

Design Criteria Utilised to Develop Prototype Jackets for Motorcycle Riders in Rural Communities of Akwa Ibom State, Nigeria

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Abstract

The purpose of this study was to determine design criteria for the production of prototype jackets for motorcycle riders. Specifically, the study determined functional apparel needs of motorcycle riders and design criteria for the production of the prototype apparel. The study was carried out in Akwa Ibom State, Nigeria. The population comprised 4,650 motorcyclists. Purposive sampling technique was employed to select 195 subjects for the study. The instrument data collection was a 13-item Functional Apparel Design Assessment Instrument for Motorcyclists (FADCIM). One research questions guided the study. Frequencies, mean and standard deviation were used for data analysis. Findings revealed 13 design criteria required for the production of prototype jackets which were positively rated by the study participants. Mean values ranged from 4.85 – 5.00 on a 5-point Likert-type scale. One of the recommendations among others was that the findings of this study should be made available to apparel industries and manufacturers in Nigeria to encourage the production of functional clothing based on established criteria obtained from needs assessment studies in other occupations as well.

Keywords: design, prototype jackets, motorcycle riders, rural communities, design criteria.

INTRODUCTION

The central goal of design education in any field of design is the preparation of students to become creative problem solvers. In a digital-age technological world, apparel design educators are constantly challenged to find ways to develop problem solving skills in clothing and textile/apparel design students to enable them go beyond product making to combination of product evolved through a process or otherwise content and process. Many design scholars who have studied design have attempted to identify and name the steps required in a design process and consequently there are a multitude of systems and sets of terminologies. Design has been defined by many authorities to connote a noun, a verb or an adjective in connection with the discipline of clothing and textiles, Engineering, Fine Arts, Architecture and Environmental planning. The wide variation in end products of these disciplines makes it difficult for a specific approach to be devised to bind together the various design professions.

Lawson (1983) sees design as a highly complex and sophisticated skill which must be learnt and practiced as in sports or the playing of a musical instrument. Koberg and Bagnall (1981) opine that design is the process of making dreams come true and also the process of creative problem-solving; a process of creative constructive behaviour. Jones (1970) states that it is the performing of a very complicated act of faith to initiate

change in man-made things. Schon (1983) also views design as converting the actual to the preferred.

From these definitions, it is clear that design is viewed by many authorities as a skill-oriented concept used by people in many professions to solve problems. Generally, people who believe that they are designers have been trained to quickly come up with a process that generates creative approaches to solutions and bring them to reality; every designer must be familiar with both content and process. This is why it is easier for designers who have trained in one area of specialization to simply have greater dexterity in moving through the process of product development, since they have a knowledge database about specifics in the field. Design criteria are determined based on four basic factors namely: characteristics of individuals involved as users of the design product; the specific tasks performed by these individuals; the environmental condition where these tasks are performed or where these individuals thrive and; materials available for design.

Motorcyclists were studied as potential users of a product that will meet the specific needs of their profession in a tropical environmental condition where temperatures could be high and the environment hot and humid. The needs assessment study resulted in a number of criteria identified for the prototype jackets. These criteria were based on the fact that the apparel

ensemble design should be aesthetically pleasing; design should accommodate body movements around the work environment; design should fit a range of sizes and figure-types; provide adjustable closures for easy donning and doffing operation; apparel should be comfortable; accommodate personal items like cell phones and money during riding operations; design should protect against water/chemical intrusion; design should enhance self and professional image; design should be capable of mass production; apparel should be affordable and easy to care for; design should adequately cover body parts susceptible to weather hazards; it should be visible from a distance and it should be generally acceptable in the local area of operation.

Several needs assessment studies have been conducted to address the articulation of values underlying needs in clothing. Illmarinen, Tammela and Korhonen (1990) conducted a needs assessment study of new functional work clothing for meat-cutters. Interviews with the wearers revealed a need for protective clothing from extreme cold environmental conditions that allowed mobility and flexibility of the hands and arms. Prototype work clothing was developed and wear-tested, design changes continued until a final set of work clothing were produced.

Another needs assessment study by Lee, Sontag and Slocum (2002) determined the perceived needs of apparel manufacturers in Michigan with a view to making their firms more competitive than at present. Some of the needs identified were categorised under

- (a) product development, pricing of products, advertising and promotional strategies, identification of target markets, (b) training of employees, labour supply and productivity, (c) new equipment and machinery maintenance of equipment, computer use, (d) taxes.

The unique feature of this study was the identification of specific needs within each main needs category. In each category, improvement and optimisation of functional roles was needed to make firms more viable than at present. In a study conducted by Brandt and Cory (1989) the needs of clean room workers in a microelectronic and semiconductor industry were assessed. The industry recognised that the garments in use at the time of the study were incapable of isolating and protecting microelectronics and semiconductors from the contamination generated by personnel. A two-year investigative process revealed the design criteria necessary to develop new clean-room garments. Alexander (1998) carried out a study on needs assessment for flight attendant uniforms. This study

enabled the researcher to gather the preferred design criteria necessary to develop an ideal flight attendant uniform different from the one in use at the time. Most of these needs assessments were conducted as part of a wider research process.

In clothing research therefore, needs assessment is an inevitable task that designers, researchers and other related personnel must not overlook. The physical, socio-psychological, thermal, movement, activity and impact assessment must be thoroughly done in designing clothing for specific purposes and functions. Several other studies have used needs assessments to examine clothing needs of various populations. Bergen, Capjack, McConnan & Richards (1996) worked on neonates; Yoo, (1996) worked on petite and tall-sized women. Thompson & Anyakoha (2012) used needs assessment to determine cosmetologists' functional apparel needs. Needs assessment studies have also been used to determine task-related clothing needs for female bicycle riders, dancers, tennis players and clean-room workers (Barker, 2007). Clothing needs identified in these studies ranged from physical comfort, garment function, fit and design, wearer preferences to garment appearance/attractiveness and protection.

The needs assessment literature exposed several areas of need related to the practice of motorcycle riding operations. These include socio-psychological assessment which addresses clothing preferences of the users; values that will affect the ultimate acceptance of a garment and tolerance of specific design features. Activity assessment which includes an in-depth observation of activities as performed in the natural setting, movement assessment meant to determine whether clothing interferes with motorcyclists' performance of tasks, impact assessment, which determines areas of the body impacted by water, physical and thermal assessments are all areas of need that greatly directed the design of prototype jackets for motorcyclists in rural communities of Akwa Ibom State, Nigeria.

Purpose of the Study

The main purpose of this research was the design of prototype jackets for motorcycle riders in rural communities of Akwa Ibom State, Nigeria. Specifically, the study determined criteria required for the design of prototype jackets for this population.

Research Question

What design criteria should be utilised to produce prototype jackets to accommodate the needs/activities performed by motorcycle riders in rural communities of Akwa Ibom State, Nigeria?

Design and Area of the Study

This study adopted a survey design. It was carried out in Akwa Ibom State which is one of the thirty-six states in Nigeria. It constitutes a major crude oil producing state in the south-south geopolitical zone of the country. It lies between latitudes 40321 and 50331 North, and Longitudes 70251 and 80251 East of the Meridian. The State occupies a total landmass of 7245939 Sq. km², bordered on the east by Cross River State, on the west by Rivers State, Abia State to the north and on the south by Atlantic Ocean. It comprises three major ethnic groups of Ibibio, Annang and Oron, with Ibibio language being the major spoken language. The people are predominantly of the Christian faith, and a few practising native African religion (Akwa Ibom State Investment Guide, 2008)

Population of the Study

The population comprised all motorcycle riders in the area of study, made up of all registered motorcycle riders who operate within rural communities of the 31 Local Government Areas of Akwa Ibom State at the time of the study. The estimated number of persons was 3,650.

Sample for the Study

A purposive sampling technique was used to select 195 motorcyclists for the study. In collaboration with Akwa Ibom State Commercial Motorcyclists Association (AKSCMA), 195 subjects who attended a meeting convened by the researcher made up the sample size of the study.

The researcher scheduled a meeting with members of AKSCMA group at the Ibom Hall on June 7, 2013. One hundred and ninety five members were in attendance. All of the 195 participants made up the sample for the Determination of Design Criteria Utilised to Develop Prototype Jackets for Motorcycle Riders in Rural Communities of Akwa Ibom State, Nigeria.

Instrument

Functional Apparel Design Criteria Instrument for Motorcyclists (FADCIM) was used for collection of data. The objective of the FADCIM instrument was to gather information concerning the functional apparel needs and the design criteria that represented the motorcyclists' preferences for functional clothing meant for use in their profession. The instrument evolved through two drafts. The first draft included open-ended questions, while in the second draft the open-ended question were omitted for ease of data analysis. Section A of the instrument had basic demographic information like years of service, age, educational qualification, size, locality of operations. Section B, was arranged to elicit

information on the 13-item design criteria to be utilized in the production of prototype jackets for motorcyclists.

Data Collection and Analysis Technique

One hundred and ninety five (195) copies of the design criteria instrument FADCIM were used in obtaining data from the subjects. After obtaining the responses from the study participants, the design criteria/specifications were determined. These specifications and criteria became the anchor upon which the design of the prototype jackets for motorcycle riders in rural communities of Akwa Ibom State rested. Descriptive statistics was used to analyse data obtained from the needs assessment instrument. Frequencies, percentages, mean and standard deviation were used to analyse functional apparel needs of study participants. The mean was used to analyse the design criteria obtained from the study participant. The analysis was done with the statistical package for social sciences software (SPSS). On a 5-point Likert type scale, a mean value of 3.00 > was considered satisfactory in all the variables measured. Mean scores on any variable <3.00 were considered unsatisfactory.

Findings of the Study

Based on the data analysis, the following findings were made as shown in table 1.

The table reveals the needs assessment/design criteria scale which motorcycle riders were asked to respond to. A thirteen – item, 5-point Likert-type scale of *strongly agree – strongly disagree* was presented for assessing the design criteria to be utilized in producing the functional apparel to accommodate the needs/activities of motorcycle riders. Items in the scale included such statement as (1) design should be aesthetically pleasing, (2) design should accommodate body movement around the work environment (3) design should fit a range of sizes and figure-types (4) provide adjustable closure for easy donning and doffing operation (5) design should be comfortable (6) accommodate personal items like cell phones and money during riding operations (7) design should protect against water/chemical intrusion (8) design should enhance self and professional image (9) design should be capable of mass production (10) apparel should be affordable and easy to care for (11) design should adequately cover the body parts susceptible to weather hazards (12) it should be visible from a distance and (13) it should be generally acceptable in the area of operation. The mean and standard deviation was calculated for all the design criteria statements presented as important specifications to the successful production of functional apparel geared towards user needs

Table: design criteria to be utilized in Functional Prototype Jackets
n=195

S/N	Design Criteria	SA	A	N	D	SD	$\bar{X}$	Std	Remarks
1	Design should be aesthetically pleasing	195	2	1	-	-	4.98	0.175	SA
2	design should accommodate body movement around the work environment	180	10	5	-	-	4.9	0.38	SA
3	design should fit a range of sizes and figure-types	185	5	5	-	-	4.92	0.351	SA
4	provide adjustable closure for easy donning and doffing operation	195	-	-	-	-	5	0	SA
5	design should be comfortable	195	-	-	-	-	5	0	SA
6	design accommodate personal items like cell phones and money during riding operations	189	3	-	3	-	4.94	0.388	SA
7	design should protect against water/chemical intrusion	194	1	-	-	-	4.99	0.07	SA
8	design should enhance self and professional image	190	5	-	-	-	4.97	0.158	SA
9	design should be capable of mass production	170	20	5	-	-	4.85	0.427	SA
10	apparel should be affordable and easy to care for	193	2	-	-	-	4.99	0.101	SA
11	design should adequately cover the body parts susceptible to weather hazards	165	20	10	-	-	4.79	0.517	SA
12	design should be visible from a distance	195	2	1	-	-	4.98	0.175	SA
13	design should be acceptable in the area of operation	165	20	10	-	-	4.79	0.517	SA

Note: design criteria were rated on a 5-point Likert-type scale where "5" represents strongly agree (SA), "4" represents agree, "3" represents neutral, "2" represents disagree and "1" represents strongly disagree (SD)

n=Sample size

Adapted from: Thompson & Anyakoha (2012)

Based on the outlined criteria, motorcycle riders specifically and positively agreed on eleven criteria that should be utilized for the production of functional apparel to accommodate the needs and the activities performed during motorcycle riding. The criteria and the mean scores on the items were as follows: design should be aesthetically pleasing ($\bar{X}$ =4.98, SD=0.175); design should accommodate body movement around the work environment ($\bar{X}$ =4.90, SD=0.380) design should fit a range of sizes and figure-types ($\bar{X}$ =4.92, SD=0.351) provide adjustable closure for easy donning and doffing operation ($\bar{X}$ =5.00, SD=0.000) design should be comfortable ($\bar{X}$ =5.00, SD=0.000) accommodate personal items like cell phones and money during riding operations ($\bar{X}$ =4.94, SD=0.388) design should protect against water/chemical intrusion ($\bar{X}$ =4.99, SD=0.072) design should enhance self and professional image ($\bar{X}$ =4.97, SD=0.158) design should be capable of mass production ($\bar{X}$ =4.85, SD=0.427) apparel should be affordable and easy to care for ($\bar{X}$ =4.99, SD=0.101) design should adequately cover the body parts susceptible to weather hazards ($\bar{X}$ =4.79, SD=0.517) it should be visible from a distance and ($\bar{X}$ =4.98, SD=0.175) it should be generally acceptable in the area of operation ($\bar{X}$ =4.79, SD=0.517). The mean and standard deviation was calculated for all the design criteria statements presented as important specifications to the successful production of functional apparel geared towards user needs.

DISCUSSION

Major functional needs/criteria for motorcycle riders were identified in the table earlier presented. It became

necessary for a needs assessment to be carried out to establish the functional apparel needs of motorcycle riders before embarking on the actual design of a functional apparel product for this occupation. As observed by Barker (2007), several studies have used needs assessments to explore clothing needs for variable occupations. These studies include design clothing for neonates (Bergen et al; 1996) and for petite and tall-sized women (Yoo, 1996). Needs assessments have also been used to determine task-related clothing needs for dancers (Turk & Black, 2003), tennis players (Chae, 2002), soccer (Holland, 2007), female pear farmers (Choi & Ashdown, 2002), female flight attendants uniforms (Alexander, 1998), design criteria for cosmetologists functional apparel (2012) as well as uniform design for food service workers (Workman, 1991). Apparel needs identified in these studies were physical comfort, fit, mobility, wearer preferences, garment appearance/attractiveness, protection and safety and general garment function. These became the foundation upon which the design criteria needed to produce the prototype functional apparel to accommodate the needs and activities of motorcycle riders established.

Result showed that mean values ranged from 4.85 – 5.00, which was a positive indication that all the respondents strongly agreed that all of these criteria were important specifications to the successful production of prototype functional jackets geared towards user needs. The perception of the motorcycle riders was again needed to support the findings by Watkins (1995) who asserts that the major objective of

functional apparel design is to address both individual and task-related needs geared towards wearer safety, improvement of job efficiency, enhancement of comfort, movement and the self-concept. In support of this assertion, Sindicich (2008) also states that design criteria should be established by the design researcher in the initial steps of the design process to ascertain that finished products meet these requirements.

CONCLUSION

A major challenge of the functional apparel designer is to meet the complexity of clothing needs of an individual in a specific situation. There are many clothing needs as they are solutions to them. It is therefore important to deal with an interrelatedness of these needs in the development of ensembles to serve multiple purposes. Each clothing situation generates a wide variety of often conflicting criteria. These conflicts pose major challenges to designers. Practicing designers however know that in real world setting, the criteria for each design problem are endless. Therefore there may be endless conflicts to resolve in any final design.

RECOMMENDATIONS

Home Economics lecturers and students should utilise the findings of this study to tackle design problems in clothing, textiles and interior design/decoration aspects of Home Economics programmes.

The findings of this study should be made available to apparel industries and manufacturers in Nigeria to encourage the production of functional apparel based on established criteria obtained from the needs assessment studies in other occupations as well.

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