

Assistive Clothing for Disable People based on *Kansei* Approach Using Indigenous Clothing Construction

Nazlina Shaari*, Norhayati Suleiman*

**Design Technology Department
Faculty of Applied and Creative Arts, Universiti Malaysia Sarawak,
94300 Kota Samarahan, Sarawak, Malaysia.
Tel: 082- 581343 Fax: 082 581354
E-mail: snazlina@faca.unimas.my*

Abstract: Today's consumers demand more of what will enrich their life. They desire new products that could fulfill their needs. With the reference to the changing society and consumer-oriented trends, design today takes place in a different framework than ever before. Functionality, attractiveness, ease in use, affordability and safety are all attributes that are expected by the users in their everyday product. This paper aims to reveal the importance of *Kansei* in product development for disable people. In this pilot study, we examine clothing interest as a mediating factor in self-perception of emotional stability and dominance satisfaction or dissatisfaction with clothing was specified. Using traditional clothes constructions, few product lines has been designed for the disable people. By studying the pattern construction from traditional clothes, mainly the clothes opening were re-construct for the purpose of easy wear concepts for the disable without changing much on its originality. The main identification on designing the clothes involved with the opening, sleeves and its closure. The product enables the maximum functions for the disable user.

Key words: indigenous clothing, disable people, *kansei* method

1. Introduction

In clothes product development the influence of a product has on the user has been described through customers' satisfaction. Further understanding in the relationship of a apparel to the body requires an analysis of many complex factors. This is because clothing can conform to the body and act as our second skin. Assistive clothing is important, as it is a bodily need of the user particularly for the disables, and all needs should be considered on every product. Thus, future product developments in a pparels will enhances the application of mass customization that fits the basic needs of body sizes and its practicality in its usage. The tendencies in product development make it likely that many future products will be functional and fulfill the customer's needs. One task for product development in this context is to be able to capture customer's considerations and feelings of products and transfer these emotional aspects into excellent apparel design based on specific needs. Functionality, attractiveness, ease in use, affordability and safety are all attributes that are expected by the users in their everyday product especially for people with disabilities. This is where Universal Design is recognized as design benefits people of all ages and abilities? There are many guidelines and checklists relating to Universal Design proposed by various organizations, for example the Seven Principles advocated by R. L. Mace of the Center for Universal Design at North Carolina State University.

Although the demand for Universal Design is becoming greater, these basic principles are fundamental and crucial in actual design development. Within these concerns, we performed research on the daily scenario of

wearing garment among the disable people in Malaysia. As the increase of customers' self-determination, the designers need gain an acute insight into their psychology cognizance and requirement to develop new products. In product development, *Kansei* engineering is a new approach which translating human feelings into product design. It has played an important role in the field of design in enhancing new product line up that fit to customer needs. We believed that *Kansei* plays an important role in clothing too. It is the nearest approach that can acknowledge user's needs as it is our second skin. In order to do the pilot test, we started with a survey of various indigenous clothes constructions as our guidelines since it is commonly used in Malaysian daily wear.

2. Case Study

2.1 Targeted Groups of Disabilities

Disable persons were classified to two groups. The persons in Group A were paralyzed one side of the body but were able to walk themselves. The persons in Group B were concerning with daily used for nursing, in the hospitals and were able to move with or without automatic wheelchair. As the awareness on clothes that had the significant difference between Group A and B, the following items were obtained. At every item, Group A had much answers than B and therefore needed some careful consideration. 1) Choice hems for top and bottom wear pullover type, front open type, magic tape and button. 2) Inconvenience on clothes: size unsuitable, fastener, difficult to put fastener in box, button, hook and rubber used clothes.

Before *Kansei* can be applied to clothes design, its structure should first be mapped. We collected 3 of examples of daily indigenous garment used and constructed and build a classifications of social domain, physical domain and psychological specification. In this pilot study, examine clothing interest as a mediating factor in self-perception of emotional stability and dominance satisfaction or dissatisfaction with clothing was specified. The details of the classifications were as follows:

1. Social domain: involved with environment, situation, activity, community
2. Physical domain: condition, active, tactile, visual
3. Psychological: behavior, emotion, feeling

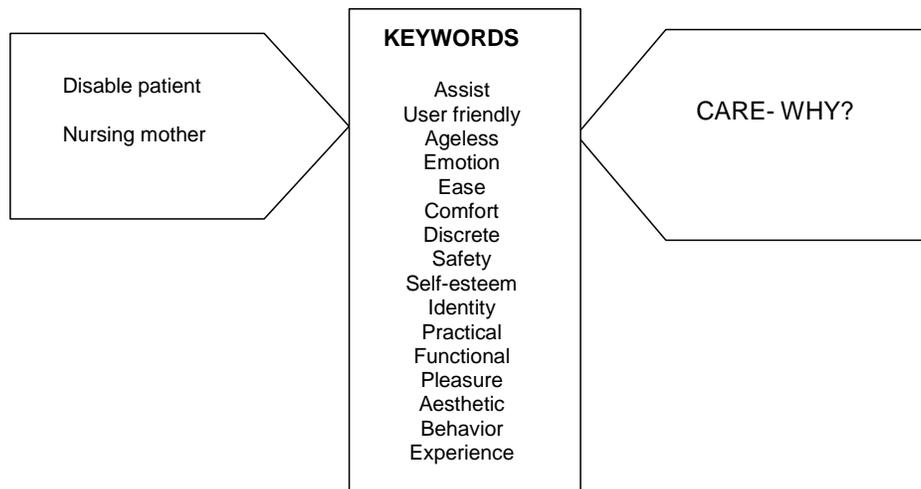


Figure 1: Identification of assistive clothing

Various aspects of human capability and functional limits are identified. In this study, the human emotion vs. product function is formed and analyzed. The physiological input is an important element that highly related with this garment design. There are two elements involve:

1. Tactile stimuli
2. Perceptual stimuli (visual indications)

These two elements can be defined as the transformation of the consumer's implicit needs and potential demand on a product into design details. In tactile evaluation, the haptic experience was used in identifying the preferable materials for clothing. Whereas in perceptual evaluation involved with the appearance values of the clothes.

In order to make some clothes with which the disabled persons (physical handicaps) are satisfied, we first survey the actual condition of their daily life and their awareness of life to wear clothes.

2.2 Method and Design Process

Pilot assessments on traditional clothing

In this study, it involved the comparisons study of the existing garment with three major components in assistive clothing: 1) Physical 2) Social and 3) Psychological. It is found mainly imparts to new designs constructed from the indigenous wear. It is important areas of study as it's linked to identity perception and the creativity in indigenous product that have the possibilities in executing good product for disable.

The Semantic Differential (SD) method was used to measure the user's preferences and image perception towards clothes design. Female's scores for tactile and perceptual evaluation were obtained from Principle component analysis (PCA) method.

- i) Tactile evaluation- a list of thirty-six image words deemed suitable for expressing the product image. Each subject was asked to evaluate seventeen types of materials used in the clothes according to a single pair on 11-point scale. Testing involved with Total Hand Value (THV) evaluation to identify specific sensory during the tests.
- ii) Perceptual evaluation- female's perceptions for clothing images in visual and sensory recognition tests.

i) Tactile Evaluation

The fabric smoothness is of primary importance based on hand- touch feeling by both groups of subjects. The categories of descriptive terms given were mainly observed by gestures. It is well understood that the gestures presents variations of tactile recognition and identified high and low scales from the samples given. Table 1 explained the gestures motion found during the evaluation. These motions were observed to indicate the ability of females' in handling the fabrics.

By gestures motion, the fabric samples were again being classified in to four main groups of fabric tactile property. This appraisal worth to recognize at this stage in order to tackle clearly of what typed of fabrics do both group require for their traditional clothing. The fabric's categories were able to classify the proper adjectives that

reflect the image words evaluated. The seventeenth samples selected illustrating the existing fabrics used in clothing. The cluster analysis identifies nine classes of typical touches (Table 1).

Table 1: Attributes selected to describe the touch properties applied in fabric hand evaluation.

Attributes	Active part	Type of gesture
Deep	Fingertips	Small, no pressure, minor movement
Elastic	Hands	Large wide movement
Compact	Fingertips	Small, pressure, minor movement
Mobile	Fingertips	Small, pressure, minor
Rigid	Hand	Large, deep pressure, large movement
Relief	Fingertips	Small, no pressure, minor movement
Rough	Hand	Small, no pressure, minor movement
Smooth	Fingertips	Small, no pressure, minor movement
Crisps	Finger	large, pressure, movement

Haptic evaluation also described the differences that exist between fabrics. On the other hand, specific categories such as fabrics with flat surface, mix-embossed fabrics, silk-like fabrics and typical touch fabrics for fabric tactile could be recognized easily. The developed methodology shows good panel performance and large expectation in fabrics property could be tackled.

Through these predictions, both subjects can easily recognize the important area for total hand value (THV) in fabric preference assessment and appearance explained as hedonic, pliable, activity and tangible. Therefore, it can be concluded that hedonic elicits an emotional response that is preferred in fabrics for clothing.

i) Perceptual Evaluation

This study was intended to reveal female's perceptions clothing images in visual and sensory recognition. These perceptions enhanced females to make their own analysis or emotional response to identify the clothes images that ideal for their appearance.

A questionnaire was designed to measure five dimensions of clothing interest as well as each of the three traits both with, and without, a "clothing satisfaction variable," or typed of clothes that they desired or felt easy to wear. PCA analysis revealed that specific dimensions of clothing interests suggesting clothes were most likely to mediate self-perceptions of sociability, emotional stability, and dominance when one was either satisfied or dissatisfied with one's clothing.

The evaluation covers the Total Appearance Value (TAV), which is related to the attributes of garment appearance. Total Appearance Value were created in order to tackle necessitate females emotional mapping towards their clothes. In this part of evaluation, empirical studies were made to identify the categories of clothes appearance that were highly elicited by females.

Methods

To study the perceptual dimension of user's preferences, the semantic differential method (SD) is one of the most frequently used methods. It is quantitatively deals with how people feel about the clothes with the aim of identifying the exact *Kansei* desire by subjects. The SD is used to find out consumers' feelings about the product as an ergonomic and psychological evaluation.

Sensibility appearance expressed the suitable image words and design elements for the clothes are observed. It is to identify female's perception on why and how they evince the clothes in visible and invisible appearance. This evaluation expected to give supreme results on reaching females cognition and stimulation of mind in traditional clothing.

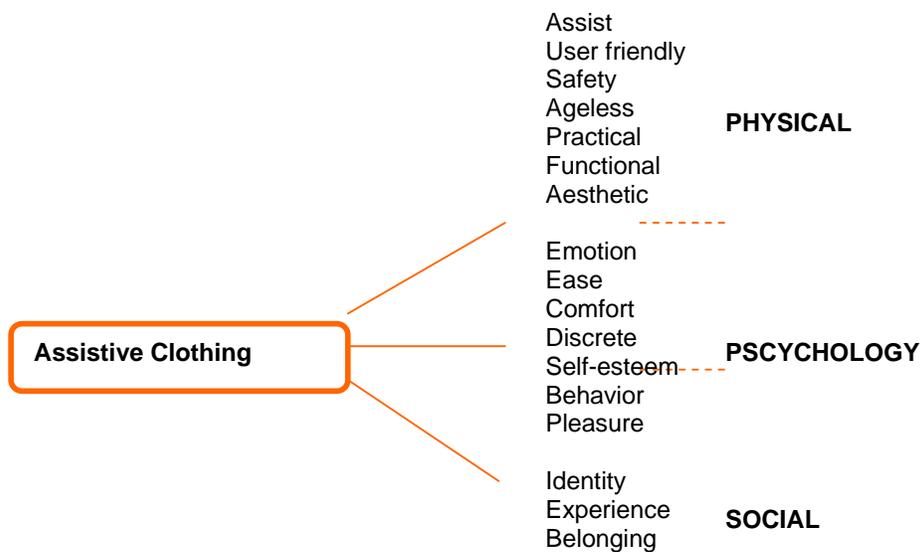


Figure 2: Assistive clothing attributes

This method of analysis is related to principal component analysis (PCA). The categorization result was transformed into qualitative scorings for each consists of 1 until 5, indicating the preferences of very, slightly and neutral. Second, the semantic differential test was applied to measure female preferences and image perception. SD methods were used in order to identify specifically the overall images of the clothes chosen based on their experience. A selection of attributes was list up that could closely represent females feeling during wearing the clothes. In the semantic differential test, the preference and image words were scored according to a five-point scale. A bipolar pair of descriptive adjectives defines the attribute scale, with an image word on the right and its antonyms on the left.

3. Results and Findings

Through the pilot test, the results shows that user were able to perceived the concept and its functions. The main results are as follows. (1) Common awareness of clothes: A common awareness to all kinds of physical handicaps on clothes, we took notice of items to obtain many answers and found the following results. 1) Choice

items for top and bottom clothing criteria: Concerning with fabrics, the surveyed subjects required the tactile feeling, the thermal feeling and the practicality of the clothes. Concerning with easiness to put on and take off clothes, pullover type and elastic fabrics. Secondly, based on perceptual stimuli focuses on: 2) Designs based on authenticity and identity (2) Assistive clothing will eventually trickle down to everyday users as innovations emerged from health and fitness areas.

Table 1: Identification of clothing in Kansei category.

Category	Attribute	Input: areas identified	Output: care-why
Case 1-Nursing			
Physical	User friendly Safety Practical/functional Assist Aesthetics	Armpit Side body panel	Easy opening Ease of wearing Comfortable to wear Durability Culture acceptance Aesthetic acceptance Care personnel Mass-customization Provide alternative Low physical efforts Simple and intuitive use Equitable use
Psychology	Emotion Ease Comfort Discreet Self-esteem Behaviour Pleasure		
Social	Identity Experience belonging		
Case 2-Disable Patient			
Physical	User friendly Safety Practical/function Assist Aesthetics Ageless	Shoulder line Neckline Armpit Side body panel Centre front line Waistline Hipline Crotch Side pants panel	Easy opening Ease of wearing Comfortable to wear Durability Culture acceptance Aesthetic acceptance Care personnel Mass-customization Provide alternative
Psychology	Emotion Ease		

Based on the results in case 1 and case 2 from the perceptual test, most users found greater ease at the armpit area acceptable. In case 1, majority users agree on the material selection: 100% cotton that is low friction to the user. In case 2, majority of user agreed on spread styles of opening with Velcro for top and bottom clothing are practical and ease wear. The overall clothing had presented in loose fitted tunic style.

4. Conclusions

The research is in its early stages so far initial survey to proof the indigenous concept had a potential to develop into assistive clothing. This study will enable to improve from common usage into more practical and innovative design. We found that the indigenous pattern cutting are: 1) save a lot of materials where mainly the pattern cut are in geometric types, 2) easy production 3) each of panel on its clothing are suitable for practical openings. It is our concern to sustain indigenous creativity that can benefit and blend their social cultural environment.

5. Acknowledgement

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