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UNIVERSAL DESIGN: BEYOND USABILITY AND AESTHETIC STUDIES FOR PRAYER CHAIR

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User-usability effect and aesthetic recognizes to fortify value in product creation in assisting the product to be more valuable. The contribution of usability and aesthetic factors enable to increase the potency of the product to be utilized for the target market segment of individual preferences. This paper focuses on the design aspect concerning the aesthetic-usability effect. An appropriate technique of designing the product, which compromises by many types of users in retaining the functionality, size, proportion, space for approach, reach manipulation, is discussed. Performing a prayer using a chair is a critical necessity for those who are no longer able to stand for a longer period of time. Little attention is given to these issues is the main caused of neglected targets for their comfort in the practices of prayed. The researchers agreed that the pleasant appearance of the products able to contribute to positive aesthetic-usability feeling and serve affordance quality with end-users, comparable to less aesthetic outlooks.

Keywords: aesthetic, usability effect, perceptions, universal design, prayer chair

1. INTRODUCTION

Research and development of prayer chair products is considered a marginalised activity. Existing chair products are not intentionally designed for Muslim prayers with disability and the form of the chairs may disturb concentration the other congregation during the prayer due to the size and bulky shape. Therefore, the researchers apply a Universal Design approaches in designing a prayer chair that is versatile and practical for all classes of users. This research briefly discusses and defines aesthetic and usability effect in the context of universal design approach. In general, aesthetic carries a vital role in the way design is used. A common parallel with the intended function and attractiveness of the design can stimulate a positive relationship between end-users and products (Lidwell, Holden, & Butler, 2003). In this study, the researchers were developing a prayer chair (Figure 1), which focuses on the functional-aesthetics. This product is considered as the functional-aesthetic product because of unique and affordance design that enable to stimulate the consumer's senses in immersive experience and to a dynamic effect (Seymore, 2010).

2. BACKGROUND

2.1. Design considerations for prayer chair

The Muslim prayer or Solat is a ritual worship, consisting of prescribed recitations (in Arabic) along with specified bodily positions such as standing, bowing, prostrating, and sitting. All Muslims obligatorily must perform five times prayers every day. If someone is unable to perform Solat standing, he should perform it sitting. If he is unable to perform it sitting, he should perform it lying on his back." Allah SWT has mentioned about ability in performing Solat in Surah An-Nisa verse 4:103.

> "Whoever has some excuse due to illness and cannot stand during the obligatory Prayer is allowed to pray sitting. If he cannot pray in a sitting posture, he may pray while on his side by making gestures. In such a case, his gestures for Sujud (prostration) should be lower than those for his Ruku` (bowing). This principle is based on Allah's words: (And celebrate Allah's praises, standing, sitting, and lying on your sides)" [Surah An-Nisaa 4:103]

Owing to the aforementioned situation, a Muslim people have given some leeway in performing their prayer positions depending to physical abilities. Therefore, there is a need to design a product or system to assist them. According to Ahuvia (2005), people can intervene over what the system is not capable by suggesting some action and process depending on individual proficiency and experience.

Liu Yong-Xiang and Li Jie (2006) also agreed that the creation of the product should be simple and efficient for beginners and experts. For instance, if the designers are designing a dual- functions product, they must consider about both utilitarian and emotional functions. The utilitarian function basically deals with pleasure and pain consequences. Meanwhile, the emotional functions engage with people experience and particular lifestyles such as living in city or rural areas and education levels. The design must not neglect the aesthetic elements and simultaneously need to fulfil the customary demand. According to Wu (2009), a good seat must adapt human body shape, comfort when in used and custom-designed. In addition to the comfort factor, consumer style design concept also needs to be taken into account. It is important to highlight that the good design is not only based on the shape, colour and form but must embed some cultural influences of the marketplace, for example, the natural resources, the number of users and climate conditions.

It may be assumed, the future market for furniture design, particularly prayer chairs, does not depend merely on the demand for the number of chairs produced, but will rely on the success with which the product meets the needs and preferences of the consumer. These essential factors will help to sustain demand and add value to the product. Designers and product developers must explore, scrutinise and comprehend consumer needs and their emotional engagement with respective product designs. To design a product that can be widely accepted by consumers, the designers must understand consumer preferences and taste (Margolin, 1997).

Figure 1: ¾ perspectives drawings of prayer chair

2.2. How do we measure user effect experience?

In this study, well-crafted questionnaires are designed by embedding the universal design principles into survey questions. The survey questions analysed and the usability report made base upon total number of problem found and the list of problems that will be fixed in order to gauge consumer common trends across observations. It is important to highlight that the list of attributes in the questionnaire were discussed

and agreed among researchers and peers before disseminating to respondents. These attributes are highly suitable for the interrogation of the actual aesthetic quality of the prototype designed. The participants are allowed to sit on the prototypes. They were also able to observe the prototype material, standard of finish, jointing system, size and much more. Hence, the considered response procedure gives the opportunity to respondents examine the subject evaluation and give opinion without prejudice.

The level of satisfaction has been measured such as how pleasant and comfort when using and utilizing the product. In principle, when measuring users' satisfactions, the elements of satisfaction, error and learnability must be included (Waldemar, 2011). We also discovered how the users learn and adjust product according to the low physical effort concept; for example, allow the user to accommodate body posture position when seating and operating the prototype. The error is also one of the attributes that frequently associated with usability property in which we also seek how frequent mistake do users make and how serious are these failures, and how easily the end users cope from the error? Another component should be considered is learnability which, people acquire new knowledge and skill of new product operation system through study, experience and being thought. According Han, Yun, Kwahk, & Hong (2001), the usability defined as a level of satisfaction of a product, from performance and image impression.

3. DESIGN RESEARCH PROPOSITION

3.1. Proposition and method

The mixed method procedure applied to obtain feedback on the usability and aesthetic values of subject matter. This procedure refers to quantitative and qualitative methods. The observation technique is applied through analysis of participants'' requirements and needs. The participants were asked their preferences when purchasing the prayer chair. The majority opinions will be used as an indicator to capture participant taste and personal desire of purchasing the product. The framework of this research included the execution design experiment, evaluation and user feedback.

Early in the project, the researchers designed and constructed a working prototype (Figure 2) based on design specifications. The design specifications are in accordance with current trends and the popularity of prayer chair forms and shapes in the market today. The initial design concepts are generated in the form of drawings, ideation, technical models, assembly drawings and mock-ups. This provides the researchers the ability to select which drawing to be emphasized and developed. Finally, the final prototype in a full size functional model is created to be used for evaluation and validation.

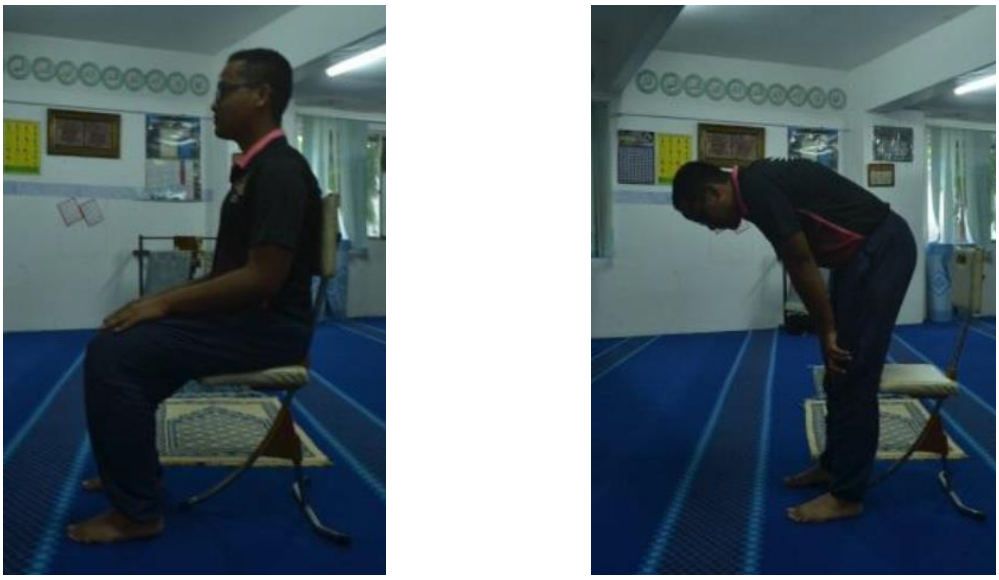

Figure 2: The prototype of Prayer Chair

3.2. Approaches to user: Observation

The most fundamental research skill applied is observation technique. Participants were asked to answer questions based on comprehensive observations, which allowed them to touch, lift and sit on the chair. The observation needs researchers to record participants' feedback systematically, including how participants interact toward the product, environment, events and behaviors (Martin & Hanington, 2012).

For the design analysis purposes, the observational approach distinguished by the degree of formality of pre-structuring of observations and recording methods, and their intended use. The pre-structure imposes upon testing or using the prototype, utilizing checklist, or other form codifying behavior or product. This research is concentrated only on observing product and recorded feedback to questionnaire in order to detect the usage practices and determining the motivational factors to make a purchase decision. A total number of 100 participants are involved in the observation survey.

The value of motivational factors or subjectivity attribute is varied upon consumer experience, prejudice, perception and life's lessons (Bradley, 1994; Chuang, 2001; Petiot, 2003). What can be concluded from the observation during the research session; the majority of participants preferred to have a small size prayer chair, light in weight and it must have an option to adjust the height of the chair.

4. RESULTS AND DISCUSSION

A full-scaled prayer chair is created and the feedback survey is done through disseminating the tailor-made questionnaires based on universal design principles. At this phase, the participants were required to respond the questionnaires based on

emotional response to physical form of working prototype. The physical and emotional attributes of the questionnaires have been formulated into adjective syntax by describing, identifying, or quantifying the meaning, features and characteristics of the subject evaluation The researchers agreed that the actual prototype able to embark an impactful feedback such as opinion about form and aesthetic during the observation and assessment. Although, this work offers general validity, the database obtained is important to assist in completing the experiment and provide more relevant first hand data on a prayer chair for consumers.

Figure 3 illustrates the feedbacks of the survey based on the Universal design principles' attributes. The attributes of the questionnaires etymologized from the Universal Design keywords and reflects the characteristics of usable and physical descriptions of the product. The assessment of the universal design factors of the prayer chair consists of seven factors known as equitability of use, flexibility in use, simple and intuitive use, perceptible information, tolerance for error, low physical effort and last but not least, size and space for approach and use. As shown in figure 3, majority participants provided positive responses to the universal design factors questions. Most participants provided high score and positive feedback to all elements of universal design accepted for simple and intuitive use.

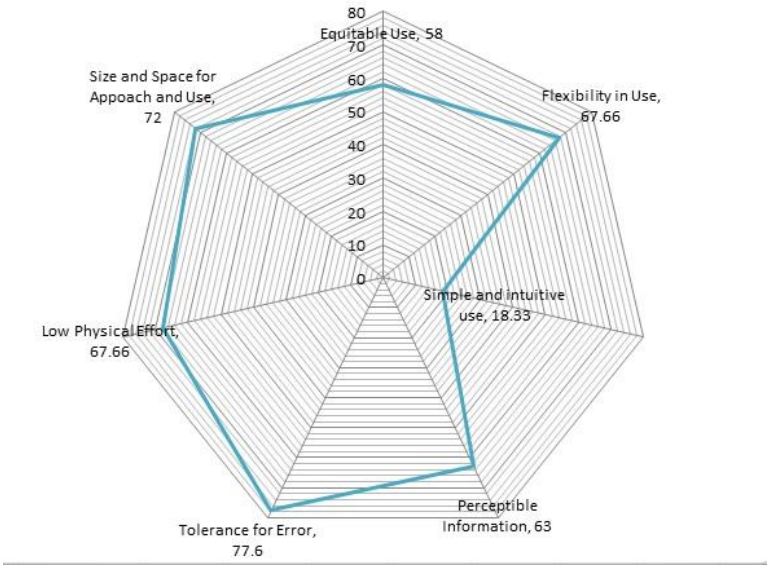

Figure 3: Universal Design elements in the Prayer Chair

In general, 58% of participants agreed the prayer chair design is feasible and marketable to marginalized people with diverse abilities. 67.66% of participants believed the proposed design easily can be adapted to end users due to its ability of the functions and artistic tastes. However, only 18.33% agreed the design needs to be improved, especially the additional features of product such as table and pocket for storage are not really needed for the design.

The use of the graphic elements such as colour and pattern are not obvious, but an overall they preferred the suggested graphic, disregard of the participants' experiences, knowledge and language skills (63%). For them the design has spoken effectively, regardless of conditions of end user's sensory abilities. 77% of participants agreed that the design minimizes risk of injury and the adverse consequences of unintended events. The participants also agreed that the design can be used efficiently and comfortably and with a minimum of fatigue (67.66%). An appropriate size and reach distance to the height adjustor (pin hole button) of the chair is advantages (72%). Participant claimed that they can adjust the seat height without any problem regardless of body size and posture.

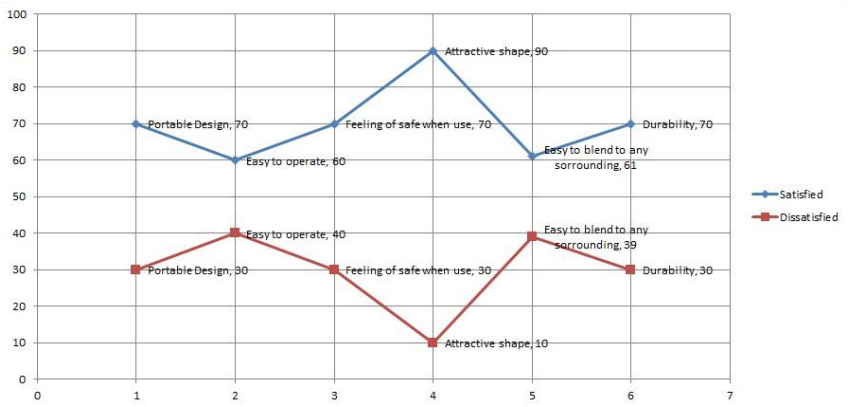

Figure 4: Scatter plot of users' responses toward prayer chair prototype

Figure 4 illustrates a positive wave of scatter diagrams shown in the blue line. The diagram displays values of data which represent the level of Satisfied and Dissatisfied of the features provided. Majority of participant's agreed that the features of the chair such as portable design (70%), safety (70%), durability (70%) and attractive shape and form (90%) are applied in the prototype. They also agreed that the prototype is suitable to be placed in public spaces and private residential due to size and proportion. The outcome of the questionnaires indicates that clear statements of preference in response to their 'pre-conceived ideas' about the prayer chair in general or about the attitude and character of a chair. The ability to think conceptually and apply personal experience and feelings allow them to promote clear interaction with the prototypes and to be able to intuitively read the language of a product without any unnecessary complications.

5. CONCLUSION

In conclusion, the proposed prayer chair is widely accepted among participants. The more this product obtained positive response, the more its ability to attract people to look closer and purchase the product. The positive results also clearly show the responses of participants were reflected individual taste and highly satisfied with the design proposed. This is because most of the attributes of the chart have shown a

higher result score which above medium score. We believed that the prototype is a safe and practical product to be used.

The comfort level, and practical features and functions of the product give more advantage to the prayer chair to compete in the commercial market. The prototype also demonstrates an aesthetically pleasing form in terms of physical appearance, which able to portray a good example of product in its category. The majority of participants' also believed that the prototype with universal design approach and unique features able to influence consumer purchasing the product at any time. In short, this design project has advanced the awareness to participants, bring suggested prototype in commercial ways and has contributed a high impression to them in respects of the physical outlook, practicality, safety and functionality of the product features.

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