* are flat gold thread and its custom-made needle different from a normal embroidery needle. Both *kelingkan* and *keringkam* use the same materials although the embroidering processes are different in terms of the sewing technique.

Fig. 3 Gold flat metal thread used for *Kelingkan* embroidery (Source Rose Dahlina Rusli)



The main material used in *kelingkan* embroidery is the use of the flat metal thread that is also known as Silver *Lamatta* or Gold gilded *lamatta* with a diameter 0.1 cm wide as shown in Fig. 3. The thread could be obtained from a local embellishment shop in Singapore especially for Malaysian, Singaporean, and Indonesian *kelingkan* embroiderers although it is said that the metal thread can be obtained from India and Dubai.

In *kelingkan* embroidery, a special needle is needed and it is custom-made individually by a silversmith or jewelry maker. The *kelingkan* needle is made to fit the *kelingkan* metal thread, which is flat and fragile. The needle has two needle eyes and measures 0.3 cm width and normally about 3 cm long with a sharp tip (Fig. 4). The needle is customarily made with silver for *kelingkan* technique and bronze for *keringkam* technique. Bronze is preferable for use for *keringkam* because it is harder than the needle made of silver that is more suitable for the *keringkam* technique where pulling the thread is needed [10–12].

Other than the thread and the custom-made needle, basic embroidery tools are also needed such as the fabric stretcher, cotton tape, and embroidery scissors to complete the embroidery. Traditionally, lightweight fabrics are used for both



Fig. 4 *Kelingkan* needle made of silver and bronze (Source Rose Dahlina Rusli)

kelingkan and *keringkam*, especially cotton voile that is widely used in *keringkam*, and for the *keliingkan* technique, lightweight fabrics such as chiffon and light silk can be used [12].

4 Techniques and Process of *Kelingkan* Embroidery

Traditionally, there are three techniques of embroidering the flat metal thread known as the *kelingkan* thread. However, this research only focused on the techniques that are practiced in Peninsular Malaysia.

Basically, *kelingkan* embroidery is normally embroidered using a satin stitch, known as the *tikam-timbus* by the locals. The process is continued all over the design and the process is started by stretching the fabric onto the frame after the motif or pattern is traced according to the design as shown in Fig. 5.

As for *kelingkan* embroidery, a wooden slate frame or stretcher frame with or without a stand is used and constructed according to the dimensions of the work to be produced by the embroiderer. Based on the original *kelingkan* or *keringkam* frame observed as illustrated in Fig. 5, the frame consists of two wooden dowels and two sidebars to connect each other as illustrated in Fig. 6. The dowels and bars could be lengths of wood from any size of measurement that can be made up as requested. The sidebars have a set of holes to lock in the pair of dowels necessary to make a good firm frame.

Figure 7 shows the process of embroidering *kelingkan* from stretching the ground fabric to the finishing steps, which are the trimming of the embroidery piece. There are seven basic steps in the making of *kelingkan* that have been used by the local embroiderer.

Another style of technique in embroidering *kelingkan* is the style that was used in the state of Selangor. The style of stitches is formed into a ribbon as illustrated in

Fig. 5 The process of stretching the base fabric onto the *pemidang* (Source Rose Dahlina Rusli)



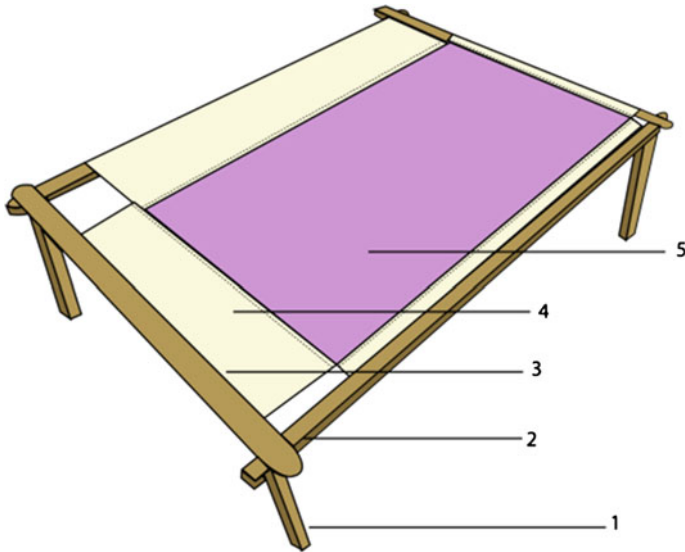


Fig. 6 Wooden slate stretcher frame with a stand. (1) *Meja Peminggang* (stretcher stand); (2) dowel; (3) sidebars; (4) The *Telinga*; (5) *Kain dasar* (ground fabric) (Source Rose Dahlina Rusli)

Fig. 7 First steps in stitching *kelingkan* embroidery

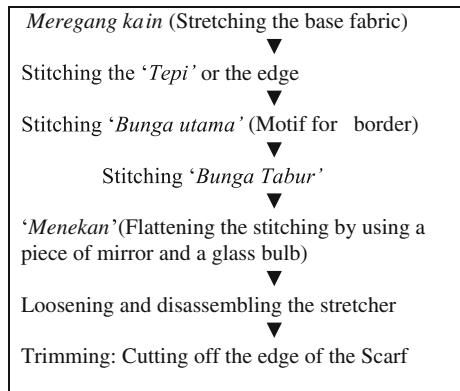


Fig. 10. These single ribbons are then arranged and composed to form the desired motif such as motif *daun keladi*, *daun sireh*, diamond shapes, and others. In Fig. 11, the motif *daun keladi* is formed from pieces of ribbon stitches onto a net fabric. The Selangor style of *kelingkan*, however, did not need to use a frame stretcher to stretch the ground fabric as it can be stitched directly onto the net fabric.

By observation and study made during the research, the techniques used are similar and some are the same from piece to piece. Generally, the *kelingkan* threads are stitched up or down from those stitched before it as the satin stitch that is mainly used in making the embroidery. After all motifs are traced onto the ground fabric,

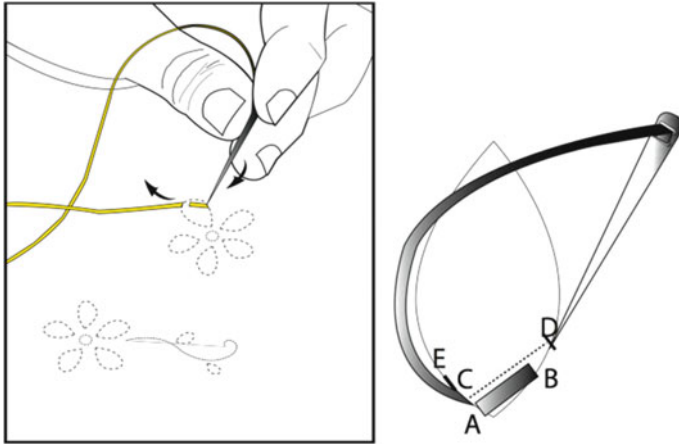


Fig. 8 First step in stitching *kelingkan* embroidery

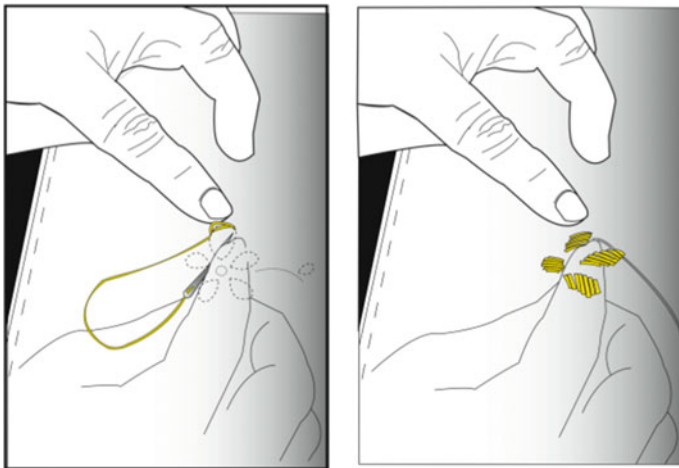


Fig. 9 The technique of *kelingkan* with satin stitch or *tikam tembus*. Illustrated by Rose Dahlina Rusli

the *kelingkan* thread can be worked in a diagonal direction to the weave of the ground fabric especially for curvy shapes such as flower petals. It is started by laying the thread diagonally across the traced shape starting from the centre of the figure and filling clockwise along the curve. As described in Figs. 8 and 9, the stitch can be started by working diagonally from point A up to B and come up directly to point C. From point C the thread is crossed to point D and through to point E. The processes are continued until the entire shape is filled with the necessary amount of tension in every stitch.

Fig. 10 The basic technique of *kelingkan* stitch practised in the state of Selangor



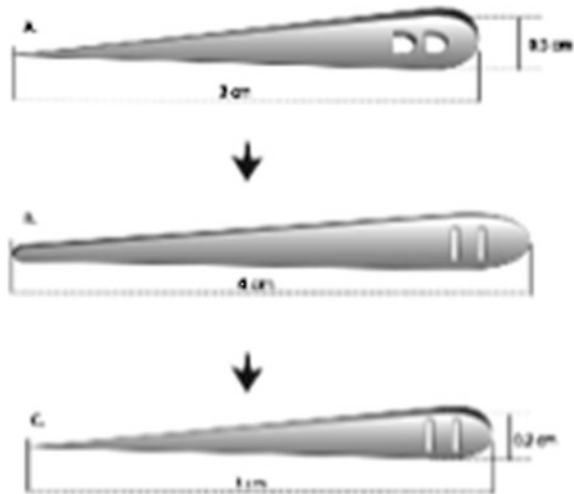
Fig. 11 The arrangement of ribbon stitch or Selangor style of technique in keladi leaves motif (Source Perbadanan Muzium Selangor)



5 Innovations and Transformation

Today, new generations of embroiderers are more likely to think out of the box when designing and producing embroidery. They are more creative and are not afraid to break tradition and create their own way of embroidering. The desire and request for certain qualities of the tools especially the needle and metal thread make this research more significant toward the transformation of the traditional craft. Throughout the research, a few suggestions for modification and improvement were made in terms of the tools, material, and style of stitch for a better way of embroidering. Figure 12 shows an example of modification made from the original needle design (A) and there are two suggestions in the *kelingkan* needle that are shown in designs B and C. In design B, the needle is blunt at the tips rather than sharp and thin as in the original design. This type of needle (B) would be suitable for embroidering *kelingkan* on loose-weave fabrics such as tapestry cloth, linen, and

Fig. 12 Suggestion of modification on the *kelingkan* needle. Illustrated by Rose Dahlina Rusli



netting that are used by the Selangor embroiderer. Because of the blunt tip, it is easier to insert the needle without tearing the fabric as with the use of a normal tapestry needle. Design C is almost the same as the original *kelingkan* needle; however, it is improved by modification on the needle's eye. The shape of its eye is smaller in terms of its length and it would be easier to slot in the metal thread without having to adjust the thread width. Other than that, the width between the two holes would measure not more than 0.3 cm to assure the end of the metal thread will not be dislocated in between the threading that may cause difficulties during the embroidering process.

Along with the special tools needed in *kelingkan* embroidery, the metal thread has also played an important part in transforming and inventing new ways for the *kelingkan* embroidery. With further experiments throughout this research, the original metal thread for *kelingkan* was developed to be coloured by experimenting with the colour process in metal technique. Other than colouring the thread, the research also determined if the thread could be softer and more flexible so that the use would be wider.

In transforming the traditional craft aligned with the new style and modern design, *kelingkan* embroidery is also embroidered onto different new products to be more commercialised and to attract attention especially amongst the young generation. As shown in Fig. 13, the new style of headscarf that has been popular from 2011 till now is adorned with the *kelingkan* embroidery as its border. Less *kelingkan* thread was used to reduce the price, thus making it affordable in the mainstream market. New styles and designs of the *kelingkan* embroidery can also be combined with other materials such as the use of beads and sequins as in Fig. 14. Combining materials in *kelingkan* embroidery will also make the new look more creative and contemporary without destroying the traditional look.

Fig. 13 Samples of new trend of women's scarves with *kelingkan* embroidery (Source Rose Dahlina Rusli)



Fig. 14 Combination of the *kelingkan* thread and metallic gold thread (Source Rose Dahlina Rusli)



6 Conclusion

The research was to document and to improve the art of gold thread embroidery known as *kelingkan* or *keringkam* as one of the unique arts of embroidery in the Malay culture. It is important to conserve this art especially the tools, technique, and motifs used that are now dying and forgotten by the young generations due to

the vast modernisation and technologies. There are few reasons for its becoming extinct as the art requires lots of time and the threads are very expensive and hard to find nowadays that limit the developing of the art into more accessible commercial products.

It is hoped that this research could motivate the existing *kelingkan* and *keringkam* embroiderers to continue making the embroidery and also for the new generations to continue this traditional art. It is the researchers' opinion that the surviving art has to be enhanced by adding more commercial value other than finding alternative materials that are cheaper and easy to get. Although new alternatives could be used, it has to retain the aesthetic value of the traditional art.

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Transformation of Traditional *Telepuk* Motifs into Contemporary Artwork

Syarifah Nur Atiyah Syed Baharom and Norwani Md. Nawawi

Abstract The Kain Telepuk is known as a rich fabric, usually worn by Malay nobility at least 300 years ago. Telepuk is a traditional technique that involves the process of gilding woven fabric with gold leaf. To produce a telepuk, two traditional techniques are employed: *menggerus* (calendering the fabric) and *menelepuk* (the printing process). Nowadays, due to the lack of understanding and information on telepuk, most Malaysians do not know about this Malay textile heritage. Therefore, this research seeks to revive and commercialise traditional telepuk motifs, by transforming its design and motifs into contemporary artwork. This research does not apply the traditional techniques of telepuk making, but instead applies a variety of different techniques, such as silk screen printing, laser cutting, and digital printing. This use of modern techniques seeks to transform this traditional art form, as well as provide a new direction in creating contemporary artwork that still preserves traditional *telepuk* motifs. The findings of this research will provide vital information for future generations, particularly in sustaining the exclusiveness of telepuk in Malaysia.

Keywords Telepuk · Commercialize · Transformation · Printing

1 Introduction

Telepuk is one of a number of traditional Malay textiles that have faded away from public knowledge. This is despite its illustrious history, as the telepuk is believed to have been worn by Malay nobility at least 300 years ago. The beautiful cloth known as telepuk is produced using two traditional techniques, which are *menggerus* (calendering the fabric) and *menelepuk* (the printing process). Aesthetically,

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telepek means gilding gold leaf onto woven fabric or kain gerus (cloth that has been calendered).

As telepek is such an important part of the Malaysian heritage, a new approach must be found to revive traditional telepek motifs. This is to ensure that it will continue to be recognized as a Malay textile heritage. To date, there has been little effort to revitalize the traditional craft of telepek. In Malaysia today, the most well-known textiles are sutera, songket, and batik. However, few people realize that a rich textile heritage, the telepek, has slowly been fading away. According to a lecturer from Politeknik Ibrahim Sultan, Johor Bahru, "*Kain telepek sudah menjangkau usia lebih 300 tahun dan kini semakin suram dengan arus masa kini dan kemasukan fabrik dari luar negara yang lebih moden dan mewah menenggelamkan tekstil telepek*" [1].

The statement above illustrates that there are still people who are concerned about the telepek and the fact that it is facing extinction. To revive traditional telepek motifs and bring them to the next level, we must develop ideas on how to commercialize this Malay textile heritage. Inspiration can be obtained from viewing resources such as the Internet, newspapers, books, magazines, and articles.

As a motif is a key visual element in producing an artwork, it can play an important role in beautifying any artwork. In telepek, the motifs commonly used consist of small floral motifs. "*Motif tradisional memerlukan kemahiran seni yang tinggi. Kurangnya kemahiran untuk melukis dan mereka menjadikan pembuat motif masa kini memilh jalan mudah menghasilkan motif yang kurang memerlukan kesenian dengan cara bentuk moden atau kontemporari*" [2].

Based on the statement above, this research is an effort to transform telepek motifs with modern techniques, which will help to give direction in creating contemporary artwork, while still preserving the essence of traditional telepek motifs, as well as to introduce the potential of the traditional telepek motifs as commercial merchandise and mass production.

2 Literature Review

2.1 History of Telepek

Kain Telepek is a rich fabric, which was worn by Malay nobility at least 300 years ago. The art of gilding in Malaysia originated with the Bugis people of Sulawesi and was practiced mainly by Bugis communities, especially in the states of Johor, Kedah, Perak, Selangor, Terengganu, Pahang, and Kelantan, from as early as at least the seventeenth and eighteenth centuries [3].

Figure 1 shows a fabric decorated with telepek on the kepala kain and badan kain. This fabric was probably made during the height of the telepek's popularity, between the 1930s to the 1940s in Selangor [4]. In the Malay Peninsula, telepek motifs are usually applied on seluar (trousers), handkerchiefs, sarongs, and destars (men's headress cloth). This rich fabric would be worn by nobility when attending



Fig. 1 Telepuk cloth

special functions, such as weddings in Malay society. There is evidence to prove that the telepuk was worn only by nobility.

For example, it is mentioned in Malay literature as a luxurious textile used by noble families, as described in Hikayat Aceh (Teuku Iskandar 1958): “*Maka Sultan pun memakai kain sungkit pelangi yang bertelapuk berpucuk rebung bertepi mas bepermata, dan berseluar {r} dzardzari* bertepi tenunan Istanbuli, dan bertali mas dandan ‘Iraki berbuah ru bepermata pudi dan berikat pinggang’*” [5].

There is also some evidence that suggests the telepuk originated from Perak: “*Pemerian pakaian raja Perak itu dikatakan sebagai ‘..pakaian yang indah-indah berkainpelangi dan berbaju germsut murup dan bulang hulu pelangi: maka semuanya itu dipercikkan dengan air emas sekaliannya serta bertelepuk dengan perada terbang’*” (ibid) [6].

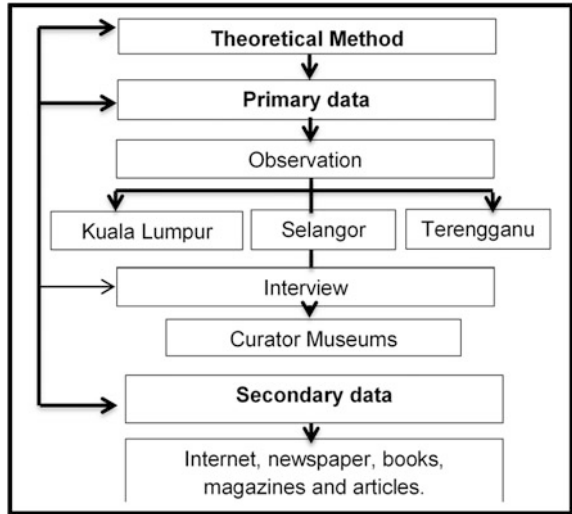
2.2 Gold Leaf

Gold is a precious material treasured by Malay royalty and nobility. That is why gold leaf has long been applied to special objects for ornamentation. Normally, a sheet of gold leaf has a thickness of only about 0.1 μm , or 4 millionths of an inch. Used for gilding from at least the fifteenth century, it takes on various forms, including gold foil or gold dust [7].

3 Research Methodology

To study the transformation of traditional telepuk motifs into contemporary art, the researcher applied theoretical and practical methods [8, 9]. All the information collected was based on primary and secondary data. Figure 2 shows how the methodology of data collection was applied during this research.

Fig. 2 Flow chart of theoretical method



3.1 Overview of Theoretical Method

The theoretical method in this research involves primary and secondary data. Primary data involve observation and interviews, whereas secondary data involve all the data from various sources.

Observation

Observation for this research focused on traditional *telepuk* motifs. All of the observations and interviews were conducted at museums and historical galleries in Selangor, Kuala Lumpur, and Terengganu. In Selangor, this research was conducted at the Shah Alam Museum and the Sultan Abdul Aziz Royal Gallery, Klang. In Kuala Lumpur, it was carried out at the National Museum and in Terengganu, it was at the Terengganu Museum.

Interview

Interviews were carried out with a number of museum and gallery curators. From the interviews, the researcher collected the name of motifs and knowledge about traditional *telepuk* motifs (Figs. 3 and 4).

3.2 Overview of Practical Methods

(1) Silk Screen Printing

In this research, this technique was applied as the main technique. Silk screen printing is the process of creating prints on various materials by using a very fine



Fig. 3 Tools for *telepuk* making

Fig. 4 Flow chart of the research

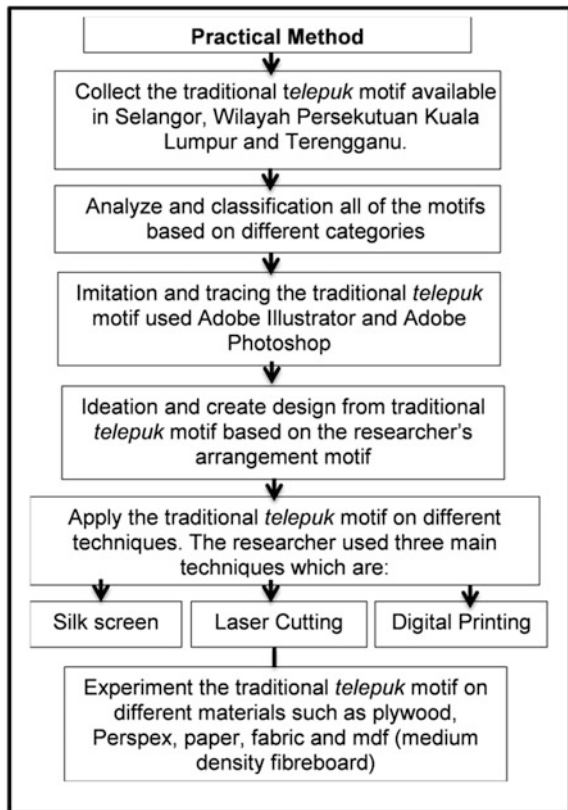




Fig. 5 Silk screen printing

silk net that is stretched tightly onto a frame. Figure 5 shows how the silk screen printing technique was used while this research was conducted.

Laser Cutting

Laser cutting is a process that uses a powerful laser to engrave or cut materials. In this research, this technique was applied on wood, Perspex, and mdf board. Laser cutting is usually used for industrial manufacturing applications and mass production. Figure 6 shows how the laser cutting technique was employed while this research was conducted.

(2) *Digital Printing*

The digital printing method used in this study employs the use of a large-format inkjet printer that can be modified for fabric. This technique can produce any

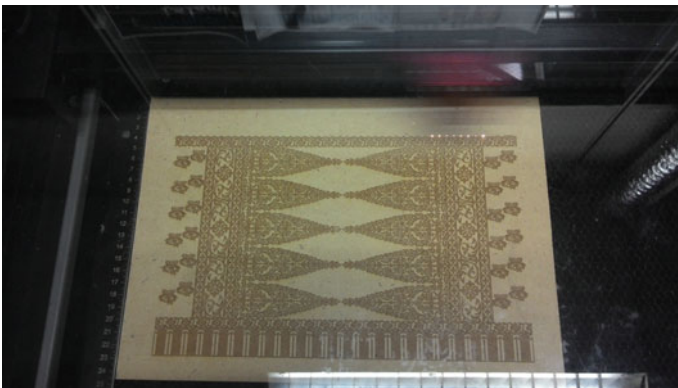


Fig. 6 Laser cutting



Fig. 7 Digital printing

colour, design, or pattern. Figure 7 shows how digital printing was carried out while the research was conducted.

3.3 *Traditional Telepuk Motifs*

Based on the researcher's observations, the *telepuk* has many traditional motifs. These can be divided into eight categories, namely flowers, spices, fruits, vegetation, fauna, architecture, natural surroundings, cosmology, and calligraphy. Figure 8 illustrates *telepuk* motif categories.

4 **Results and Discussions**

4.1 *Overview of Results*

Through this research, the researcher found the advantages and disadvantages of using the three main techniques, as seen in Table 1.

4.2 *Usage of Silk Screen Printing, Laser Cutting, and Digital Printing Techniques*

The results obtained in this research, from using different techniques to transform traditional *telepuk* motifs, are something very new. From the aspect of materials, the researcher used fabrics, plywood, mdf board and Perspex in place of the traditional

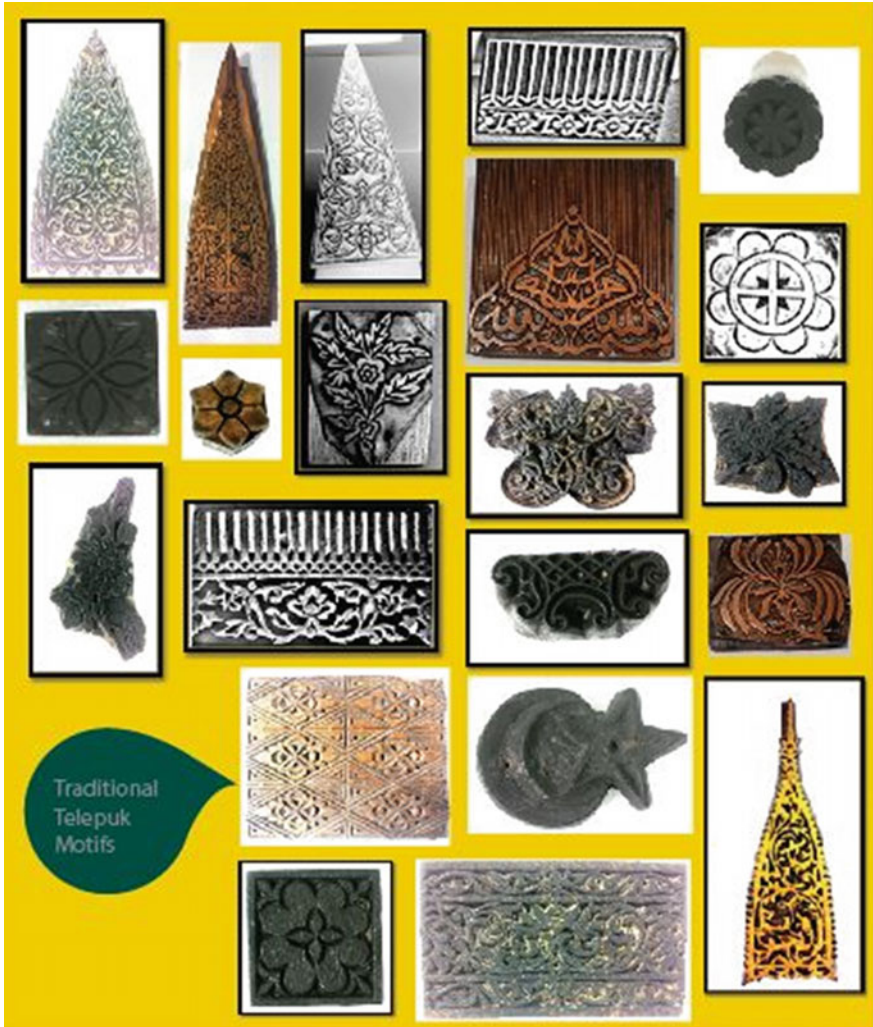





Fig. 8 Traditional telepuk motifs

kain gerus. This research was not carried out through traditional techniques, but applied a variety of different techniques, such as silk screen printing, laser cutting, and digital printing. This is to show how modern techniques can be employed to create contemporary artwork that preserves traditional *telepuk* motifs. Table 2 shows the results of the explorative use of the three main techniques.

Table 1 Advantages and disadvantages of the three techniques

Techniques	Advantages	Disadvantages
Traditional <i>Telepek</i>	Preserves the traditional technique	High cost is needed in using gold leaf
Silk screen printing	Multitask printing option that works well on a variety of materials and objects	Requires several pieces of equipment that will need replacing and maintenance (photo emulsion and silk screen)
Laser cutting	Does not require a lot of time and can be applied to cut a variety of materials such as wood, rubber, plastic, and perspex	The rate of production is not consistent, because it depends on the thickness of the piece and type of materials used
Digital printing	Very fast result and can print thousands of copies with the same design	No limitation in producing the same design

Table 2 Findings in the final art works

Design	Material	Techniques	Motifs	Colours
	Corduroy fabric	Silk screen	Pucuk Rebung	Dark blue
	MdF board	Laser cut	Pucuk Rebung	Light brown
	Satin fabric	Printing	Bunga	Maroon and gold

5 Conclusion

In conclusion, traditional telepek motifs possess a unique cultural and aesthetic value that needs to be preserved so that future generations can recognize and remember them. This research shows examples of how traditional telepek motifs

can be revived and commercialized in contemporary art and product design. The findings of this research provide both information and inspiration to future generations in order to sustain the exclusiveness of telepek in Malaysia.

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The Role of Designomics in Jewellery Design

Hema Zulaika Hashim and Khairul Adlin Azlin Abd Rahman

Abstract *Designomics*, a new terminology is derived from the two words, ‘design’ and ‘economics’. The value of a particular design is determined by the theories of economy in this influence. This research bares the objectives of developing guidelines and criteria for designers to adapt the concept of designomics in the jewellery industry. The aim of this study is to inspire design skills towards enhancing entrepreneurial leadership. In addition, the researchers develop a method to ensure the attainment of the designomic’s investigation. The designers will be able to contribute their value within the business sector. With a more extensive understanding of the theory, we can address the economic contribution of the design for business managers to understand.

Keywords Designomics · Jewellery · Design

1 Introduction: Design Economics

1.1 Design

Design varies in different fields and disciplines. It ranges from an action, process, concept, proposal, or plan. According to Chick and Micklethwaite [1], the outcome of a design process is also called a design. A design process is produced through a mixture of theme, ideation, and concept. Thus, the connection of the theme, ideation, and concept plays the most significant role in a design process, which will in turn produce a tangible design product. The connection that ties these three

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values altogether is the parameter of constraints depending on the demand of a client, a brief, or a market. Design is an applied art and commercial art that functions accordingly to improve human life.

There has been a significant recognition of the economic impact of designs and the value it brings to other industries. Generally, designers work within their own scope of designing firms. But the economic values are derived from the in-house and freelance designers in other industries, such as fashion, commercial, and graphic designers. Designs are a source of innovation and competitiveness in industries ranging from education to manufacturing renewable energy [2]. Designs naturally bare semantic contents. For example, colours are perceived as a system of signs and not a language. But it is undeniable that colours have both synthetic and semantic aspects.

The design in this context refers to the pattern or the physical look of a product, specifically a metal product. Scoping down to jewellery, there are a lot of common designs, differentiated by culture and trends. The development in the jewellery industry paved the way for more contemporary design, thus giving a wider choice for consumers to be creative with jewellery wearing [3].

1.2 Economic

Formally, economic analysis is the monetary evaluation of alternatives to meet a given objective. For example, a decision for construction, renovating an existing facility, or leasing another building is required to build an office. The evaluation is based on a comparison of discounted costs and benefits over a fixed period of time. Alternatives can be summarized in terms of the ratio of total benefits to total cost (benefit–cost ratio) or, equivalently, the total net benefits (net present value).

Figure 1 indicates the steps to estimate the economic consequences of a decision, as listed in Ruegg and Marshall's *Building Economics—Theory and Practice* [4] and are summarised below:

1. Define the problem and the objective.
2. Identify feasible alternatives for accomplishing the objective, taking into account any constraints.
3. Determine whether an economic analysis is necessary, and if so, the level of effort which is warranted.
4. Select a method or methods of economic analysis.



Fig. 1 Economic analysis process

5. Select a technique that accounts for uncertainty and/or risk if the data to be used with the economic method are uncertain.
6. Compile data and make assumptions called for by the economic analysis method(s) and risk analysis technique.
7. Compute a measure of economic performance.
8. Compare the economic consequences of alternatives and make a decision, taking into account any nonquantified effects and the risk attitude of the decision maker.

The designing industry contributes to the economic competitiveness with other industries regardless of their employment sector.

1.3 Designomic

Basic concepts in neoclassical theory explain how supply and demand are reconciled in the market. Scarcity is the foundation of a market. A scarce good is allocated to the consumers wanting the goods. Furthermore, the price of the goods decreases as the quantity of production increases [5].

Designers have an indirect responsibility to change the existing situations into better ones. Fundamentally, their work in producing material artefacts has no differences compared to doctors who find the cure for cancer. A previous study stated that design is construed as the core of all professional training; it is the principal mark that distinguishes the professions from the sciences. [5, p.129].

Heskett in referring to Simon reported replicate reasoning is an emphasis on design as a thought process underpinning all kinds of professional activities; yet the varied skills through which design is manifested are not discussed. He did indicate, however, why design is so rarely considered in economic theory. Economics, he stated, works on three levels, those of the individual, the market, and the entire economy [6]. The centre of interest in traditional economics, however, is markets and not individuals or businesses [6, p.37]. A serious problem is thereby raised at the outset: two important considerations relating to design—how goods and services are developed for the marketplace and how they are used—receive scant attention. The rationale reflected in this empirical study is important to establish the clear context of a quality of design with other sensory aspects of value and commercialisation.

2 Statement of Problem

The discipline of economics does not acknowledge design. To be fair it must also be acknowledged that the discipline of design is deficient in communicating its economic role.

John Heskett, 2008

The above statement clarifies that designing is a professional activity practiced immensely within the business context. Upholding the value of design in any organisation is a continuous challenge. By determining how designs can contribute economically, designers will be able to integrate their designs into business thinking. In addition, design theory explores and portrays variations of ingenious expressions within the limitations defined by the sense of human creativity. It determines the ability to identify similarities, characteristics, and also the relationships between industry frameworks.

The theoretical issues here are to discover commercial values that are related to the product and emotional content of a design. It may be possible to explore the design secrets of expression into a product in order to communicate with the user at an emotional level.

Figure 2 shows the relationship of the significance of inspiration amongst the designers which may have been assimilated with other business relatives or

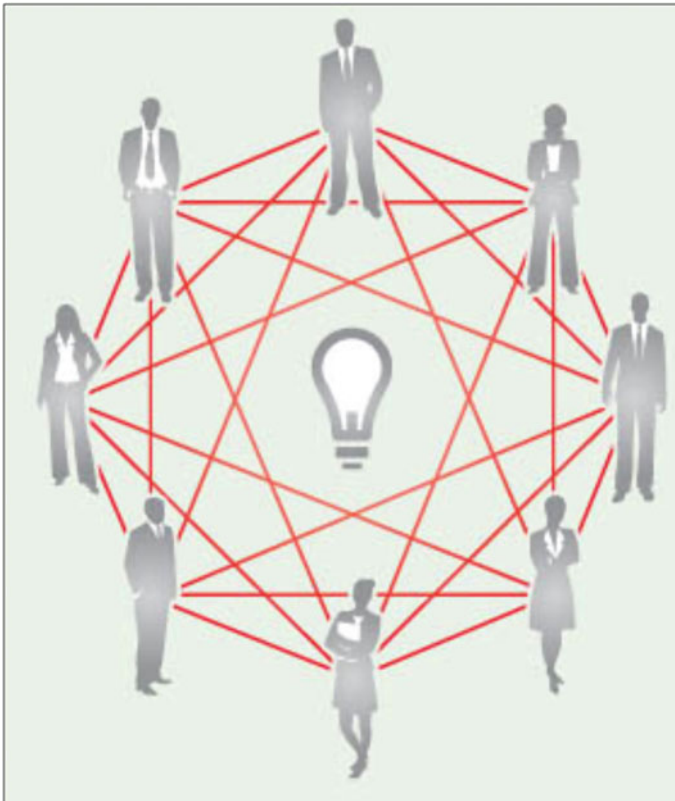


Fig. 2 Relationship from idea to considerable profit (Courtesy: Multiple stakeholder sustainability image)

stakeholders in the industry. There needs to be an innovative system for the studies of designomics which only consider attributes of the design and value sensation, that is, those which can be perceived and assessed solely by means of the innate imaginative sense. All concepts referring to design, value, material, or marketability must strictly be excluded.

3 Design with Economic Value and Its Role in Jewellery Design

This study validates the dimension of designomic criteria towards jewellery design that is currently upheld in society. The changes caused by cultural assimilation are beginning to arise and the context of jewellery design is an important element in the changes sustained with production demand. The existing knowledge of the civilisation will be revised with the evidence of new cultures in the current generation. Nowadays, the developments in the jewellery industry paved the way for more contemporary designs, thus giving a wide choice for consumers to be creative with jewellery wearing, specifically for wedding ceremonies which are strongly influenced by culture.

Jewellery analysis may lead to the idea of uniqueness that focuses on emotional set and the significance of existing design. The accomplishment of a design process was attributed to the idea and philosophy that adamantly remained through the precious experience. Just like diamonds, the concept of philosophy is clear, solid, and brilliant. A designer has to be customer-centric and ensure the highest level of quality in products and designs. Jewellery is a fine art, a human venture that we deem only achievable through true standards of design processes. That is what makes designs so fashionable, contemporary, and efficient at the same time [7].

The diamond jewelry market has gone full circle from premium priced custom and ideal cuts to off-color, industrial-grade and uncut diamonds showing up in major collections.

Carol Besler, 2012

The key in putting together designs in creative activities is through the method of learning the semantics (meanings) of sensitivity and emotions [8]. As such in artistic design, understanding the materials thoroughly will be the designer's top priority. Without doubt, material is essential in designing purposes to determine the reputation of the wearer, but sometimes it depends on the personal experience and rationale of the product's characteristic elements [9]. Unusually, the distinctiveness of a jewellery piece portrays the beauties that cleave the wearer's emotion.

In connection with that, this revision is conducted to determine the significance of the designomic approach in Malaysia from the perspective of the designer and retailer (jeweller). The study determines the consumer demand of a particular jewellery design and the current demand that seemed to have evolved. With the vast exposure

to many other aspects of demands, it changes the perception and importance of development in design process. This will also affect the significance of jewellery designs that should be available for the current market.

4 Methodology

This study was based on a descriptive research and observed the role of the designomic approach towards the significance of jewellery design. For this, the researcher conducted a survey to gather information from samples of the target population.

Figure 3 shows a flowchart of the research framework for this research activity. The domain of this research was qualitative in nature [10]. The assessment was on the syntactics (structure establishment) [11] and semantics (meaning carrying) [8] of form elements. These different levels involve [12–14]: (1) different level of trend development/trend specification such as explorative, explanatory, and persuasive; (2) different level of career development such as practitioners and students; and (3) different level of learning/work such as industrial/jewellery design institutions and industries. In line with other respondents, this improvement will be beneficial to the government agency and those involved directly or indirectly in enhancing the jewellery design business in Malaysia. Revising the research questions and sources of data continuously was necessary, and they were refined after verification of new findings.

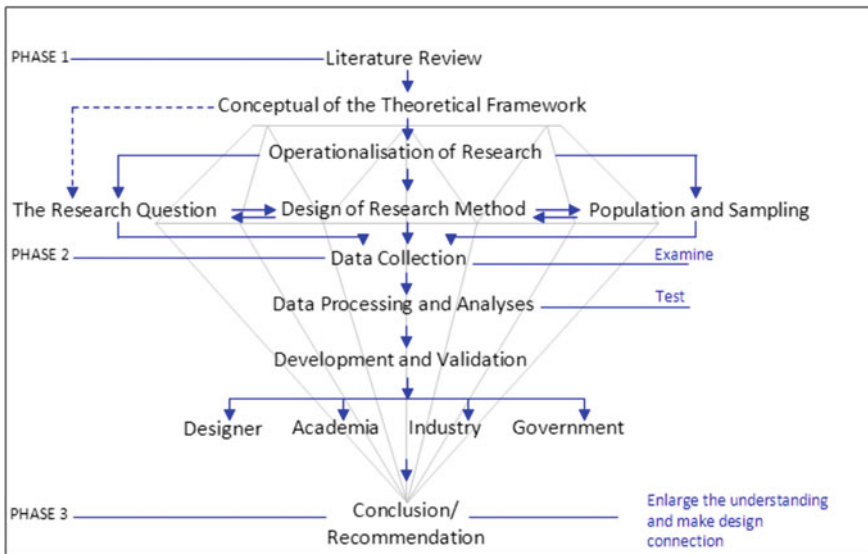


Fig. 3 Flowchart of the research framework

5 Conclusion and Further Research

If we consider how our society is, by nature they love to adapt new thinking to their lives, for example, a designomic as a thought of power and strength in the designing process. Thus, they are more prone to adapt the significance of design and economy as an indication of the design and product development practice. This affects the design of jewellery or other products in the current market as something universally understood.

In the future, a new sense of daring and conviction driving ingenuity and innovation is identified as the key spirit in the upcoming trend of jewellery design, and exposed with a radical, modernist, minimal style that focuses on the power and engagement of recreational emotions. The possibility of integrating LED technology in fine jewellery is an idea gathering momentum, amplifying the light, luster, sparkle, and sheen of gems and jewels [15]. A trend that will continue into the future is focusing on the colours of gemstones, the light of the life emphasising the mysterious wonders of the natural world.

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Islamic Geometric Pattern Within the Molecular Structure

Rahman Amin and D'zul Haimi Md. Zain

Abstract The Islamic geometric pattern is well-known and stated as one of great relevance in this century, which contributed vast insight for decoration art. Indeed, as to the deficiency of attention, there are sample written works that provide the background literature for this subject by several scholars, which discussed detailed study about aesthetics in Islamic art and geometric patterns. Therefore, the first objective of this research is to identify the features of Islamic geometric patterns as to correspond to the molecular structure. The second objective of this study is prove the relation between Islamic geometric patterns in order to suggest the new classification of Islamic geometric patterns. From the knowledge of Tawhid, Islamic philosophers provide the opportunity for creativity, rendering them to attain the zenith point of knowledge in order to seek answers to this problem. Knowledge is the source of creativity and thus the production of the Islamic geometric pattern that has high relevance in the world today based on the essence of nature which is the molecular structure.

Keywords Islamic · Geometric pattern · Molecular

1 Introduction

Tawhid as the Principle of Aesthetics differentiates Allah from all of His creations. Nothing represents the Creator nor can the Creator be described. This has led man to start observing his surroundings, which is nature. From the knowledge of Tawhid, Islamic philosophers provide the opportunity for creativity, rendering them

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to attain the zenith point of knowledge in order to seek answers to this problem. Knowledge is the source of creativity and thus the production of the Islamic geometric pattern that has high relevance in the world today based on the essence of nature which is the molecular structure. The scope of this research emphasises the discussion of theory on Tawhid as the principle of aesthetic supported by Ismail and Lamnya Faruqi and Hossein Nasr, as noted by Ismail al Faruqi, ‘Tawhid is the one denominator common to all artists whose worldview is that of Islam, however geographically or ethnically separate them’ [1–5].

This discussion mainly focuses on various knowledge and culture in western Asia such as Greece, India, China, and Persia. Next, emphasis is given on providing evidence to show how the Islamic geometric pattern in essence is a depiction of the molecular structure. This research places focus on the Islamic atomism and its development by studying the views of Ibnu Sina, al Biruni, and the alchemy of al Kindi, as well as the comparison to the Sufism forwarded by al Ghazali and Fakr Din Ar-Radzi. The findings of the literary study produced a theory on matter that would be synonymous with the molecular structure. The research identified the relationship between the Islamic geometric pattern and the molecular structure [6–9].

It would be most possible that scientists of the Islamic era had discovered this technology during which the knowledge of science and technology was at its highest point. This element had a vast impact on the forms of structures, buildings, and decorations adorning them. Indirectly, this research would be able to trace the connection between Islam, past knowledge, and the present modern-day knowledge. Moreover, they can provide a methodology that responds to the challenge of negotiating religious functions with other secular, social, and cultural practices [10].

2 Literature Review

Recently research in computer graphics adapted the technique of reconstructing geometric patterns by placing star units within a basic grid of polygons. Kaplan [11] used this approach to develop a software implementation of the technique. The study of Kaplan and Salesin [12] extends Kaplan’s analyses to introduce a more generalized system within a novel parameterised collection of tiling formations. Moreover, they introduced the idea of absolute geometry, which allowed them to create designs on the sphere and in the hyperbolic plane [1, 13]. Arabesque software is a Java tool designed to help construct and draw patterns. It is particularly aimed at 3D artists wishing to use complex patterns for their scene settings. It can also be used as a special 2D drawing tool to design original patterns. It relies on a heavy use of symmetry groups. Recently, Kaplan [14] presented a method for constructing transformable Islamic patterns by using a different star unit “rosette” within the same basic grid of polygons. His construction was based on Hankins’s ‘polygons-on-contract’ method, which uses a grid of polygons as the basic grid [15–18].

The findings of these researchers led to more inquiries that have great potential for research. According to them, ‘The art of Islamic symmetrical patterns has proven to be an elegant method for the study of symmetry’ [15, 18]. In fact, they have also come to the realization that new fields related to the Islamic geometric patterns have emerged as prospective endeavors. Therefore, the development of an analysis tool can be very useful in studying and analysing the evolution of Islamic symmetric repeated patterns, and also, to explore ways in which these patterns can be created algorithmically. Moreover, these patterns have strong relations with other sciences such as theoretical physics, crystallography, chemistry, and biology [11]. Based on these statements, a method to correlate the Islamic geometric pattern with other fields of knowledge needs to be explored. It is with this mindset that the purpose of this research is to seek the parallel that can be used as evidence that the Islamic geometric pattern is the product of findings in the Islamic knowledge during the zenith of its achievement. The findings of past research clearly have come with unexpected results. For instance, Peter J Lu is of the opinion that the mathematics principles applied to produce the Islamic geometric pattern were very complex is one that should be most inspiring [19–22].

The Islamic scholars of the past have been found to describe the solid body. This incomprehensible endeavour during the zenith of Islam came at a time when the influences of the Greeks, Persia, India, and China intermingled with Islamic knowledge. The discussions revolving around this concept were mentioned by Al-Biruni and Ibnu Sina regarding the four factors forwarded by Aristotle. The first being the heavens, the second is the six routes to the outer space, the continuity of the physical bodies, and the fourth, the existence of an alternate universe from the one that we see today. Through the discussion of both Islamic scholars, the focus was mainly the observable and unobservable world [23].

From the statement, we can infer that to create aesthetics based on the guidelines of Tawhid, Islamic scholars seek to find the alternative that visualizes the beauty of the All Mighty’s creation. They choose to portray the essence of nature that does not try to envision the Creator himself, and simultaneously produces works of art that emphasise abstraction and stylization [24].

3 Tawhid as First Principle of Aesthetic

The development in the discussion refers to how Islam encourages the emergence of Islamic scientists who had played essential roles in the expansion of Islam. This development is crucial in determining the character or the value of Islam that led to the expansion based on geographical aspects, and later contributed to the development of the Islamic geometric pattern [25].

4 Development of Islamic Geometric Pattern and Its Relationship to Islam

We identified the methodology and the characteristics of Islam that have promoted the advancement in knowledge through the study of Greek scriptures and other civilizations such as the Indian, Chinese, and Persian. The influences of this knowledge had ripple effects into the Islamic civilization and simultaneously the geometric patterns. When this influence has been identified, the transformation can be seen in the design of the Islamic geometric pattern [25].

5 Characterization of Islamic Geometric Pattern and Characterization of Molecule Structure

- (a) The characterization of the Islamic geometric pattern is executed by applying the existing research findings and the relationship with the advancement of past Islamic knowledge. These findings will be compiled and categorized to allow the comparative presentation to the molecular structure.
- (b) This molecular structure will be researched to ascertain the similarities of its form. Categorization is intended to allow comparative analysis to the Islamic geometric pattern [26, 27].

6 Preliminary Summary

To sum up, this study is to prove the relationship between Islamic geometric patterns with molecule structure (periodic table). The characters and categories obtained from the Islamic geometric pattern and molecular structure will be compared to ascertain similarities and differences. Then, towards the end we suggest the new classification of Islamic geometric pattern based from findings is to propose classification is needed as proof that the Islamic geometric pattern is a product of research into the molecular structure or has close relevance to the molecular structure.

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Erratum to: Kufi Lari: The Hybrid of Khat Kufi to Uphold the Malays' Identity in Digital Art Application

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