A study of **User preference** for the **Visual domain** of product form

Ravi Mokashi-Punekar
Roll Number: 0161501

Under supervision of
Prof. K. Ramachandran

Department of Design

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Indian Institute of Technology Guwahati
Guwahati 781 039

CERTIFICATE

The thesis presented here in titled: **'A STUDY OF USER PREFERENCE FOR THE VISUAL DOMAIN OF PRODUCT FORM'** by Mr. Ravi Mokashi-Punekar, was undertaken under my guidance and supervision. The volume of work presented here in for the Degree of Doctor of Philosophy of Indian Institute of Technology Guwahati was not submitted by him earlier for any other degree or diploma.

He has undergone four specified courses and fulfilled all the requirements as mentioned in the rules and regulations for submitting the thesis for the PhD degree of Indian Institute of Technology Guwahati.

K. Ramachandran

Professor, Department of Design

Indian Institute of Technology Guwahati

Guwahati 781 039

Assam, INDIA

A temple bell sounds
in the morning.

Heard amongst rays of
the early sun that
escape mango leaves,

At home
are deep
yearnings for elders
who have left.

This dedication is
a humble offering.

- For Dada, Avva and Baba

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Ravi Mokashi-Punekar

ABSTRACT

Introduction

There are new opportunities in Design practice and research that are emerging in the Indian markets today as a result of the dramatic shift in government policy since the early Nineties. Liberalization of the Indian economy has led to major transformations in the economic environment of business and commerce. Competition is felt with global players entering Indian markets and Indian industries have had to remodel their approaches to meet these challenges. Foreign companies seeking opportunities in Indian markets are faced with challenges of understanding the diverse culture of India. What is obvious is an urgent need to understand the ethos and aspirations of the Indian customer and make changes in management strategies, including design and communication which meet these dynamic changes. This implicitly means understanding regional and cultural factors that influence taste. It becomes an important consideration to study this phenomenon in the context of its influence on design and its implication on business. Design researches that involve cultural responsiveness and its influence on business therefore need to be looked at with a fresh perspective.

The study of the Indian user, the cultural values and taste in purchase decisions are increasingly being examined through surveys. While recent studies undertaken by marketing research focus on the Indian consumer, particular studies in methods that examine the preference pattern in the domain of 'Visual aspects' of product form are hardly in vogue. This aspect is of particular interest to the industrial designer and forms an important consideration in the creation and innovation of new products for the market. Consumer preference in visual aspects is the focus of design research in this thesis. The thesis presents a design method that attempts to find the users' preference pattern for the visual aspects of a product.

Literature review

This section provides an overview of the current status of design methods as relevant to the development of product form, examining product form development from two perspectives:

1. A marketing research perspective with a focus on approaches to new product design and development that directly concern design conception. These include aspects of developments in product planning and marketing, user studies etc. and the approaches to requirement capture involving end users.
2. The designer's perspective who, as an important member of the product development team contributes as 'form giver'.

Literature review indicated that there is however little focus on the role of the end users and their response to the visual interpretation of the product. Attempts have been made to model this complete framework of product and user interaction (Crilly, Moultrie and Clarkson, 2003). These studies trace the various development stages in the product development cycle focusing on the importance of consumer response to the visual domain in product design. They propose a model that outlines a frame work for such a study and the scope it offers for designers in their process of design and design decision making. However there is no outline of an approach or method of how to conduct such a study which this thesis hopes to formulate.

The present thesis has evolved an approach that will focus on the study of user response to product preference fulfilling a real need in design studies: a study of the visual aspects of product form.

Identification of the Problem

The design methodology in Industrial Design draws from different knowledge domains but aims to culminate in the design of products / artifacts or communication system that meet identified user need. An understanding of socio-cultural consideration vis-à-vis users' needs and aspiration becomes a critical domain of research.

This factor has gained importance considering that business today operates at a global level. Products/artifacts designed are to meet aspirations of users across different cultural/religions and economic class of users. However user responses to the 'Visual' in product form have not received sufficient attention as a domain of design research.
Will a study in user response and preference of the 'Visual' parameters in design lead to pointers that may influence the act of designing and design decision-making? Can a methodology for design research be evolved to evaluate these visual parameters that will help to examine user response to the design of shapes and forms of products? Will such ethnographic research lead to interesting new dimensions in understanding patterns in product form preferences of specific cultures? Will they add to the knowledge in understanding design in the context of 'the global and the local'?

Industrial Designers in India have a unique opportunity to study and research into form preferences amongst target user, giving insider (Emic) perspective to this study.
It could form a significant knowledge base for both national and international agencies that focus on manufacturing and marketing of products / product systems for the Indian market.

Visual studies of this nature are few and far in between, particularly in the Indian context.

This thesis uses an empirical methodology involving user response to two dimensional images. The data assimilated form the basis for studying preference patterns for artifacts / objects of every day use. It presents the findings of the study undertaken for digital camera as a case study.

Hypotheses

Preference patterns amongst specific user segments for the visual domain of product form constituting aesthetic elements: volume, plane, line and color and their inter-relationships do exist.

An understanding of this local preference pattern of user segment can influence design decision making in form generation of products for that segment. There is need to evolve a design research methodology to study user preference for the visual domain in product form.

Considering one product category as a case, the design research study has examined visual factors for a digital camera in the context of Indian users.

Aim and Objectives of the Thesis

The aim of this research study is to evolve a method that seeks Indian users' preference for the visual aspects of product form for a chosen product category and to examine if the inferences drawn from the study indicate cultural basis for product form preference.

The objectives of this study are to be met through the following means:
- To evolve a methodology to measure the user preference for visual aspects of one selected product viz. the digital camera.
- To conduct empirical studies in a geographical location such as Guwahati from amongst a cross-section of users with different profiles. It plans to outline two empirical studies – one qualitative and the other quantitative in its approach to examine the user response to the visual and draw inferences from the results generated.
- The findings could form the basis for a design brief in the visualization of new concept/ ideas.

Planning the Empirical Research Methodology

The empirical methodology includes the following aspects:
1. Identification of visual elements through Product Form Studies and analysis.
Based on features of the camera, visual elements that constitute the interface between the user and the product are analyzed for their denotative and connotative aspects.

2. The form generation process of the camera is identified through some case examples.
3. Based on identification of the visual elements relevant to the form generation of a camera, a 'visual flipchart album' and a questionnaire to garner user response to the visual domain of product form were planned.
The final approach to conducting the survey and evaluating the user response so generated included
-A questionnaire and response sheet
-A 'visual form' directory to examine form elements; their inter-relationship and aspects of form attributes
-Outlining the user profile
-Documentation of the visual environment of product use.

Empirical Studies and Experimental Results

This section summarizes the user studies that were conducted through two experiments by applying the visual research methodology for the selected product category. Data on user preference for 'visual' form was generated.

Empirical study 1: Focus Group Method for study of preference for product form of camera

The first experiment was Qualitative in nature based on Focus Group approach following the MaxDiff method. The total sample size was of 51 respondents. 10 -12 respondents were invited to participate at a time. Three sets comprising of 143 visuals constituting series Form Elements (FE series with 41 images), Form Attributes (FA series with 80 images) and Form of the camera (FC series with 24 images) were presented. Observations were made of the respondents as they went through the visual flip book as they were administered the same. The response sheet was collected at the end and the results tabulated.

Through this approach it was possible to have one on one interaction and to observe the difficulties and responses of the respondent when they were undergoing the test. From experiments conducted it was observed that at best the results gave indicative user preference patterns of 'most preferred' of the product forms. For the purpose of seeking overall preference indicators for product form, the respondents found the visual aproach easy and interesting.

Empirical study 2: Quantitative Method for study of preference for product form of digital camera

The second experiment was an On-line survey conducted through the local network. Within the constraints of limited resources available and the cost of conducting such a survey, the experiment was set up for a sample size of 250 respondents. It was quantitative based involving 'Most Preferred' choices sought from a population of approximately 3500 residents staying on a technical institution campus coming from different regions of the country. Intimation was sent through e-mail posted on the intranet inviting them to participate in this research study. There were 498 hits of which 252 respondents completed the survey in all respects. This sample size was taken for analysis and drawing inferences. The methodology combined approaches that included responses to a Questionnaire and also seeking respondents using a 'visual image' based format presented in two series viz. Camera series (FC Series) and Form Element Series (FE Series) comprising of 58 visual images. The preference patterns were examined by seeking 'most like' preference as outlined in the MaxDiff method.

The data collated was subject to Frequency tabulation and Cross tabulation. The results were analyzed to draw inferences from the data generated.

Conclusions of the research with inferences influencing design decisions

The methodology evolved sought user response to the visual domain of product form elements, product attributes and product features for the digital camera from three positions:

1. The FC series accomplishes the 'true user response to the product under study'
2. The FE Series introduced visual cueing to the user and through that mode sought to find the imagined associations with respect to the camera and its product attributes
3. The questionnaire sections sought users' response to product features, product use and product aspired for.

Such a holistic perspective, it was felt, was sufficient to help understand users' preference pattern for the product under study.

The summary of inferences drawn and conclusions were verified against the aims of the research project.

CONTENTS

List of Figures

Photo Credits

Images for the case study of the creative process of product form development for a camera are courtesy Meisei Publications, Japan and Rikuyo-sha Publications, Japan.

Source 1: (For SLR cameras)
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Source 2: (For Autofocus cameras)
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List of Tables

Chapter 1 Introduction

INTRODUCTION

1.0 Introduction

In our living environment we are surrounded by man made objects and goods that mirror the state and evolution of society. The designer's era is part of the post-industrial society and culture which has been driven by scientific and technological developments. Interchangeable objects form an integral part of our everyday lives. Today the study of the language of objects (references, appearances, components, use…) has acquired complex overtones and the boundaries between art and industry have melted away. Objects evoke varied emotional relationships, reflecting the social and cultural values prevalent in our society.

> *Goods are neutral, their uses are social; they can be used as fences or bridges.*
> (Douglas and Isherwood 1991)

Raising the basic question on consumption, Douglas and Isherwood (1991) state that people buy goods for two or three restricted purposes: material welfare, psychic welfare, and display. The first two are needs of the individual person; the last is a blanket term that covers all the demands of society. The authors argue that consumption has to be recognized as an integral part of the social system that accounts for the drive to work, which is itself part of the social need to relate to other people. Goods can thus be seen as materials that mediate between people.

A visit to a shopping mall is an experience in understanding the influence that the world of objects and artifacts have in our everyday lives. They stand witness to Maslow's theory of the hierarchy of needs. Examining product life cycles we find that these objects are conceived, are used and they die. The design and creation of these objects forms an integral part of this product life cycle. What is Design? What is the role of the Industrial Designer in this cycle of product creation? Who manufactures these products and what is the engagement of technology in the process of this creation? How are these products sold? Who buys them? These questions help to locate the complex parameters that are involved in the act of creation of products and product systems.

This chapter outlines new opportunities in Design practice and research that are emerging in the Indian markets today as a result of the dramatic shift in government policy since the early Nineties. Liberalization of the Indian economy has led to major transformations in the economic environment of business and commerce. Competition is felt with global players entering Indian markets and Indian industries have had to remodel their approaches to meet these challenges (Bijapurkar 2001).

As the Indian retail market expands, information relating to marketing has acquired greater significance than at any time in the past. Market research is an activity that studies the needs of consumer in relation to particular goods and services.

As companies move from local to national and to global marketing, their managers need information much faster than at any time earlier. With the disposable income of the consumer growing faster, the consumers are also becoming choosy and marketing has moved from serving what the consumer needs to what he/she wants. If the sellers are to cater to the tastes of the consumer, then they require precise information about market trends.

With competition moving from pricing to non-pricing issues, the sellers turn to market research as they increase the use of branding, product differentiation, advertising and sales promotion and want to know how effective these marketing tools are.

New techniques and management practices are being adopted, including product planning, in the development of innovative products. 'Design for Delight', 'Design for Pleasure' are the current mantras in marketing parlance. This has resulted in new design opportunities. Foreign companies seeking opportunities in Indian markets are faced with challenges of understanding the diverse culture of India. What is obvious is an urgent need to understand the ethos and aspirations of the Indian customer and make changes in management strategies, including design and communication which meet these dynamic changes. This is often referred to in business parlance as studies in Business Intelligence (BI). This implicitly means understanding regional and cultural factors that influence taste. It becomes an important consideration to study this phenomenon in the context of its influence on design and its implication on business. Design researches that involve cultural responsiveness and its influence on business therefore need to be looked at with a fresh perspective.

The study of the Indian user, the cultural values and taste in purchase decisions are increasingly being examined through surveys (Saran 2003; Harel and Prabhu 1999). While recent studies undertaken by marketing research focus on the Indian consumer, particular studies in methods that examine the preference pattern in the domain of 'Visual aspects' of product form are hardly in vogue. This aspect is of particular interest to the industrial designer and forms an important consideration in the creation and innovation of new products for the market. Consumer preference in visual aspects is the focus of design research in this thesis. The thesis presents a design method that attempts to find the users' preference pattern for the visual aspects of a product.

The current status of design methods therefore needs to examine product form development from two perspectives:

1. A market research perspective with a focus on approaches to new product design and development that directly concern design conception. These include aspects of developments in product planning and marketing, user studies etc. and the approaches to requirement capture involving end users.

The domain and scope of market research is quite large. It plays a key role in recognizing opportunities and threats, and continuously monitors changes in the environment. It also identifies and conducts research in demography, lifestyle patterns etc. that have an impact on the market. Methods applied in market research help analyze consumer and business behavior. Strategies and objectives of industries and the strengths and weaknesses of competitors are important areas that are studied. Identifying and profiling distinct buyer groups who might need different products/mixes, evaluating the potential of each segment and forecasting the product demand also fall within the domain of market research. Since distribution plays a key role in products reaching the consumers, market research helps in the selection of proper marketing channels and helps companies to design, evaluate and modify their channels in line with current trends. This tool is also important to the companies in deciding their marketing communication strategy and in pricing the product when they hit the market for the first time and in varying the pricing depending on the market dynamics. It is also a valuable ally in assessing the success of advertisement or sales promotion activity in pushing the product in the market and in devising a strategy that would make a product look distinct from what the competition has to offer and to place it in such a way that it retains consumers' attention always.

While these aspects of market research are eminently interesting, this thesis will restrict its scope of study to focus on approaches to identifying requirement capture of the visual domain of product form. This approach in formulating a basis for form giving has an important role in the development of new products and in identifying the reasons that might impact the consumer response.

2. The designer is an important member of the product development team who contributes as 'form giver'. The designer approaches form visualization through various means. These include a constructivist approach involving an understanding of the syntactic elements of product form (Hannah 2002 ; Akner-Koler 1994) and a semantic approach involving a search for meaning through visual form (Krippendorf and Butter 1984; Lannoch and Lannoch 1989; Smets and Overbeek 1995). Recent studies have engaged the designer in a search for understanding human thought processes in his interaction with the product. Psychological parameters involving the emotions of the user are being analyzed to understand deeper cognitive structures. A number of studies on design and pleasure, design and emotions (Desmet and Hekkert 2004; Cupchik 2004) have emerged, enriching the affective understanding of human responses.
There is however little focus on the role of the end users and their response to the

visual interpretation of the product. Attempts have been made to model this complete framework of product and user interaction (Crilly, Moultrie and Clarkson 2003). These studies trace the various development stages in the product development cycle focusing on the importance of consumer response to the visual domain in product design. They propose a model that outlines a frame work for such a study and the scope it offers for designers in their process of design and design decision making. However there is no outline of an approach or method of how to conduct such a study which this thesis hopes to formulate.

The present thesis has evolved an approach that will focus on the study of user response to product preference, fulfilling a real need in design studies: a study of users' response to the visual aspects of product form.

1.1 Motivation for the project

The motivation for design research in the study of user preference for the visual in product form emerged from a project involving this researcher along with a team of designers during his tenure at the National Institute of Design in year 1999. The client was an American MNC who had a small part of their business operations based in India. With the introduction of digital technology, the traditional market for imaging products was undergoing radical changes. The earlier technology was being replaced by digital imaging technologies in a phased manner. The MNC's in-house product planning and industrial design group had initiated an ethnographic research study based on feed-back received from a select community of Indian diaspora based in the US. The preliminary design brief was outlined on the basis of this approach and product forms were generated. The client, however, having undertaken such a research from an 'Etic' perspective was eager to have views of an independent design organization located in India who could undertake a study that would offer them an 'Emic' perspective of views and opinion of form preferences and user interface preferences for their product range.

On earlier occasions the author had undertaken similar ethnographic field based research in the areas of study of traditions of Indian leather crafts. This project offered the domain of consumer product range involving ethnographic studies of urban Indian users, and their engagement with and response to contemporary technological products of every day use. How could design practice be influenced by the study of such ethnographic considerations? This curiosity formed the basis for seeking new opportunities in learning how design decision in product design may be influenced by a study of regional and cultural parameters.
Subsequent to completion of this study which was located in the state of Gujarat in the

western region of the country, this researcher relocated to the present institute, teaching at the Department of Design. This institute is located in the city of Guwahati in Assam, one of the north eastern state of the country. The landscape, its people, their tastes and cultural practices are quite different from those in the western part of the country. During the gap of time that separates the earlier study and the present, India has gone through dramatic and wide ranging changes in economic and cultural domains. Products available in the market place today could not have been imagined five years ago. Tastes have evidently changed.

Under the impact of these startling changes it seemed particularly apt to pursue research in the domain of cultural parameters. Consumer responses to the visual aspects of products formed the motivation to understand and gain insights in strengthening the approach and methodology for the subject.

1.2 Identification of the Problem

From the above considerations it is now established that design methodology in Industrial Design draws from different knowledge domains but aims to culminate in the design of products / artifacts or communication systems that meet identified user need. An understanding of socio-cultural consideration vis-à-vis users' needs and aspiration becomes a critical domain of research.

With the 'state of the art' use of technology today, products are considered as black boxes. These technological developments have led to critical studies in product and user interface to find ways and means of making the design of products more user friendly, interactive and pleasurable to use.

Studying user response therefore involves two sets of considerations. One set is the study of the different features of the product including the visual aspects of the product. The second set is at the cognitive level and includes consumers' perceptions of the product with relation to - Product function
- Product form
- Product usability
- Product maintenance

The domains of product planning and marketing on the one hand and manufacturing on the other have sophisticated methods of scientific evaluation aimed towards design optimization, quality improvement etc.

The domain of the study of the 'Visual ' with respect to the product form and its com-

munication to the user, offers considerable scope for research.

Designers have traditionally considered 'form-giving' as one of their core strengths and responsibilities. How is form generated? What is the creative process behind form generating approaches? Research in the areas of Product semantics, Design and emotions, Design and pleasure have lead to interesting hypotheses.

However user responses to the 'Visual' in product form have not received sufficient attention as a domain of design research. This factor has gained importance considering that business today operates at a global level. Products/artifacts designed are to meet aspirations of users across different cultural and economic strata. Will a study in user response and preference of the 'Visual' parameters in design lead to pointers that may influence the act of designing and design decision-making? Can a methodology for design research be evolved to evaluate these visual parameters that will help to examine user response to the design of shapes and forms of products? Will such ethnographic research lead to interesting new dimensions in understanding patterns in preferences for product form of specific cultures? Will they add to the knowledge in understanding design in the context of 'the global and the local'?

1.3 Hypotheses

Preference patterns amongst specific user segments for the visual domain of product form constituting aesthetic elements: volume, plane, line and colour and their inter-relationships do exist.

An understanding of this local preference pattern of user segment can influence design decision making in the form generation of products for that segment.

There is need to evolve a design research methodology to study user preference for the visual domain in product form.

Considering one product category as a case, this design research study has attempted to evolve a methodology that can adequately measure consumer response in the diverse Indian context. These measurements would then give indications for visual form preferences for a digital camera.

1.4 Aims and Objectives of the Thesis

The aims of this research study are to evolve a method that seeks user preference for the visual aspects of product form for a chosen product category under study as applicable in an Indian context.

The sub-themes that such a study would aim to find are:
1. Do the inferences drawn from the study indicate a cultural basis for product form preference?
2. Can the inferences drawn from the study influence and contribute to the visual design process of product development?

The objectives of this study are to be met through the following means:
- To evolve a methodology to measure the user preference for visual aspects of one selected product viz. the digital camera
- To conduct empirical studies with the methodology and examine its efficacy.

It plans to outline two empirical studies – one qualitative and the other quantitative in its approach to examine the user response to the visual and draw inferences from the results generated.

The findings could form the basis for a design brief in the visualization of new concepts/ ideas.

1.5 Planning the Empirical Research Methodology

Chapter 2 of this thesis is a literature review that surveys the various developments in the domain of product planning as related to requirement capture and examines the approaches to the development of product form. Chapters 3 and 4 focus on evolving an empirical research methodology by identifying the digital camera as one selected product category and planning two empirical studies for seeking user response to the visual elements of product form.

The methodology includes the following aspects:

1. Visual elements of the camera were identified and analyzed for their denotative and connotative aspects.

2. The process of form generation of the camera was examined through some case examples.

3. Based on identification of the visual elements relevant to the form generation of a camera, a 'visual flip chart album' and a questionnaire were planned to garner user response to the visual domain of product form.

The final approach to conducting the survey and evaluating the user response so generated included:

- A questionnaire and response sheet
- A 'visual form' directory to examine form elements; their inter-relationship and aspects of form attributes
- Outlining the user profile
- Documentation of the visual environment of product use.

1.6 Empirical Studies and Results

Chapter 4 outlines the user studies that were conducted through two experiments by applying the visual research methodology for the selected product category.

The study was conducted with respondents from a residential campus in a technical institution of higher learning in Guwahati city. Being a residential campus, respondents hailing from different geographical locations of the country stay on the campus and have participated in the research. Further the campus offered good intranet connectivity and the possibility of conducting an online survey with a large sample size at relatively low cost. Further it was also possible to go back to the respondents for personal interactions during the course of the study. The profile of the user indicated that they were fairly well versed with technical awareness and use of the digital camera.

Based on the above empirical study, data on user preference for 'visual' form was generated.

1.6.1 Empirical study 1: Qualitative Method for measurement of preference for product form

The first experiment was qualitative in nature based on Focus Group approach. The total sample size is of 51 respondents. 10 -12 respondents were invited to participate at a time. A brief outline of the aims and objectives indicated for the research study and sample sheet of the visuals were shown to the respondents. Attributes of the visual design elements of the product form / camera and the mode of circling against the identified visual in the response sheet were explained. The visuals were displayed in the order FE (1, 2, 3…) followed by FA and FC (1, 2, 3, 4….) series specific to camera under study.

Observations were made of the respondents as they went through the visual flip book shown to them, one after the other. On a few occasions suitable clarifications were given in case it was required. The response sheet was collected at the end and the results tabulated.

Through this approach it was possible to have one on one interaction and to observe the difficulties and responses of the respondent when they were undergoing the test.

1.6.1.1 Observations on the Focus Group Study Methodology

From experiments conducted in the Focus Group study it was observed that the results gave indicative user preference patterns of overall likes and dislikes of the product forms.

For the purpose of seeking overall preference indicators for product form, the respondents found the MaxDiff method easy and interesting. However the time taken in administering the test proved to be long (approximately 20 minutes) because the product forms alternatives selected were too many (Approximately 150 images presented through 30 plates with choices ranging between two visual images to five visual images).

Further the user's concentration and interest was seen to have waned while answering the questionnaire section that followed after the visual flip chart.

It was felt that the response time for administering could therefore have been reduced by selecting a smaller set of visuals and keeping the questionnaire sharply focused to the product under study.

It could also be said that the focus group approach could be more fruitful and appropriate to use at the product validation stage of any new product development process. Conceptual models or beta level prototypes could be user tested again for preference measures against the different design alternatives developed. For example, new concepts for cameras could be subject to conjoint measurement to identify relative likes and dislike of specific visual features of product form.

1.6.2 Empirical study 2: Quantitative method for measurement of preference for product form

The second experiment was an on-line survey conducted through the local network. Within the constraints of limited resources available and the cost of conducting such a survey, the experiment was set up for a sample size of 250 respondents. It involved 'most preferred' choices sought from a sample size of 252

respondents. The methodology combines approaches that included seeking users' responses to a questionnaire and a 'visual image' based format. The preference patterns were measured by seeking 'most like' preference as outlined in the MaxDiff analysis method.

In addition a study of the environment of use of the product was undertaken to gather supplementary visual data of life styles through direct observation and photo-documentation.

Considering that the sample size of the respondents was larger, appropriate modifications to the approach were made with the use of suitable software package. Further the data base so generated was subjected to frequency tabulation and cross tabulation of data to get a measure of preference pattern for specific variables such as:

- Age group vis-à-vis Frequency
- Geographical Region of origin of respondent vis-a-vis Frequency
- Literacy levels of Respondent vis-à-vis Frequency etc.

Respondents included a good cross representation of students, staff and teaching faculty residing on the campus of the technical institution. They hailed from different geographical parts of the country and were in the age group range 18-25 years and 25 to 45 years of age. Their technical awareness and comfort with the use of digital products of every day use, including the use of digital camera, is fairly good.

The on-line survey titled 'User Survey for the Preference of the Visual Characteristics of Products of Everyday use' was designed carrying forward the outline planned in experiment1 with suitable modifications.

The modifications include the following aspects.

The visual selections of product forms included series FC for cameras available in the market place and FE series for abstracted product forms. Images for the FC series were short listed from a selection of product images downloaded from the web after categorization based on identified visual attributes. They were grouped forming the FC series and the FE series. The number of visuals (58 images distributed across 16 plates) varied between 2-5 visuals per plate. The respondents were to choose the visual form that they 'like the most'.

Section two includes responses to a questionnaire involving 'most liked' preference. Questions included modes of use, preference for type of camera, photography habits, brand associations and feature choices.

The last section sought data on users' personal profile. These include age range, gender, educational backgrounds and region of origin in India etc.

Software comprising of demonstration version of Sawtooth SSi web was chosen to plan and structure the on-line survey. A data base program based on MySQL program was written to collate the user response at the back end.

The data collated was transferred into an SPSS program file and subjected to frequency tabulation and cross tabulation. The results were analyzed to draw inferences from the data generated.

1.7 Conclusions of the research with inferences influencing design decisions

The methodology evolved seeks user response to the visual domain of product form elements, product attributes and product features for the digital camera from three positions:

- The FC series accomplishes the 'true' user response to the product under study.
- The FE Series introduces visual cueing to the user and through that mode seeks to find the imagined associations with respect to the camera and its product attributes.
- The questionnaire seeks users' response to product features, product use and product aspired for.

Such a holistic perspective, it is felt, is sufficient to help to understand users' preference pattern for the product under study.

The summary of inferences was drawn from the tabulated results of the previous section and point towards users' preference patterns.

1.8 Significance of the study

Ethnographic studies with respect to form preferences in an Indian context offer diverse challenges. Factors could include the following aspects: studies in form preference; cultural influences; religious influences; economic influences; technology literacy; gender factors and regional preferences.

Identification of the different user segments becomes important to understand these influences on the design of objects and artifacts.

This thesis uses an empirical methodology involving user response to two dimensional images. The data assimilated form the basis for studying preference patterns for artifacts / objects of every day use.

Visual studies of this nature are few and far in between, particularly in the Indian context.

Industrial designers in India have a unique opportunity to study and research into form preferences amongst target user, giving insiders (Emic) perspective to this study.

It could form a significant knowledge base for both national and international agencies that focus on manufacture and marketing of products/ product systems for the Indian market.

1.9 Summary

This design research study has attempted to meet the basic objectives laid out at the commencement of the thesis. It has outlined the basic structure of evolving a 'visual method' that seeks to examine the preference pattern amongst users for the visual domain of product form. The focus has been on seeking user preference with emphasis on their choice for syntactic elements and their relationships that constitute the overall form and structure of the product. The resultant preference pattern would be an enriching input for the designer to particularly understand the context of design of 'visual elements' of the product form. The findings of the experiments prove that the preference pattern so identified can be a sufficient basis to add credence and strengthen the basis and justification for the formal aspects of new design concepts so generated. This domain will particularly help to bring more objectivity to the designers' decision making process. The softer concerns of 'product form' in any new product design and development initiative in the overall product development cycle will be thus addressed.

The results of the two empirical studies also indicate that seeking user response to product form using a quantitative approach as a part of an on going design research initiative over a period of time would give a better understanding of cultural preference patterns.

This becomes particularly pertinent when considered in the present scenario of global markets and global manufacturing. It would be very useful for the professional designer in particular and the marketing researcher who could learn aspects of user research that would enrich a design perspective.

Chapter 2 Literature Review

LITERATURE REVIEW

2.0 Overview

This chapter undertakes a review of literature that broadly covers subsections on:

- Historical overview of definitions of Design in the context of this research study.
- Review of developments in the creative process of visual form generation as a means of communication
- Product Design in the context of Product Planning and Marketing
- Review of studies undertaken in the domain of participatory design in the product development process
- Review of studies in the domain of visual design research methods

2.1 Historical overview of definitions of Design in the context of this research study.

> *To design means, amongst other things, to plan, to anticipate according to a devised course of events in view of a goal and under the influence of environment. (Wuppertal 2003)*

Design is a general concept reflected in the underlying quality of objects, actions and representations, which various people make possible in a given culture and within a value framework. In German language the term design is referred to as 'Gestaltung' or formation/ form giving'.

The use of the term Design is enigmatic and can conjure up many definitions amongst different people. Design professes to bring a marriage between the domains of art and aesthetics on the one hand and the real tangible world of materials and technology on the other in the creation of man-made artifacts and their communication through systems in the environment that surrounds us.

As may be noted the profession of Design therefore, has traditionally been associated and anchored more in practice. Developments and search for a theory in Design has been a recent phenomenon. In fact it draws theoretical frameworks from a wide variety of fields including the Sciences and Humanities and Social Sciences.

From a historic perspective four major phases may be identified as important phases in Design (Figure 2.1). Jugendstil design in early 20th century was indebted to the general

tendency towards symbolism as reflected in the arts and crafts movement. The Bauhaus movement in design that followed in the third decade of the 20th century focused on a functionalist approach that involved interaction between art and industry and understanding the social nature of design. This was followed by the Technical / Rationalist and Scientific temper that the School of Design at Ulm, Germany propounded in the 1950's which subsequently gave way to the post-modern design movements of the 1980's. These were encapsulated in catchy phrases that summed up the focus of attention. 'Form follows function' of the 1960's subsequently transforming into 'Form follows Emotion' by the late 1980's. The profession being influenced by developments in manufacturing and technology, it is not surprising to note that the changes that were ushered in led to geometric forms dictated by tight simple geometric / primitive constructs that led to products and artifacts which followed a dogmatic functionalist approach. It was referred to as 'machine aesthetics'. Post war period saw a resurrection of the market place leading to a push towards consumption. The user became consumer. Marketing era emerged. Technology developed rapidly shifting from electro-mechanical towards electronics and the immense possibility of miniaturization led to products and artifacts becoming 'black boxes'. Approach to design shifted away from products as 'material manifestations' to 'communication through material manifestations'. At the turn of the 21st century, design of products and artifacts involve digital technology. We witness a new dynamics, with possibilities emerging from the real to the virtual, from tangible form to the intangible. Design is identified as problem solving activity which involves a relationship between the designer and the beneficiary / user.

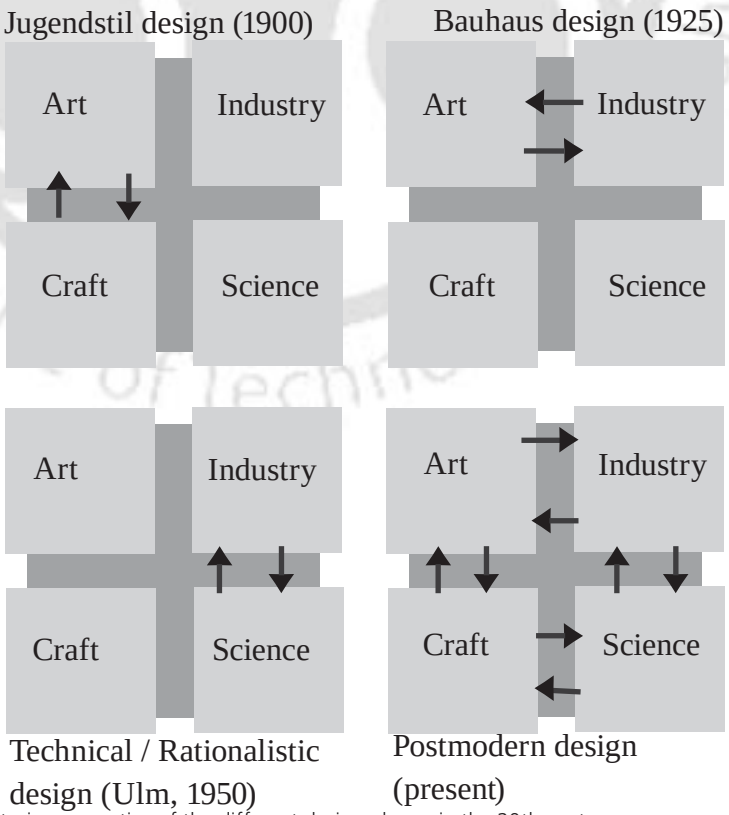


Figure 2.1: Historic perspective of the different design phases in the 20th century

2.1.1 Some definitions of Design

Summarizing a diverse variety of collated definitions of Design (Jones 2001) that have appeared, one is struck by the difference rather than similarity in the manner in which Design is defined.

"There seem to be as many kinds of design process as there are writers to write about it. One thing that is common to all the descriptions is that they all refer, not to the outcome of designing, but to its ingredients". (Jones 1970, 2001 ed.)

Some of these descriptions are summarized below:

Finding the right physical components of a physical structure. (Alexander 1963)

A goal oriented problem solving activity. (Archer 1965)

Decision making in the face of uncertainty, with high penalties for error. (Asimov 1962)

The conditioning factors for those parts of the product which come into contact with people. (Farr 1966)

Relating product with situation to give satisfaction. (Gregory 1966)

Performing of a very complicated act of faith. (Jones 1966 a)

The optimum solution to the sum of the true needs of a particular set of circumstances. (Matchett 1968)

The imaginative jump form present facts to future possibilities. (Page 1966)

A creative activity - it involves bringing into being something new and useful that has not existed previously. (Reswick 1965)

What is a recurrent theme in all these definitions is the act of creating something tangible that is manifest in the imagination of the mind. While this act is a product of an individual mind (Ranganath and Ketteringham 1986) it is influenced by many of the real world factors in the environment in which it is created. A study of those parameters that constitute the environment in which new products are created, it may be suggested, could have a bearing on and influence the mind of the person (designer) creating the product.

2.1.2 Definitions of Industrial Design

Definitions of the Profession of Industrial Design (product Design) as stated by the Industrial Design Society of America (IDSA) defines designing to be:

> *….. The professional service of creating and developing concepts and specification that optimize the function, value and appearance of products and systems for the mutual benefit of both users and manufacturers…….*

Further it states:

> *(….) The industrial designer's unique contribution places emphasis on those aspects of the product system that reflect most directly the human characteristics, needs and interests.*
> *This contribution requires specialized understanding of visual, tactile, safety and convenience criteria, with a concern for the user. Education and experience in anticipating psychological, physiological and sociological factors that influence and are perceived by the user are essential industrial design resources.*
> (IDSA 2003)

The definition stated by the International Council of Societies of Industrial Design (ICSID 2003) envelops a larger canvas including ethical issues and defines the profession of Industrial Design as:

> *…Creative activity whose aim is to establish the multi-faceted qualities of objects, processes, services and their systems in whole life cycles. Therefore, design is the central factor of innovative humanization of technologies and the critical factor of cultural and economic exchange. Design seeks to discover and assess structural, organizational, functional, expressive and economic relationship with the task of:*
> *– enhancing global, sustainability and environmental potential (global ethics)*
> *– giving benefits and freedom to the entire human community, individual and collective*
> *– final users, producers and market protagonist (social ethics)*
> *– supporting cultural diversity in spite of globalization of the world (cultural ethics)*
> *– giving products, services and systems those forms that are expressive of (semiology) and coherent with (aesthetics) their proper complexity. (…..)*
>
> *….) Therefore, the term designer refers to an individual who practices an intellectual profession, and not simply a trade or service for enterprise.*

For the purpose of this research study, the above definition outlined by IDSA will form the basis to examine its hypotheses. It aims to evolve a process that will enhance and enrich design decision making for the practising designer by an understanding of users' response to the visual in product form.

2.2 Review of developments in the creative process of visual form generation as a means of Communication

The generation of the 'Visual' in product form on the one hand and their affect on the viewer are two perspectives that have drawn considerable interest and attention amongst the design community. The influences that various theoretical frameworks drawn from different knowledge domains have had on the design profession are being reviewed to understand the integrative and synthesizing nature of design as an activity.

Herbert Read (1931) enumerates the difference in the terms 'Aesthetics' and 'Expression' in the context of plastic arts. He cites Schopenhauer who states that in the appreciation of any form of art

> *all arts aspire to the condition of music.* (qtd in Read: 15)

Referring to the visual in all forms of plastic arts, Read suggests that for any theory of art must begin with the supposition that man responds to

> *the shape and surface and mass of things present to his senses, and that certain arrangements in the proportion of the shape and surface and mass of things result in a pleasurable sensation, while the lack of such arrangements leads to indifference or even to positive discomfort and revulsion.*
>
> *"….beauty is the unity of formal relations among our sense-perceptions" . (16)*

For an understanding of aesthetics or the science of perception in general and visual perception in particular it would be necessary to engage in an understanding of:

a) Form Elements: Line, Plane, Volume, Texture, Pattern, Color and a study of the inter-relationships of these elements in form.
b) Form Attributes: Measure, Balance, Rhythm and Harmony etc.

Read states that in art, man's aesthetic sensibility is static. What is variable is the understanding which man builds up from the abstraction of his sensible impressions,

his intellectual life. And to this is formed the variable element in art, that is to say, Expression. It may therefore be safe to assume that Expression denotes more a direct emotional reaction. Expression is therefore intuitive.

Designers in their attempt to combine form with function also attempt to strive and achieve this ideal in plastic form in the product and product systems they design for the man-made environment.

Every end user who finally uses these products possesses artistic sensibilities which are shaped by a complex web of influencing factors and responds to the 'visual' in all plastic art forms. Read states that the response to the 'visual', may happen in three stages: first, at the mere perception of material qualities – color, sound, gestures and many more complex and undefined physical reactions; second, at the arrangement of such perceptions into pleasing shapes and patterns. The aesthetic sense seems to end with these two processes. There may be, however, a third stage which comes when such an arrangement of perceptions is made to correspond with previously existing state of emotion or feeling. Then it is said that emotion or feeling is given an 'Expression'. The sense of Expression is therefore derived from the earlier two inherent processes of sensuous perception and formal (pleasurable) arrangement (of products / product systems).

If in the ultimate analysis, the responsibility of the designer is one of 'form giving' (Bonsiepe 1964) and goal oriented problem solving activity (Archer 1965), then the professional designer plays a very significant role in bridging the demands of art on the one hand and technology on the other in bringing about a marriage between the demands of these two streams.

The study and analysis of the 'aesthetic' elements in product form can therefore be seen from two perspectives. On the one hand is the creative generation of product form by the designer and on the other is the reception by the user in relation to the interface with the 'visual' in product form. This may perhaps lead one to examine if a study of the users response to product form would enhance and influence design decision making during design of new product and product systems.

2.2.1 Studies in development of Visual Form

Significant studies in approaches and means to the development of visual form in the post industrialization era are being reviewed. The most significant amongst these have been the methods developed in Germany at the Bauhaus School of Design by Walter Gropius, Marcel Bruer, Josef Albers and Paul Klee and subsequently at the School of Design, Ulm by Maldonado, Gui Bonsiepe, Mohaly Nagi, and others. The Foundation program at the Bauhaus introduced a number of basic courses to study

'aesthetic principles' in form generation by exploring assignments in non-functional form generation, colour and visual order through a process of 'learning by doing'. These approaches have left their mark in influencing design education methods in design schools across the globe.

The study of visualizing and analyzing three dimensional forms is brilliantly covered by the experiments undertaken by Rowena Reed in her design courses with students at the Pratt Institute, New York. She encouraged her students to "think with their eyes" (Hannah 2002) to understand the 'principles of visual relationships' that helped to bring visual thought into the 3-dimensional world.

Based on Constructivism, Rowena Reed proposed an approach to form analysis by classification of visual form elements in the following manner:

Analysis of form

Basic Elements	***Dimensions of Elements***	***Variations of Dimensions***	***Form Characteristics***
Volume -	*3-D*		*Massive Positive Elements*
Plane -	*2-D*		*Superficial Negative Elements*
Line –	*1-D*		*Extensional Linear and Curvilinear*
Point –	*0-D*		*-*

Principles

• ***Proportion***	*- Extensional; Superficial; Massive*
• ***Movement***	
	– Axis : Primary / Secondary / Tertiary
	– Axial Movement: Inner / Continual / Directional
• ***Forces***	
	– Strength: Weak / Strong
	– Scope : Focused / Spread / Neutral
	– Directionality: Concave / Convex
	– Angularity: Accentuated / Neutral
• ***Relationship***	
	– Transitional Forces - Divide; Adapt; Merge; Distort
• ***Order***	*– Dominant; Sub dominant; Subordinate*

- ***Joining Relationship Axial Relationship***
  - *Oppositional / Adjacent / Across / Parallel*
- ***Attributes***
  - *Heavy Light / Fast Slow / Static Dynamic*
  - *Rhythm*
  - *Orientation*
  - *Integration / Differentiation of Form*
  - Form Transformation

Source: Cheryl Akner-Koler, Three - Dimensional Visual Analysis, Institutionen for Industridesign, Konstfack, Sweden 1994

Figure 2.2: Reed's classification of visual form based on syntactic elements

Reed demonstrates the strength of visual analysis of form which includes:

- Visual Elements and their properties
- Movement and Forces
- Relationship
- Organization

Within this frame work there are several underlying principles that are central for application of this 3-dimensional visual approach.

- Recognizing an interdependence between form, movement and space
- Visualizing the inner movement and structure of form
- Prioritizing asymmetry
- Deconstructing a composition in a logical sequence from inner structure – movement / volume / plane / line / point
- Perceiving 3-dimensional composition from a number of different views in order to group their all-roundedness

Cheryl Akner – Koler (1994) a student of Rowena Reed highlights these approaches to the process of 3-dimensional form generation and its analysis. She introduced assignments based on syntactic elements of form to her students at the Institutionen for IndustriDesign in Konstfack, Sweden. These approaches to form generation follow non-functional and abstract approaches to the appreciation of form as an aesthetic experience.

Such an analytical approach has been considered in the context of how visual form could be analyzed and presented in seeking user response to form in this thesis.

2.2.2 Design as Communication

Design can also be perceived as the communication of meaning through the means of signs. Under the influence of the work of Roland Barthes in his book *Mythologies* (1977), attempts have been made to interpret and analyse Design in the context of a semiotic framework. These studies have considered aspects of types of representation, consistency of representation, means used, type of interpretation and relation between the design and the final product (may it be in the domain of product design or communication design). New theoretical frameworks have evolved.

These recent developments in Design theory therefore now look at the domain of formative and analytical aspects of design as one of communication of signs. In Design communication takes place through the language of drawing. We may remember the ancient Indian text *Vishnudharmottar*- a treatise on the sacred art of image making (4th Century AD) which mentions very succinctly that the visual world which forms our experience is a construct of just two basic visual elements - the curved line and the straight line. All visual signs are a construct of its combinations.

In his article 'Drawing, Design and Semiotics' the author Clive Aswin (1984), develops a theory of drawing based on semiotics. He states that in verbal language individual signs (words) are combined in a linear sequence that permits analysis in terms of both the meaning of each sign and its position within the syntax of the sequence. For this reason verbal communication has been described as a discursive system. Pictorial communication usually presents interpreters with manifold ensembles of signs rather than sequences, and interpreters must make a order of presentation, perhaps attending first to the whole and then its parts, or vice versa. For this reason he states that pictorial systems have been described as presentational, as opposed to the discursive systems.

Although applying the concept of syntax to pictorial imagery may be difficult, he suggests that it makes a very useful analytical tool for the study of drawings, and this is true for the whole area of semiotic theory.

Thomas Ockerse (De-Sign/Super-Sign 1984) carries this further by focusing on the generative approach to signing, with attention being directed towards the pragmatic relations of signs. Considering the graphic designer as problem solver and critical mediator in the formulation of sign processes and visual language systems, he argues that the system is a 'language' wherein the word language is generalized to refer to the form and not the content. Visual language, he states, typically has this 'form' association. For most part visual language involves the development of syntactic relations (e.g. area, contrast, sequence, hierarchy, proportions etc). As an axiomatic system the visual can function as a dynamic meta-language for the rules of operational relationships of each visual element to the others.

Further the word 'language' he states is most frequently used to mean a 'context relationship' and that the sign represents a process called semiosis at the end of which results knowledge. Language is a set of signs that functions in a particular organized fashion: a system of signs. The components of the language are:

Syntax (relations between the signs and how signs are constituted)
Semantics (what signs convey)
Pragmatics (what signs are used for and how).

Signs are therefore, entities through which we define context, while language is the system that fosters relationships amongst signs i.e. language is a communication activity in which signs are viewed in their specified semantic relations. The combined potential or unity of visual and verbal systems will result into what will be referred to as 'Visible Language' (i.e. Language in its social/communicative reference made visible).

He opines that the producer of visible language faces three problems:

1) The problem of 'de-signing': this is a degenerative process wherein selectivity plays an important role. It specifically concerns a desired or necessary control in the reduction or elimination of the so-called 'noise', that has or may potentially have an undesired effect upon the communication.

2) The problem of defining the so-called 'super sign': this means to provide a rational system for communication wherein the sum forms the major role for signification. The whole is actually a sign made up of other signs; more precisely the super sign is a sign system. It includes all signs that operate within the system or that can influence the system. Involved are potential layers or levels of information (in terms of importance, denotative and connotative references) for the reader/viewer. The super sign is like a text but its potential is even inter- textual, a characteristics of signs. In fact the super sign concept even provides a system that invites the reader/viewer to become an active participant in the generative process.

3) The last is the problem of defining the appropriate means/devices/relations to unify the parts that are in themselves language systems, such as the visual, verbal, gestural. For the designer; this means an extensive semiosis:

- relations among the object /representamen and intepretant or sign mediation amongst form / representation and context.

- between intentional and unintentional signs; among cultural, group, and individual conventions.

In other words the designer seeks to reconcile the center of communication between the sender and receiver, client and consumer, producer and user.

This particularly involves defining certain appropriateness in the syntax, semantics and pragmatics of the language. As such the end result of a super sign should be self contained mediating quality, a meta-language that guides the viewer / reader to the super signs desired effect.

2.2.3 Semiotics in Product Design

Applying the principles of semiotics in Product Design can provide a set of valuable tools for analysing issues like identity, metaphors and visibility in artifacts. It may perhaps help precipitate an appropriate method to design artifacts so that they are easy to use and understand.

Reinhardt Butter and Klaus Krippendorf (Product Semantics 1984), argue the challenges posed to traditional semantic theory when applied to the context of Design. Linguistic expressions distinguish between sign, referent and thought. While linguists often distinguish between the world of language and the world of non-linguistic phenomena and locate meaning in the relationship between the two.

How would this be applicable in the context of design of a product? According to them objects cannot mean anything by themselves. They argue that this when applied to the context of perceiving and acting on artifacts, the object and their representations of the semiotic triangle (in language) are collapsed and become one.
In the context of product design, they state:

> *An objects form says: first something about the object itself; second something about the larger context of its use; and both to the user who interacts with it and develops the conceptual connection. An object's form does not say what it is. Rather, the object is what it says to the user'. Artifacts therefore have their own representation, but in the context of interaction with users.*
> (Krippendorf and Butter 1984)

Therefore the response of the user to the object may yield some of the following categories of responses:

- The category to which it belongs (its identity)
- The apparent qualities (attributes)
- What it is similar to (similes, revealing metaphors)

- What it is for (purpose and context of application)
- How does it work (principle of operation, target)
- How to handle it (principle of manipulation)
- How would (can) buy or use it, price (user access)
- What does it make of its user to be (user identity)
- What do others say about user (social integration/differentiation)
- Material
- Method of production, producer, designer
- History and mythology of which it is (was) a part
- Next user, disposal, ultimate beauty.

The meaning of an artifact is therefore the sum total of all the contexts in which it can occur including all that can be said about it.

One task of product semantics is to study the constraints artifacts and contexts impose upon each other. It explains the cognitive processes that connect artifacts with things in the context and how these form coherent wholes.

In a subsequent paper Krippendorf (1992) reconsiders his earlier framework and proposes the following three conceptual models for making sense of artifacts: viz. Ecology, Genesis and Cognition. He argues through these concepts that designers ultimately do not design objects but design use, which is an informed interaction involving users, material entities, and symbols. The artifacts are mere sign vehicles through which

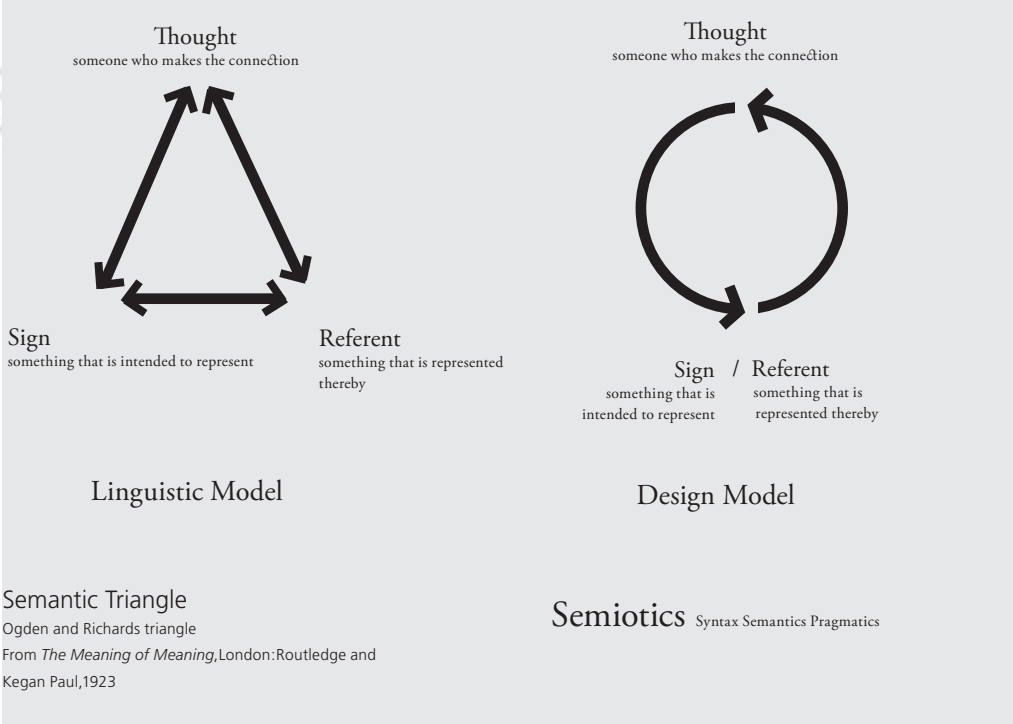


Figure 2.3: Model of the semantic triangle

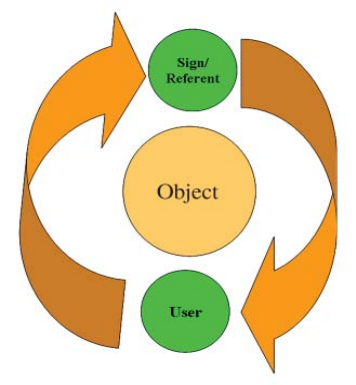


Figure 2.4: Semantic model adapted in product design

users are enabled to create patterns of interaction.

The practical consequences of design with the semantics of artifacts are:

1. A concern with processes not with objects that merely participate in it and are merely contributory to human interaction.

2. A concern with the symbolic order of a culture not with the technological/rational arrangement of objects. It is through the symbolic order that the life of individuals become meaningful.

3. A concern with the user as a human being; neither with a buyer who is no longer of interest to industry once he has bought what he or she was asked to nor with the consumer who is of interest only to the extent he or she consumes.

4. A concern with the environment of humans both symbolic and material; by preventing semantic pollution that decomposes the symbolic connections between things, materials, by slowing down or minimizing entropy.

5. A concern with liberating people from technical determinism (i.e. from the fact that we tend to surround ourselves with things without apparent use and seem to live to keep an industry running that may no longer increase our psychological, social and political well being.

Sara IIstedt Hjelm (2002) traces the terminology drawn from the field of Semiotics and elaborates on how it can be understood in a design context. Design may be examined as communication in the domain of product design involving an inter play between

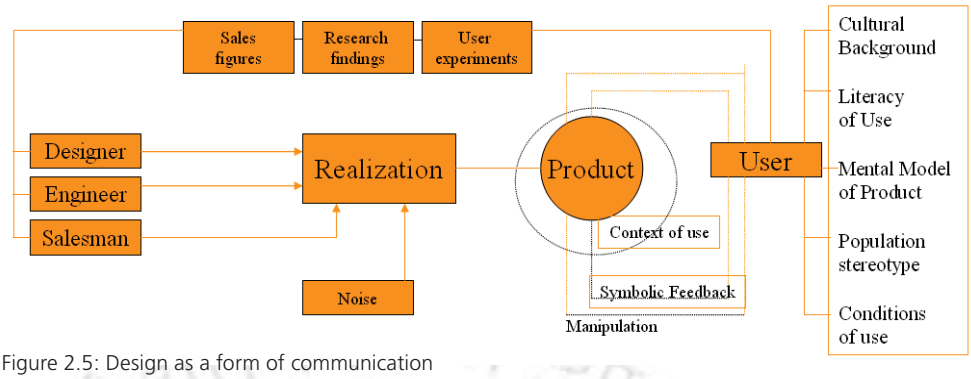


Figure 2.5: Design as a form of communication

meaning and form. She proposes that product semiotic considers the correct way in which to design artifacts so that they are easy to use and to understand. She traces the works of: Rune Monö (1997) who have developed a language of form for product designers mainly based on Pierce and Karl Bühler; and the works of Susan Vihma (1995) who has attempted to develop guidelines and tools for designing and analysis of products. Vihma proposes an approach based on the concept of icon, index and symbol. She suggests looking at products from two perspective phases –

> i) that of the process of creation of the product i.e. from conception to its final location of use in the market place and
>
> ii) to look at it from the perspective of the market, in use, and then as, used material.

This is a point of view also suggested by Krippendorf and Jonas.

Hjelm argues, however, that while these works help designers who want practical support in their approaches, they may be limiting and restrictive in the context of analyzing artifacts in a cultural context. In this, she states that semiotics has moved away from classification of sign systems to the study of how meanings are made. It is thus concerned with communication: with 'construction and maintenance of reality'.

> *Meaning is not 'transmitted' to us – we actively create it according to a complex interplay of codes which we are normally not aware. (2002)*

Research studies undertaken by Athavankar (1992) are based on classification theory as a means of understanding form perception. However, it is interesting to note that Athavankar in his later research papers (1994; 1997) cites examples from the Indian context and states the limitations of classification theory, which is unable to explain

convincingly when cultural considerations enter the domain of creation of meaning. These studies corroborate with the views raised by Hjelm.

In a situation of multi faceted cultural diversity seen in a country like India there are exciting possibilities in understanding the role of the user in the context of contribution to creation of meaning in man-made objects. It is an interesting domain of research that needs further explorations. Here the classical model based on information theory proposed by Shannon (1949) has been extensively adapted that considers design as communication of information. This presumes that there is a sender of information, a receiver and a message, the message being transmitted from the sender to the receiver through a channel. This model Mono extends to design to consider design as a process of communication.(Figure 2.6)

This section has explored developments in theoretical frameworks in form giving during the creative ideation phase of design development activity. In the next sub section, we review aspects that the marketing professionals consider as part of their product planning initiative in new product development. This will help to understand real world issues that emerge in the study of the interface between the user, the product and the environment of use and its influence on design decision making.

Basic model of communication (adapted from Shannon)

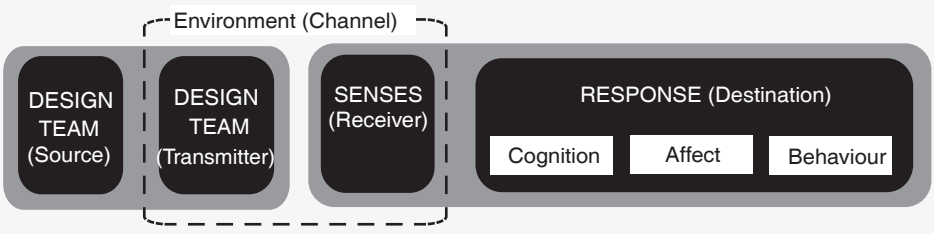


Figure 2.6: Basic framework for design as a process of communication

2.3 Product Design in the context of Product planning and Marketing

In an increasingly competitive business environment, any successful Product development cycle has to consider five specific dimensions that contribute to the assessment of the performance of the product development effort, viz. product quality, product cost, development time, development cost and development capability (Hayes 1989). The nature of this process is interdisciplinary and requires contributions from nearly all sections of a business firm. However, it is well established in business practice that the contributions of the marketing function, which mediates between the firm and its customer, contributes in identification of product opportunities, definitions of market segments and identification of customer needs.

From this perspective, it is an established fact that design function plays the lead role in defining the physical form of the product to best meet the customer needs. These include both aspects of engineering design function and those of industrial design - aesthetics, ergonomics and user interface (Ulrich and Eppinger 2003).

The manufacturing function is responsible for evolving the production system which finally produces the product. It includes aspects of purchasing, distribution and installation.

Based on the nature of the product to be developed specific composition of a development team is put together.

Any product development involves a six stage process involving:

Phase 0: Planning
Phase 1: Concept Development
Phase 2: System level Design
Phase 3: Detail Design
Phase 4: Testing and Refinement
Phase 5: Product Ramp-up

These phases highlight the nature of divergence and convergence aspects of the approach for the different phases involving analysis, synthesis, creative and evaluative aspects of the decision-making processes in each phase.

Delegation of roles and responsibilities for the various functions of the different phases of such a complex team work are well established and reflected in the overall corporate organization structure and policy of the business firm.
All issues concerning industrial design activities of the firm are reflected in the corporate organization structure and policy reflected among leading 'design led' firms where

Industrial Design policy are well articulated and implemented. For example the Industrial Design policy statement in Philips as presented in their brochure clearly establishes that their Corporate Industrial Design (CID) has been delegated the responsibility for the Industrial Design function and quality for Philips worldwide. The goals and policies reinforce the world concept for Philips products and packaging with qualitative, innovative and competitive design directed to users needs on a global scale. The objectives to be met by CID include:

1. Developing the corporate visual images: where in this function CID works towards *a strong, recognizable and qualitative corporate visual* image for all Philips products.
2. Meeting User expectations: CID uses its special skills and professional expertise in giving visual expression to products. These skills are: aesthetic sensitivity, sensibility for and expertise in the execution of form, colors, environment requirements and psychological needs, (such as cultural backgrounds, visual trends, symbolic values) and human factors. CID will apply these skills to satisfy the expectations and sensibilities of the ultimate users of Philips products.
3. Meeting production and marketing requirements: CID is responsible for integrating the above mentioned characteristics into products and product systems and the packaging development process.
4. CID will utilize its understanding of marketing, technology, materials, industrial processes in order to meet the other required functions.
5. CID will initiate and develop ways to carry out a continuous dialogue about understanding of those criteria and characteristic that achieves qualitative design.

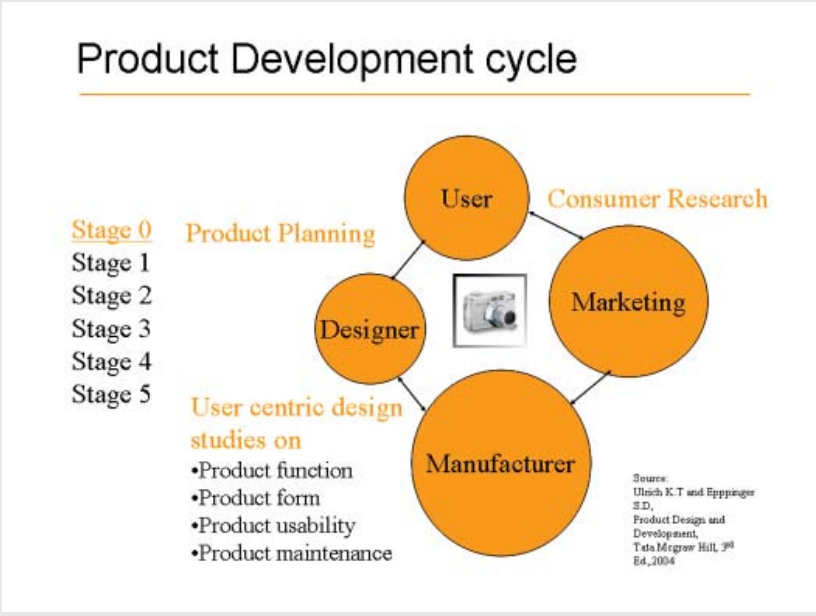


Figure 2.7: Product development cycle

From the articulated policies it is clearly evident the importance that leading firms place in the role and function of the industrial design group to the organization. It is well established that:

- The industrial design function forms a multi disciplinary product team with the product management function and the product development function.
- Industrial design function contribute on an equal basis, with its skills such as aesthetic knowledge (form, color, dimensions, environment etc.), human factors knowledge and understanding of psychological needs (cultural trends, visual trends, symbolic values etc.) to the product policy, specifications, conceptualization and visualization as defined by the multi-disciplinary product team. A well defined product policy, planning and specification should always precede the product development process.

Clearly what seems evident is that the industrial design function plays a very significant role at the top corporate decision making level in the product development cycle. It contributes significantly to create and sustain a consistent and appropriate overall corporate image of the company. The medium of sustaining the corporate image seems predominantly visual in nature. It forms the critical bridge that connects the manufactures and the end user of products.

2.3.1 Design and New Product Planning

New Product Development (NPD) is a process that transfers technical ideas or market needs and opportunities into a new product that is launched into the market. This initiative has helped companies to maintain competitive, healthy and long-term sustainable competitive advantage. Time management has increasingly become crucial to maintain competitive advantage particularly with product life cycles becoming increasingly shorter for several reasons including increasing sophistication of consumers and improving technology (Cooper 1994; Cooper and Kleinschaft 1987). Globalization and the free open economies being adapted by many developing countries have resulted in large emerging foreign markets for international firms and this has increasingly made NPD vital for companies.

Crawford (cited in Bruce and Cooper 2000) proposes a 6 stage model for the NPD as shown in the following page.

Activity	Description
1. New Product Planning	Emphasizing NPD as an element of corporate planning process
2. Idea generation	Seeking ideas internally and externally (from management, research, competition, customers and employees
3. Screening	To analyse corporate and technical synergy and feasibility of the project
4. Technical development	Concepts developed into physical forms
5. Market appraisal	To assess user opinions
6. Commercialization	Launch of the product or service

Source: Roberts 1996

Figure 2.8: Crawford's six stage model for new product development

Current practices in NPD have identified the major activities that are associated with innovative behavior at an early stage of any product development activity viz. Idea Generation, Research, and Strategy centered activities, all focused towards identifying the requirements to be captured considering the interest of all stakeholders. The customer or the user forms one of the major stakeholders.

In such an emergent competitive environment, market research has a crucial role to play at the front end of NPD. As Paria (1992) comments:

> *Recognizing and understanding customer needs and knowledge of the market place are essential component of success.*

The Planning phase which is referred to as Phase 0, offers an important platform for research into considerations of examining user expectations and aspirations in the planning and development of new products /product systems. Studies undertaken in this phase are also referred to as Requirement Capture (RC).
Requirement Capture is the process by which the needs, preferences and requirements of individuals and groups significant to the product development are researched and identified. Requirement capture defines:

- Customer, user and market requirement
- Design requirement
- Technical requirement (Bruce and Cooper 2000)

RC process (Page and Stovall 1994; Cooper and Kleinschmidt 1988) found that successful new product development was linked directly to investment in front end activities and influenced directly in product specifications that met both tangible and intangible aspects of users' expectations of products. It seems to greatly benefit companies in launching successful products into the market.

Overall the use of market research in NPD is concerned with exploring, testing and validating the design and development of new products and improvement of existing products. With the firm's objectives in mind, market research attempts to verify the latent needs of potential customers. Market research may also help to discover fresh ideas for new product development.

Different market research tools and Techniques that may be used at the different stages of NPD (Bruce and Cooper 2000) are shown below.

- Idea Generation – Brainstorming, random idea submission, creative methods, technology forecasting, exploratory customer studies, R&D breakthrough, secondary data search, information from sales people, engineers and manufa turing usage and attitude studies, quadrant analysis, brand franchise extensions, direct customer feedback.
- Idea Screening – Ranking, scoring. The use of financial criteria, attractiveness of the industry, fit with company strengths, people etc.
- Concept Development – Concept statements, focus groups, mail interviews, personal interviews, telephone. Screening – monadic, competitive
- Marketing Strategy – Detailed market studies
- Business /financial analysis – Feasibility studies
- Physical development/ design and testing – Conjoint analysis, simalto, laboratory tests, expert evaluation. Customer tests – monadic, comparative, staggered, sequential, blind and simultaneous
- Pretest and test market – Panels, microtest, trial models, consumer surveys, pack, name, price, advertising. Mini test markets, laboratory test markets
- Commercialization – Monitor-control systems, price dynamics, tracking studies, PLC analysis, ongoing market analysis.

Crawford (1987) classifies Idea Generation Techniques into three types:

1. To identify unmet need and problems (Problem find / Solve Approach)

2. To modify or improve existing products to create new products (Fortuitous Scan Approach)

3. To find problems and brainstorming to identify possible solutions (Problem find / Solve Approach)

Other techniques include Word Play, Why Questions, or Analogies. Idea generation may involve brainstorming, scenario building, morphological analysis, metaphors and mood boards.

Idea Screening Techniques include:

- Ranking
- Checklists
- Scoring Models
- Attribute-based Analysis
- Numerical Weighting Methods
- Line profiles
- Block Profiles
- Idea Sort

Concept development and testing phase of the product development process involve market research activity including identifying customer needs and refining concept specifications. Product concepts are translated into preliminary product design in the form of market models, full scale models used to test attributes or buyer reactions or simply to provide visual representation of the proposed product.

To refine concept specifications (e.g. attributes, functions) techniques such as Conjoint Analysis may be used to ensure most important or unique aspects of the product that relate to the consumer preference.

Market strategy, business analysis, testing pre test models and test market and commercialization are other aspects of the process of NDP. This is however outside the scope of the aims and objectives of this thesis and is therefore not elaborated upon.

In spite of practices and techniques followed by the market research groups in studying user requirement.

> *…there is still dissatisfaction from design areas with the type of market information supplied, the quality of this information and the format in which it is delivered.* (Cooper and Johnes 1995)

In the process Design groups / firms have evolved their own methods in seeking user aspirations and requirements through novel ways.

In the last section to follow, we review developments of these new initiatives involving the user participation in the visualization of new product needs that are aspired for and a means to tap these inherent felt needs through collaborative participation in the design development of new products.

2.4 Review of studies undertaken in the domain of participatory design

On an analysis of Mono's model (cited in Crilly, Moultrie and Clarkson 2004), it is evident that developments in the processes and approaches to new product design have predominantly focused on the role and contribution of the designer in giving 'form' to the object. However recent studies within this holistic perspective have also shifted focus away from the 'Object' to that of the 'User'. These studies consider those physiological and psychological considerations and aspects of users' aspirations and needs; patterns of use etc. which have brought forth new understanding to the interface between product and emotions (Desmet, Hekkert and Hillen 2002; Norman 2002; Desmet 2000, 2002, 2003, Yammiyavar 1999).

Empathic Design, a term originally coined by American authors Dorothy Leonard and Jeffery Rayport (1997), advocates the use of observed research to uncover information that customers cannot or do not report.

In terms of seeking customer response, Burns and Evans (2000) coin the acronym CU-PID (Customer Understanding Process in Design). Taking the case of car design in Nissan they propose an observational approach to seeking the 'Delighter' factor in a product... They stress the importance of customer involvement or user-orientation in design to ensure that product are developed that are 'wanted rather than needed' by customer and that 'delight' their users.'

Dandavate, Steiner and William (2000) practice a novel approach engaging end users as partners in evolving new ideas in product generation. They engage users' to express their emotional and cognitive experiences to reveal 'what they knew, how they felt and what

they aspired for' through the process of drawing, chatting, photographing their own activities and articulating ones desires. They firmly believe that breakthrough in design will emerge more from the 'generative' search at the front end of the design process, designed to integrate aspirations of stakeholders with design ideation, rather than the traditional design research that has depended on information derived from evaluation (e.g. usability research).

2.5 Review of studies undertaken in the domain of 'user response to the visual in product form'

In the context of the study of the visual in product form, views expressed by Kalviainen and Pontecorvo in their article 'Consumer-Designer Interaction through a Generative Design Medium' (2000) has significantly inspired the basis for evolving the 'visual' research methodology as an approach for the purpose of this thesis. They state that use of images, instead of words is more effective for design in order to elucidate 'deep' emotional aspirations, values and desire of users.

> *Visuals can be used in many ways to aid the study of consumer experience. They can serve to authenticate details about consumers and their groups. They can make the consumer's experience visible. Visuals can also be a collaborative support to the results expressed in words. Design displays visual messages that the brain is able to grasp without conscious analysis.* (Hine 1995)

In the design task, visual and other sensory information helps designers to be empathic through emotional understanding.

> *Style discrimination is an essential part of aesthetic enjoyment. Style differentiates products through their distinctive qualities or form, their holistic composition of color, shape, line, pattern in visual style, sound or scent.* (Kalviainen and Pontecorvo 2000)

Further, style deals with surface impressions, yet it forms a corridor between the world of things and human consciousness, style perceptions can be conveyed to the designer in holistic images.

> *Our interpretation reflects an inner map that is used unconsciously to organize and understand sensory experiences. We interpret intangible product meanings with the help of associations, or 'stimulus chaining' that occur in human cognition. One thought leads to another. Thoughts are not language but images. ……Meaning is interpreted both from denotative and connotative messages in the product. In denotation an object conveys information about its functions and what it stands for. Connotation refers to an aesthetic dimension, which*

conveys a subjective impression and emotion about the product.

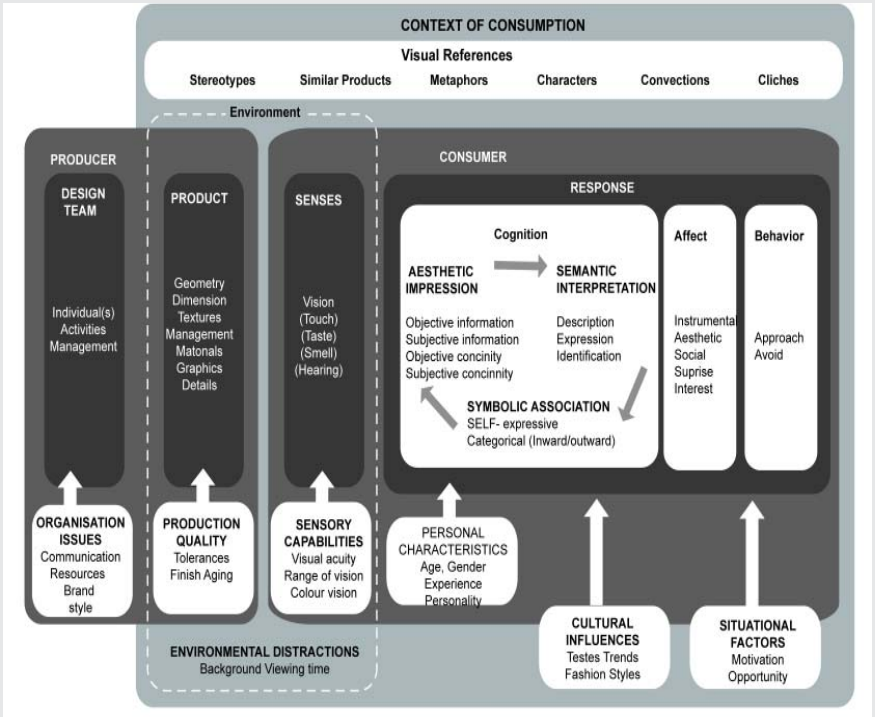
(Ewens 1990)

As designers think intuitively and visually it might be easier for them to apply consumer information gained in images than in verbal information.

Holistic Gestalt distinction of products offer the most practical and comprehensive way of inquiring about intuitive product perception.

While such an approach may prove very beneficial, Crilly, Maurice and Clarkson (2004) present a case stating the need to outline a more structured approach in seeking consumer response to the visual domain in product design. Covering a vast canvas of related research done over a period of time, they express the need to assimilate these scattered studies done in different domains into some kind of a theoretical frame work. They attempt to do so by developing upon Shanon's classical communication models and transforming it in a design context. They deconstruct the specific domains of roles and functions that the designer, the product and the user play and the factors that influence and contribute to decision making. The comprehensive model they present proves very useful in locating the position of the user and the parameters one needs to examine in the context of response to the visual domain in product design.

Framework for Consumer response to Visual domain in Product Design proposed by them is shown:



Source: Crilly Nathan, Moultrie and Clarkson John P., Seeing things: consumer response to the visual domain in product design, Design Studies Vol. 25 No.6, 2004, 547-577

Figure 2.9: Framework for the study of users response to the visual domain of product form

User response to the visual in product design is said to comprise of a 3 layered structure: (Figure 2.10)

- Cognition
- Affect
- Behavior

Cognition comprises of the first interaction comprises of three components:

- Aesthetic impression:
    - Objective information
    - Subjective information
    - Objective concinnity
    - Subjective concinnity

- Semantic interpretation:
    - Description
    - Expression
    - Exhortation
    - Identification

- Symbolic association:
    - Self expressive
    - Categorical (inward / outward)

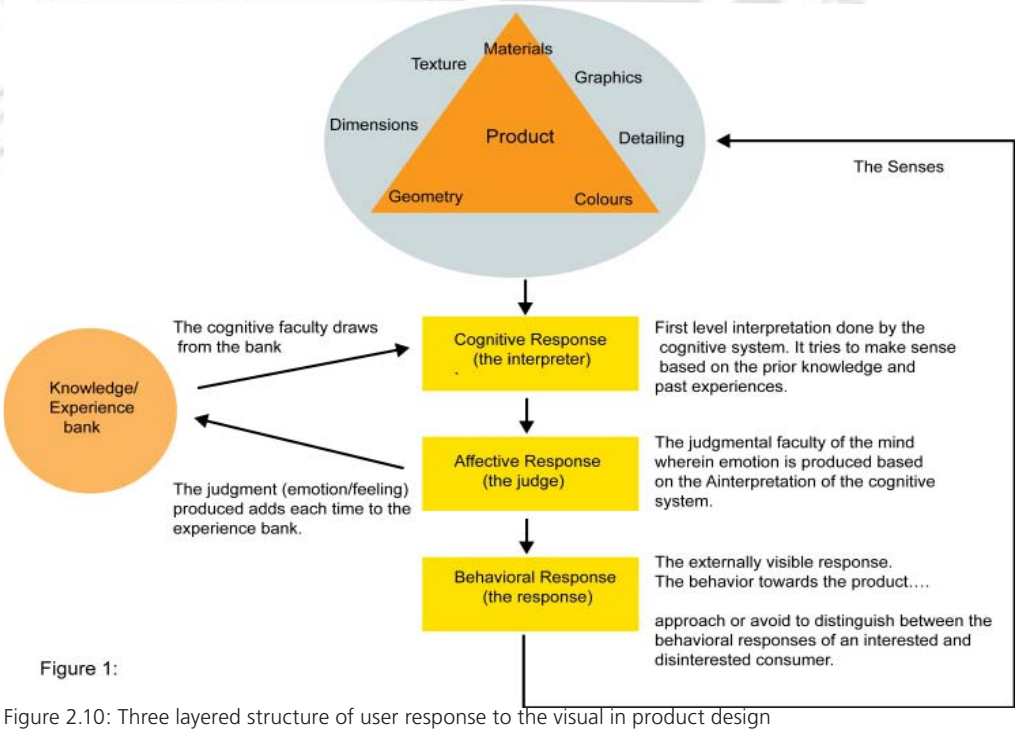


Figure 2.10: Three layered structure of user response to the visual in product design

Affect on the user could be of the following kinds:

- Instrumental
- Aesthetic
- Social
- Surprise
- Interest

And the user's response could be reflected in their **Behavior** which could be one of:

- Approach or Avoid.

The response of the user can be influenced by the context of consumption. These could be governed by the following considerations:

- Visual references comprising of:
Stereotypes / Similar Products / Metaphors / Characters / Conventions / Clichés

- Personal characteristics including:
Age / Gender / Experience / Personality

- Cultural influences could be based on considerations of:
Tastes / Trends / Fashions / Styles

And situational factors which might comprise of considerations of:

- Motivation / Opportunity / Marketing / Social Setting.

The framework outlined by Crilly, Maurice and Clarkson forms an interesting foundation to build on in outlining the strategy for seeking user response to the visual in product design.

2.6 Concluding remarks

To conclude, a review of relevant literature has been done to understand the developments in product design and user centric considerations that have influenced the stage 0 phase of new product planning. Further developments in the approaches to product form generation that designers have evolved in their approach to design have been examined. The increasing importance of role of design as communication has emerged from the study of the above literature.

From these studies it is however evident, that in a competitive market environment where new concepts in mass customizing are increasingly becoming important, a methodology for the study of the 'visual domain' of users' preference is a real need. It offers significant scope for design research. Such a study which outlines a methodology, it is felt can contribute and enrich the design decision making process of form generation. It is an aspect that forms a significant part of the designers' contribution to the new product design development process. In the following chapter, mixed research methodology which combine both qualitative and quantitative approaches are examined from cross-disciplinary domains in the context of its relevance to the focus of this research study.

Chapter 3 Research Methodology

RESEARCH METHODOLOGY

3.1 Introduction

Based on the literature survey it was evident that a study of the user response to the visual domain of product form offers good scope to pursue design research (Crilly, Moultrie and Clarkson 2004). However there is no evidence that such a research study has been explored and adapted contextually to the Indian situation.

Considering the cross-disciplinary nature of the research problem involving consumer studies in the Indian context, it was felt appropriate to adopt and explore suitable methodology and instruments for evaluation, and to examine its influence on the creative processes in new product development. India is emerging as one of the fastest growing global markets and good design is increasingly recognized as a significant factor for market success (Harel and Prabhu 1999).

This chapter consists of an overview of the different research methods that may be considered in setting up the empirical studies appropriate for the study of the 'visual domain' of users' preference for product form.

The research methodologies, both qualitative and quantitative, have been examined from cross-disciplinary domains in the context of their relevance to the focus of this research study.

The nature of any design activity involves the phases of divergence, transformation and convergence in which the following stages form a part of the design process viz. data collection and information generation; creative transformation and ideation; evaluations of design ideas leading towards design realization of the final design solution (Jones 1970). This has been taken into account in order to arrive at an appropriate methodology.

Visual research methods in Design from the point of view of architectural spaces and design including imageability, environmental measurement and environmental mapping (Sanoff, 1991) have been examined.

It is felt that such a study which outlines a methodology can contribute and enrich the design decision making process of form generation.

3.2 Alternative Design Approaches and Methods

Amongst the most common research methods and techniques examined, the one outlined by Bruce Archer through a series of papers entitled 'Systematic Method for Designer' (cited in Maldonado and Bonsiepe 1968), summaries an iterative process involving the following stages:

- Data Collection
- Analysis
- Synthesis
- Development
- Communication

Such an approach, that rely predominantly on the heuristic methods of G.Polya (1945/48), perhaps was one of the early proposals in the domain of Design which has attempted to put problem solving within a formal framework. The method did give a scientific temper to the approach to problem solving. However there has been criticism of the method stating that such a rationalist approach 'remains on the level of reducing the design process to a scheme' … 'in which only the sequence of the steps in solving design problems is stated but not the method to be employed' (Maldonado and Bonsiepe 1968).

They argue that this rationalist approach becomes particularly evident in tackling issues such as design aesthetics which are considered to be in the domain of "the theory of the perception of the beautiful" in which explanations are conveniently best left to intuition.

In the fast changing scenario of increased complexities and rapid technological advancements in the modern world, designers are faced with the challenges where issues in design need to be addressed at the component level, at the product level, at the systems level and finally at the community level (Jones 1970). Jones, in a summary of approaches to problem solving highlights the need for a critical review of design methods in his book *Design Methods-Seeds of Human Futures* (1970). The nature of the design activity engages a designer's attention into three broadly distinct phases divergence followed by a stage of creative transformation and finally leading towards convergence during evaluation and realization of the design. He draws upon developments in cross disciplinary knowledge domains and summarizes various methods that have been adopted for seeking information, analyzing data, approaching ideation and finally evaluating the design. These engagements involve two points of view viz. one set that has a product centric focus
and the other set that had a user centric focus which are to be considered together in a holistic perspective. Some of the methods adopted include the following:

Method of Searching for Visual Consistencies:

A product centric method that seeks to find direction in which to search for design improvements.

The steps involved in this product centric approach are:

- Examine samples and / or photographs of an existing design.
- Identify apparent inconsistencies and contradictions in the arrangement and purposes of components of the design.
- Infer reasons for these inconsistencies and look for evidence of causes of design change.
- Envisage ways of removing inconsistency and of adapting to the inferred external causes of change.

As may be noted it is a form refinement process in which the designer is involved directly with the product.

Form Generation based on Product Semantics:

Product Semantics lays emphasis on a method of product form generation that considers the meaning and communication aspect of product form. Individual designers and design-led firms have used this method in the generation of product form from the early 1980's. Leading designers / design researchers attempted to give formal theoretical frameworks for the understanding of design semantics as a serious domain of research and included Klaus Krippendorf, Helga and Hans Jugen Lannoch, Reinhart Butter, Gerda Smets , Uday Athavankar amongst others.

The developments and approach to form generation and its analyses have been elaborately dealt with in the earlier section on literature review.

Syntactic Approach to Form generation:

A Syntactic Method of Product Form generation and its analyses has been developed by Rowena Reed Kostellow who approaches the form generation process from an insightful focus on the syntactic elements of visual form – volume, plane, line and point and their interrelationship. This has also been reviewed in the literature section and such an approach has been considered as significant in evolving the basis for examining product form contextually in this research study.

3.3 User Centric Design Evaluation Instruments for Measurement of product form

While the above methods have been extensively used by designers in their approach to product form generation, evolving a user centric focus to evaluate users response to the visual domain of product form has not been sufficiently explored.

In this next section we examine the possibility of the use of different instruments that may be adopted for the measurement and evaluation of product form from a user centric perspective. Some of the approaches that have been evolved and have been the focus of recent design research involve both qualitative and quantitative methods. These are being followed amongst cross disciplinary fields including Marketing research, Psychology, Engineering. The following section examines these approaches.

3.3.1 Qualitative Instruments for Analysis

Qualitative Instruments for eliciting information from users and drawing inferences include techniques which are primarily observational in nature. Some amongst these approaches include:

- Interviewing Users
- Questionnaires
- Investigating user behaviour
- Protocol Analysis
- Think aloud and Cooperative evaluation
- Lifestyle explorations etc.

We could examine these approaches in detail:

Interviewing Users:

Interviewing user groups aims to elicit information that is known only to users of the product or system in question. The steps to be followed include the following:

- Identify user situations that are relevant to the design situation that is being explored.
- Seek the agreement of all the persons within the user situation who could be affected by the interviewer's presence or by a new design.
- Encourage users to describe and to demonstrate any aspects of their activity that are important to them.
- Direct the conversation towards aspects of the user's activity which seems

relevant to the situation that is being explored.

- Record both circumstantial and critical findings during the interview or within a short time of it.
- When appropriate, obtain the user's comments on the conclusions drawn from an interview.

Questionnaires:

This technique sets out to collect usable information from the members of a large population. The method involves the following steps:

- Identify the design decisions that are to be influenced by replies to the questionnaire.
- Identify the kinds of information that are critical to the taking of these decisions.
- Identify the kinds of people who have rapid access to the kinds of information needed.
- Carry out a pre-pilot investigation to gain insight into the knowledge of potential respondents.
- Write a pilot questionnaire that fits both the known principles of questionnaire design and the particular situation.
- Circulate a pilot questionnaire to test the questions, the validity of the answers, and the method of analysis.
- Select an appropriate sample of the kind of people having rapid access to the information that is sought.
- Collect replies to the questionnaire by interview or by post.
- Extract, from the replies, the data that is most helpful to the designers.

Investigating User Behaviour:

This is another important qualitative method that sets out to explore the behaviour patterns and to predict the performance limits of potential users of a new design. It involves the following steps:

- Consult and observe experienced and inexperienced users of similar equipment before designing the new.
- Carry out a man-machine systems analysis to define tasks, user abilities, and the design requirements for interfaces (the parts of the design that affect users)
- Observe or simulate critical aspects of the behavior of both learners and skilled users of the proposed design.
- Record limiting values which must not be exceeded if users are to carry out the actions required without error, injury or discomfort.

Protocol Analysis Method:

Protocol analysis is a qualitative observational evaluation technique which records users' action using a mixture of methods such as Paper and pencil, Audio recording, Video recording, Computer logging and User notebooks which are subsequently analyzed. This is particularly helpful in Product Usability experiments either in a lab setting or in the field. The time for conducting such experiments can be both time consuming, expensive and may need considerable expertise during analysis.

Think Aloud and Cooperative Evaluation Method:

Think aloud is a form of observation where user is asked to talk through what he is doing as he is being observed. It is simple to conduct and requires little expertise to perform. The response provided is however very subjective and therefore tricky to analyze.

Cooperative evaluation is a variation of Think aloud technique in which the user is encouraged to see himself as a collaborator in the evaluation and not simply as an experimental participant. The usefulness of both these techniques is dependent on the effectiveness of the recording method and the subsequent analyses.

3.3.2 Quantitative Measurement Tools for Analysis

Quantitative Instruments for eliciting information from users and drawing inferences include techniques which are primarily statistical in nature. The appropriate selection of appropriate quantitative analytical tools that can be used (based on a statistical approach) are governed by scales of measurements and relate measurements and calculations to the uncertainties of observation, to the costs of data collecting, and to the objectives of the design project.

Criteria for selection of an appropriate Quantitative Tools for analysis are governed by seeking answers to the following questions before selecting an appropriate tool for measurement:

- Pose the questions that are to be answered by measurement.
- Determine the acceptable error and the acceptable cost of measurement.
- Select an appropriate measurement scale.
- Plan the measuring procedure to be compatible with the above.

Amongst the Quantitative methods the following analytical tools could be considered useful in small-scale research tests:

Association of Attributes using Chi-square:

Chi Square analysis is used to test the statistical significance of association of attributes involved in cross tabulated frequency data also called contingency table. Chi Square analysis is appropriate for hypothesis testing of independence in cross tabulations. For example, if one is interested in testing brand preference of different brands associated with people of different income level, Chi Square analysis is appropriate to use.

Analysis of Variance (ANOVA)

Analysis of variance is considered suitable for analyzing experimental data based on field experiments. It is a useful analytical tool for marketing researchers. Whenever we are interested in comparison of means of any number of groups, analysis of variance (ANOVA) is an appropriate technique to use. This technique could be applied in new product evaluation, selection of copy theme, effectiveness of an advertising/sales promotional campaigns and the like.

Regression Analysis

Regression analysis finds out the degree or relationship between a dependant variable and a set of independent variables by fitting a statistical equation through the method of least square. Whenever we are interested in the combined influence of several independent variables upon a dependent variable our study is that of multiple regressions.

For example, demand may be influenced not only by price but also by growth in industrial production, extent of import prices of other goods, consumer's income, taste and preferences etc. Market researchers use regression for explaining per cent variation in dependent variable caused by a number of independent variables and also problems involving prediction or forecasting.

Discriminant Analysis

Discriminant analysis is useful in situations where a total sample could be classified into mutually exclusive and exhaustive groups on the basis of a set of predictor variables. Unlike the regression analysis, these predictor variables need not be independent. For example, one may wish to predict whether sales potential in a particular marketing territory will be 'good' or 'bad' based on the territory's personal disposal income, population density and number of retail outlets. A consumer could be classified as a user or non-user of one of the five brands of a product based on his age, income and length of time spent in his present job. Here the interest is what variables discriminate well between groups.

Factor Analysis:

Factor analysis provides an approach that reduces a set of variables into one or more underlying variables. The technique groups together those variables that seem to belong together and simultaneously supplies the weighing scheme. For example, one may be

interested in the identification of factors that determine the company's image. When the decision maker is overwhelmed by the factors, Factor analysis comes to his help in compressing these many variables into a few meaningful dimensions.

Semantic Differential Method

Drawing from the domain of language and meaning, the Semantic Differential method outlined by Osgood, Suci and Tannenbaum (1957), propose a quantitative method that is used as an evaluative instrument for measurement of the connotative meanings of concepts as points in what they call 'semantic space'. It consists of a number of scales, each of which is a bipolar adjective pair, chosen from a large number of such scales for a particular research purpose, together with the concepts to be rated with the scales. The scales, or bi-polar adjectives, are seven point rating (usually) scales, the underlying nature of which has been determined empirically. That is, each scale measures one, or sometimes two, of the basic dimensions or factors that are found to be behind the scales: Evaluative, Potency, Activity. For e.g.

- Evaluative – good-bad; beautiful-ugly; clean-dirty
- Potency - large-small; heavy-light; strong-weak
- Activity – active-passive; sharp-dull; fast-slow

Such a quantitative study can generate a lot of data which can be subsequently used for a number of analyses applying statistical methods including Means and related statistics, Distance–Cluster analysis etc.

Conjoint Analysis Method:

Conjoint (trade-off) analysis has become one of the most widely-used quantitative methods in Marketing Research. It is used to measure the perceived values of specific product features, to learn how demand for a particular product or service is related to price, and to forecast what the likely acceptance of a product would be if brought to market.

In Conjoint Analysis method respondents are made to evaluate potential product profiles. Each profile includes multiple conjoined product features (hence, conjoint analysis). This is different from the more routine surveys, where respondents are directly asked to indicate preference for important attributes.

Respondents usually complete between 12 to 30 conjoint questions. The questions are designed carefully using experimental design principles of independence and balance of the features. By independently varying the features that are shown to the respondents and observing the responses to the product profiles, the analyst can statistically deduce what product features are most desired and which attributes have the most impact on choice.

In contrast to simpler survey research methods that directly ask respondents what they prefer or the importance of each attribute, these preferences are derived from these relatively realistic trade off situations. The result is usually a full set of preference scores (often called part-worth utilities) for each attribute level included in the study.

There are different ways to show product profiles. The original version of conjoint analysis developed in the early 1970's showed products one-at-a-time. Later forms of conjoint analysis showed products in pairs (ACA system for Adaptive Conjoint Analysis), or sets at a time (CBC system for Choice-Based Conjoint):

Hierarchical Bayes or Least Square Regression Analysis is the most popular statistical estimation routine for estimating part-worth utilities. These part-worths are helpful to summarize the preferences for segments and markets, but they are most useful in the context of projecting buyer choices.

While Conjoint market simulators let the researcher define specific competitive contexts (specific products in competition with another) and project the share of choices (shares of preference), given the respondent's estimated part-worth scores. These simulators let researchers and managers test a variety of what-if scenarios.

Maximum Difference Scaling Method (MaxDiff Method)

MaxDiff is a technique invented by Jordan Louviere in 1987. With MaxDiff, respondents are shown a set (subset) of the possible items in the study and are asked to indicate (among this subset with a minimum of three items) the best and worst items (or most and least important, etc.).

Accoding to Louviere, MaxDiff assumes that respondents evaluate all possible pairs of items within the displayed subset and choose the pair that reflects the maximum difference in preference or importance (Louviere 1993). However, here it is theoretically assumed that respondents will scan the set for the highest and lowest preference items. MaxDiff may be thought of as a more sophisticated extension of the Method of Paired Comparisons. MaxDiff questionnaires are relatively easy for most respondents to understand. Furthermore, humans are much better at judging items at extremes than in discriminating among items of middling importance or preference (Louviere 1993). And since the responses involve choices of items rather than expressing strength of preference, there is no opportunity for scale use bias (MaxDiff is "scale free") (Cohen and Markowitz 2002). This is an extremely valuable feature for cross-cultural research studies.

MaxDiff method is increasingly used as an approach for obtaining preference/ importance scores for multiple items (brand preferences, brand images, product features, advertising claims, etc..) using marketing or social survey research.

It can be used to measure respondents' preferences for things such as brands, product features, job-related benefits, or product packaging. It can also be used to prioritize a list of performance attributes or gauge the potential impact of different advertising claims. It may be used for designing, fielding, and analyzing:

- MaxDiff (best-worst scaling) experiments
- Method of Paired Comparisons (MPC) experiments (choices from pairs)
- Choices from subsets of three items / four items, etc.

Projects may be conducted over the Internet, using computers not connected to the internet (CAPI interviewing), or via paper-and-pencil questionnaires.

Although MaxDiff shares much in common with conjoint analysis, it is easier to use (for the researcher, respondent, and end client) and is applicable to a wider variety of research situations. (It is not a substitute for conjoint analysis, however, as conjoint offers unique benefits for studying products or services made up of complex features added together.)

With MaxDiff, respondents are shown a set (subset) of the possible items in the exercise, and are asked to indicate (among this subset) the best and worst items (or most and least important etc).

Respondents typically complete a dozen or more such sets where each set contains a different subset of items. The combinations of items are designed very carefully with the goal that each item is shown an equal number of times and pairs of items are shown an equal number of times. Each respondent typically sees each item two or more times across the MaxDiff sets. MaxDiff exercises focus on estimating preference or importance scores for typically about 15 to 40 items - though hundreds of items could be accommodated in advanced applications.

Why use MaxDiff instead of standard rating scales? Research has shown that MaxDiff scores demonstrate greater discrimination among items and between respondents on the items. The MaxDiff question is simple to understand, so respondents from children to adults with a variety of educational and cultural backgrounds can provide reliable data. Since respondents make choices rather than express strength of preference using some numeric scale, there is no opportunity for scale use bias (Cohen and Markowitz 2002).

MaxDiff/Web makes it easy for researchers with only minimal exposure to statistics to conduct sophisticated research for the scaling of multiple items. The trade-off techniques used in MaxDiff/Web are robust and easy to apply. The resulting item scores are also easy to interpret, as they are placed on a 0 to 100 point common scale and sum to 100.

Software companies such as Sawtooth Software of the USA offer software programs

which can be used for conducting MaxDiff surveys. It features possibilities such that projects may be conducted over the Internet, using computers not connected to the internet (CAPI interviewing), or via paper-and-pencil questionnaires (using the included MaxDiff Experiment Designer and the separately purchased CBC/HB system). MaxDiff/Web may be used designing, fielding, and analyzing:

- MaxDiff (best-worst scaling) experiments
- Choices from subsets of three items, four items, etc. (no "worst" choice)
- Method of Paired Comparisons (MPC) experiments (choices from pairs)

Item scores are estimated for each individual using a hierarchical Bayes (HB) methodology. The HB tool is built right into the interface, and with a few clicks the estimation begins. The default settings are quite robust, so users with very little background in statistics can obtain good results. HB is a powerful approach for stabilizing scores for each individual from sparse choice data. However, it is a computationally-intensive program that takes between 15 minutes to an hour for a typical MaxDiff data set.

These Methodologies and analytical tools explored above are a combination of both Qualitative approaches and Quantitative approaches with variance in the weightage of statistical emphasis of each method. But it may also be noted that these studies can also be very expensive and time consuming to conduct.

3.3.3 Visual Methods in Design

Environmental studies have been undertaken in the architectural domain in which the visual elements are studied in the living environment to understand the form, action and interpretations given by respondents to buildings, environmental setting etc... Approaches proposed include a study of Environmental measurement; Imageability; Environmental mapping; and Visual notation amongst others.

Techniques followed in Environmental measurement include:

Community Walks:

In this technique the researcher accompanies the respondent on a community walk, asking particular questions about the environment. A direct comparison in a study by Lowenthal and Reil (1972) indicated that representation systems for directly experienced places and for images of places were similar. Knowledge is gained about the perceptual characteristics of places by walking from one place to another.

Questionnaire and Photographs:

An extension of the community walk technique is to generate insights about resident familiarity and preference through questionnaires and interviews using photographs.

Sanoff states:

> *Questionnaires and interviews can draw on a wide range of visual media Photographs contain a vast resource of information and are often less ambiguous than words. There are certain situations where photographic images are appropriate for interviewing and others were drawings and models would be more appropriate.* (Sanoff 1970).

Appraisal:

Appraisal measures the interaction between the human observer and the visual environment. Observer-based assessments of the environmental quality consists of preferential judgments and comparative appraisals. Preferential judgments represent subjective reactions to specific environments, while comparative appraisals judge the quality of specific against a standard of comparison (Craig and McKechnic 1974).

One of the issues that the above techniques raise is related to the mode of representation to be used for such user interactive studies. One method is to present the relevant features of the environment directly to the observers. Direct representations may be made in a natural setting to minimize the error of judgment. In such a situation the major problem is the difficulty in controlling the extraneous factors that may affect the observer's judgment.

Graphic representations are used where visually perceived properties of the environment are being assessed. One must ensure that the represented environment should reflect the properties and characteristics of the actual environment to be assessed.

One of the unresolved problems of visual research is the measurement of properties chosen for the study. Environmental images are usually presented in the form of photographs or images to subjects. They are then asked to rate them on a large number of rating scales. The outcome of such studies tends to be descriptive of the ways people respond verbally to the environmental images, without necessarily establishing relationship amongst the physical variables. These relationships need to be identified and assessed, and sometimes isolated, independently of the evaluative responses made on them. The variables most relevant for studying the visual environment tend to be qualitative.

Often the factors measured, such as complexity, tend to be very abstract.
Citing the example of natural landscapes, Shafer (1969) describes configurations with a total of forty-six variables, which included combinations of zones (such as sky, vegetation, lake and so on) in order to obtain groupings of physical factors to predict preference judgments.

Multiple Sorting:

In this technique people's rating of a number of elements and situations are sought by asking them to sort items freely, according to their own criteria, into as many categories as they can describe. This type of sorting establishes not only the actual distribution of elements, but also reveals personal categorization schemes and related meanings and associations. These results may be more valid in determining human responses than those obtained when the researcher supplies the categories and values, and can suggest the important issues and aspects of the research itself. Multiple sorting can be used using a set of photographs.

Test conducted using this technique indicate that more concrete, specific and familiar sets of test elements yield richer results than those that are abstract and unfamiliar to the subjects.

Sorts can be ranked or rated to produce higher orders according to the specific criteria, such as importance. Sorting one set of elements into another can be used to investigate relationships between conceptual domains. And the results from group sorting, alone or in combination with or in comparison to individual sorting, may be pertinent to some studies.

Visual Representation:

Theoretical frameworks have been established (Arnheim 1954; Gibson 1971) which explain that while the same visual information may be contained in the real environment and a picture, they do not provide the same stimulation. Pictures record information, not sensory data. Visual simulations are based on a number of graphic principles. These principles enable observers to perceive three dimensional relationships from two dimensional representations and are based on perspective principles described as surface layout (Gibson 1979). The clues pertain to texture, size, linearity, aerial, upward location, texture shift, continuity and transition.

- *Texture.* When a surface gradually becomes denser, it appears to recede from the observer.
- *Size.* As objects decrease in size, they appear to recede from the observer
- *Linearity.* When objects equal in distance from each other appear to converge to a point, they recede from the observer.
- *Aerial.* Objects lose detail when their distance from the observer increases.
- *Upward location.* The horizon line appears to rise as the observer's distance increases
- *Texture shift.* Changes in texture density gives the appearance of an occluding edge.
- *Continuity.* When objects overlap, the simpler form is perceived as being nearer to the observer.
- *Transition.* Sharp contrast in light and shade reveal an edge.

Visual Cues:

Perceiving and interpreting the physical environment is a complex process involving the interaction of human physiology, development, experience, and cultural sets and values with the outside stimuli. Three basic components of the perceptual process are involved in making sense of the visual world which define objects and their relationships in three dimensional spaces. In simple discrimination of elements in the visual field, we rely on the interaction of characteristics or cues such as size, shape color, brightness, position in the field, overlay, linear and aerial perspective, movement parallax, light and shade, accommodation, convergence, and stereoscopic vision. At the more complex psychological level we interpret selected characteristics of the perceived environment in terms of associations and values which communicate identity and status, establishing a context and defining a situation.

Categorizing Visual Cues

The environment that is part of the everyday life has embedded within it cues about the social system which contain symbolic references that are significant. In the context of verbal measurement of these symbolic references, Olver and Hornsby (1966) suggest five main modes of distinguishing equivalence: perceptible, functional, affective, nominal and fiat. These are defined as follows:

- *Perceptible.* The individual describes the item equivalent on the basis of immediate phenomenon qualified, such as size, shape, or on the basis of location.
- *Functional.* The individual may base equivalence on the use of function of items.
- *Affective.* Items may be described as equivalent on the basis of an emotion that is aroused or of an evaluation of them.
- *Nominal.* Items may be grouped by name that exists for them in the language.
- *Fiat.* Items may be described as the same or alike without providing any further justification.

While these modes are primarily based on verbal descriptions, it has been demonstrated that when using visual representations of the identical functional equivalence, judgments of similarity are more extensive than "perceptible". That is, they can be based on characteristics other than identifiable physical characteristics.

Sanoff (1991) presents a case of a study based on an experiment conducted on preference ranking of respondents for residential setting of rural houses in North Carolina selected from 1500 images for similarity and preference undertaken by Brunswik (1956). Brunswik classified the similarity responses into seven major categories: form, detail, quality, context, style, size, and status. From the results he suggests that the generality of statistical results, or representativeness, may be more important than proper sampling of subjects. The study indicates that the most significant exterior cues for conveying information about a building's function are size, homogeneity of building volume and form and various stylistic features.

3.4 Conclusions

For the purpose of this research (as outlined in the hypotheses), the emphasis is on interpreting the user response to the visual domain of product form in which the everyday experience of the consumer is to be gauged for its implications on design decision making. The findings of such user preference are to identify overall preference pattern for the visual domain of product form. Consideration of these indicative directions, it is hypothesized, would be useful during the initial construct formation phase of the study - stage 0 of the product development cycle - as inputs to the designer in his design formulation and conceptualizing process.

By reviewing the hypotheses and objectives of the research and considering the different instruments and methods suitable to best meet the above objectives, it was concluded that the approach and methodology adopted therefore had to be a mixed method. It would combine cross-disciplinary techniques such as visual methods, interviews, observations, focus groups and MaxDiff method to outline the approach and methodology to offer a more 'intepretive' scope for analysis and interpretation.

Based on the above methodology, it was decided that one product be chosen as a case study for examining the stated hypotheses. Planning of the experimental research to be conducted in the specific context of the chosen product was outlined for the pre-0 stage in the product development phase of new product planning. This would offer scope for the interpretive nature of the study. The instruments for research would combine a mix of qualitative and quantitative methods by adapting MaxDiff approach with suitable modifications, along with a combination of questionnaire and personal observation.

Further, after conducting Interpretive studies, the approach in the selection of a suitable instrument for the concept evaluation phase of new product development should adopt a more rigorous statistical evaluation method. Conjoint Analysis method or the Semantic Differential method using a Focus Group approach may be considered for interpretation at the advanced concept evaluation stage of the product development cycle.

Chapter 4

Design of Empirical Studies

DESIGN OF EMPIRICAL STUDIES

4.0 Planning the Design Experiments

This chapter outlines the methodology chosen to find out the user response to a chosen product – the digital camera. The objective of the experiment was to examine user preference patterns that focus on the users response to the visual domain of product form of the digital camera. The findings are in the Indian context.

As a Plan of Action (PoA) the empirical research study was split into two distinct stages – Product Centric studies and User centric studies for the chosen product, such that the following objectives were met:

1) To undertakes an analysis of the visual form of a camera to gain understanding of specific 'Visual' centric parameters involved in the study.

2) To examine from the design point of view, visual case studies that focus on stages in the development of product form of the camera.

3) Based on the above design perspectives, to identify parameters and develop methodology that measures user preference patterns which help to summarize recommendations for development of product form.

4) To combine the findings from the design perspectives with that of users' preference pattern to develop visual characteristics of the overall product form.

Accordingly the detailed formulation of the empirical study is outlined in two sections:

4.1 Section I: Product Centric Studies

Three tasks mentioned below were undertaken as part of product centric studies:

- Selection of the product
- Analysis for identification of visual elements of the form for the chosen product
- Study of form generation process for the chosen product, through case examples.

These tasks may be further detailed as below:

4.1.1 Selection of the Product

The camera as a product facilitates image making. As a device it could be examined to explore socio-cultural moorings of aspects of image making and photography and its significance as a cultural object.

Based on market studies it was noted that the following aspects become interesting to the study of the camera:

- The camera is increasingly becoming accepted as an object which is commonly put to use for capturing images for various leisure, entertainment and documentation purposes. Taking a photograph is only the first step in the product use cycle. It has to be seen how these images after they are taken – are stored, retrieved, shared or celebrated. The implication in the context of photography and the use and manipulation of images offer new insights to examine the sociocultural aspects of the phenomenon of digital image-making.

- There may be taboos associated with the capturing of images in India. Cultural notions of *'Buri nazarwala, tera mukh kala'* on the rear of trucks, or the black dot on the infant's chin to ward off the evil eye are only two examples of connotative meaning associated with the gaze in the Indian context (Zutshi and Suhrud 1999). How do these factors impinge on design decision?

- Convergent technology products including the mobile camera phone have spread rapidly amongst large user segment in the Indian consumer market – one of the fastest growing markets in the world. This has direct sociological implications in the acceptance of image creation and use in Indian society. Camera as the mediating device used for image making can be said to manifest the interface between social mooring and acceptance of image making in society. This dimension makes the study of the camera as a socio cultural object interesting and one that needs to be further examined.

- There is a distinct shift towards acceptance of digital cameras as reflected in the reduction of film based processing 'photo-labs' in the market place. Digital cameras share shelf space along with a range of digital and video equipment from international brands including the rapidly expanding mobile phone markets. It is estimated that there are nearly 250 million mobile phone users in India today. How many amongst them possess a mobile-phone camera?

- With the advent of the digital technologies in cameras, the pattern of use of the camera has shifted away from looking through a camera towards 'looking at the camera'. What implications does this have in design considerations of the camera?

- It is also observed that there are no manufacturers of the digital camera in India. Cameras available in India are from leading multinational manufacturers who are entering the Indian market in a major way.

The findings of the study for product preference patterns amongst Indian users therefore would be useful as inputs in product planning, design and development for prospective international manufacturers. Based on some of the above considerations, it was decided to select the camera as the product under study for this research project. For the purpose of identification and analysis of visual elements the product forms of the traditional SLR camera and the digital camera have been examined.

4.1.2 Analysis of visual elements of a camera

To get a clear understanding of parameters involved in the product form development process the visual elements of the form and structure of the camera were analyzed. The objective of this product centric analysis was focused on the 'visual domain', considering syntactic elements of the camera. These elements were looked at from the point of view of their aesthetic considerations and semantic considerations in analyzing the product form for their connotative and denotative meaning. These were examined and form the basis in setting up the experiment for the subsequent user centric study of preference for visual form of the camera.

As part of an early phase of the research, a set of 5 visuals of different models of SLR camera were chosen by the researcher and visual analyses conducted of the denotative elements of the product form with respect to identification of the dominant form elements.

The photographic images of the following 5 brands of SLR cameras were analyzed and a self assessment of the form characteristics conducted:

Pentax LX
Minolta X-1
Nikon F3
Olympus OM-2N
Canon F-1

Following this, the product form of digital camera models were systematically deconstructed to identify the visual elements and visual attributes of the form based on Reed's approach to form analysis (Figure 2.2). Considerations of overall structure, surface and line characteristics were analyzed with respect to proportions, visual hierarchy - viz. dominant, sub dominant and secondary visual elements. Surfaces and texture were examined. A holistic view of how these contribute to the personality and 'look and feel' of the product form were examined.

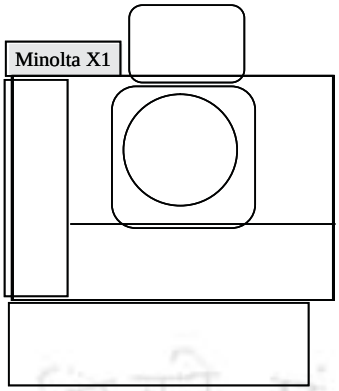
Study of SLR Camera

1-Pentax LX
2-MinoltaX-1
3-Olympus OM-2N
4-Nikon F3
5-Canon F-1

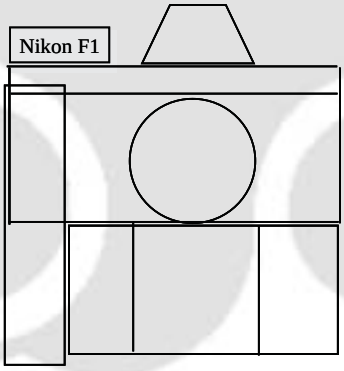
Photo Credits: Figure 4.1 to 4.4
Sano, K.(ed) (1983) *ID Japan - Structure of Dexterity Industrial Design Works in Japan, Rikuyo-sha, Japan,* 16 -21.

* All SLR cameras with body, lens and motor drives

Figure 4.1: Selection of camera forms for visual analysis

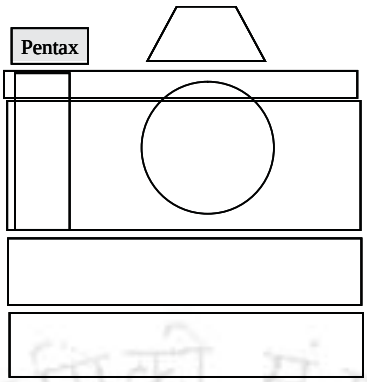


Form is stiff and rigid
Does not express the image of a sophisticated product
Controls and the prismatic crown appear very heavy
Grip feels alien and heavily differentiated
Rating of expression - Average

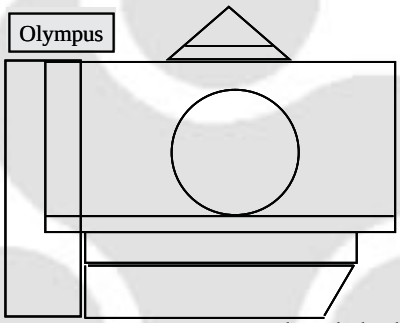


Form feels slightly busy, complex and complicated
Grip relatively underplayed and non-communicative
Motor-drive distinctly feels an add on
Very good use of texture to enhance the form
Rating of expression- Good

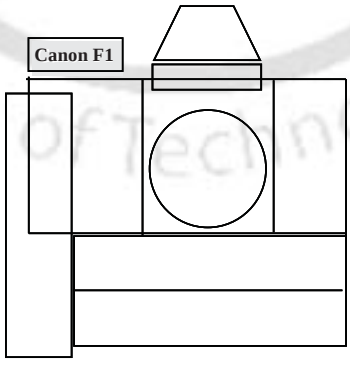
Figure 4.2



Effective use of texture and taper to clearly distribute the different visual mass giving the form controlled balance between all the elements- Grip, body,prismatic crown and the controls.
A distinct hierarchy of product functions is clearly achieved.
Rating of expression- Good



Form appears arrested and the balance lopsided
Grip and motor-drive do not appear complimentary to main product
Prismatic crown appears undersized
Making the form appear 'all eye and no body'
Rating of expression-Average



Strong and a No-nonsense form
Good balance achieved between the Body and the motor-drive
Grip is indicative and inviting and clearly differentiated
Form expresses dignity and uprightness
Rating of expression- Very Good

Figure 4.3

Integrated Indicative Conspicuous Strong Differentiated

Differentiated by texture but neutral

Differentiated through shape and superficial trim

Conspicuous and differentiated by texture

Integrated with main body

Distinct and differentiated

Figure 4.4: Study of Visual form of hand grip and motor drive of SLR cameras

Based on Rowena Reed's classification of visual form elements

Basic Elements	***Dimensions of Elements***	***Variations of Dimensions***	***Form Characteristics***
Volume -	*3-D*		*Massive Positive Elements*
Plane -	*2-D*		*Superficial Negative Element*
Line –	*1-D*		*Extensional Linear and Curvilinear*
Point –	*0-D*		*-*

Principles

Proportion *Extensional; Superficial; Massive*

Movement
Axis - Primary; Secondary; Tertiary
Axial Movement: Inner; Continual; Directional

Forces
Strength - Weak Strong
Scope - Focused; Spread; Neutral
Directionality – Concave; Convex
Angularity,
Accentuated; Neutral
Relationship
Transitional Forces - Divide; Adapt; Merge; Distort
Order – Dominant; Sub dominant; Subordinate
Joining Relationship
Axial Relationship – Oppositional; Adjacent; Across; Parallel

Attributes

Heavy Light
Fast Slow
Static Dynamic
Rhythm
Orientation
Integration / Differentiation of Form
Form Transformation

Study of Digital Cameras

Figure 4.5: Selection of Digital camera for visual study

Figure 4.6: Identification of visual elements / attributes of digital camera

Ordering and classification of visual forms

Superficial modulation

Plain — Relief — 1

Techno-image

Simple — Complex — 2

Orientation

Horizontal — Vertical — 3

Volumetric modulation

Simple — Complex — 4

Figure 4.7: Classification of forms of Digital camera based on visual attributes

Form Character

5

Integrated Differentiated

Grip modulation

6

Plain bulky

Black body forms

7

Simple Complex

4.1.3 Stages of the form generation process of the camera - Case examples

To enrich the understanding of the form generation processes as normally followed by designers, specific case studies were identified that examined stages in the product form development process for the camera. These examined inspirational and evolutionary stages of the visual elements that contributed to the expressive quality of the product form and its semantic meaning. This was done in the form of visual examples that were identified through published literature search. This contributed in identification of the various stages of the visual form generation process followed by a designer. It brought better understanding of the concepts of 'Aesthetics' and 'Expression' of product form.

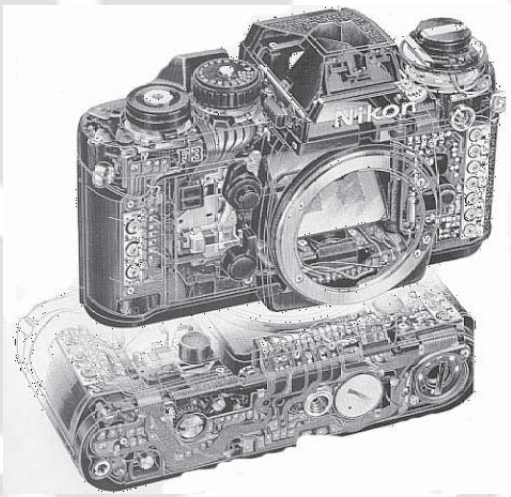


Figure 4.8: X-ray view showing techno complexity of a camera

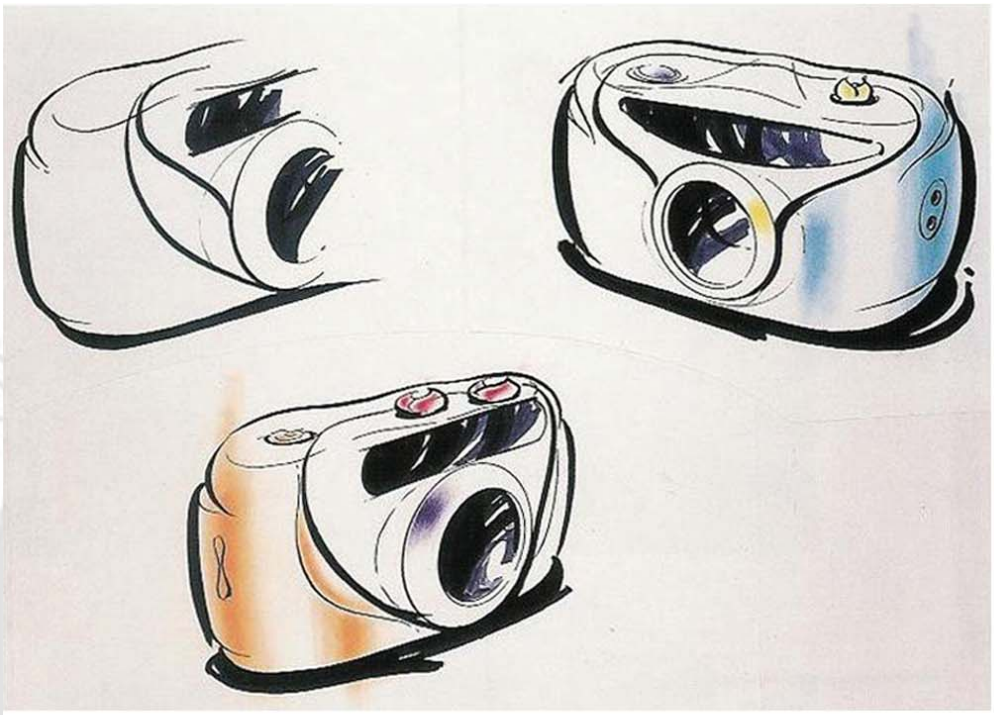
Photo Credits: (Figures 4.8 to 4.15)

Images for the case study of the creative process of product form development for a camera are Courtesy : Meisei Publications, Japan.

Source :
Nagashima, N. and Sano, K. (1994) *Industrial Design Workshop - The creative process behind Product Design 2,* Meisei Publications, Japan, 108-120.

Case example 1:

Stages of the form generation process of a camera



Initial sketches of camera designed for the youth. Ourdoor, funky and youthful

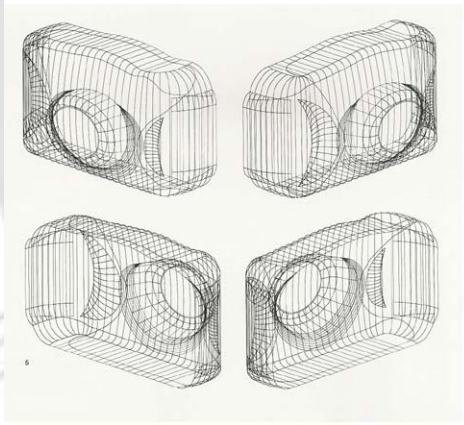
Simulated foam models

Figure 4.9: Initoia concept skecthes for a camera

Camera for under water use

Form of shutter release inspired from ripples in water

Figure 4.10: Form generation for controls inspired from nature



Concept proposals for Color ways through orthographic representations

Computer generated wireframe drawing of camera body

Figure 4.11: Concept alternatives for colour combinations of product form

Case example 2:

1

3

2

4

5

1- Variations of form - simulated 1:1 foam models

2- Form inspired by the shape of a dolphin

3- Different stages of finishing the concept block models

4- Finished model and first prototype

5- Working on the model

Figure 4.12 Mock-up models of concepts of product form

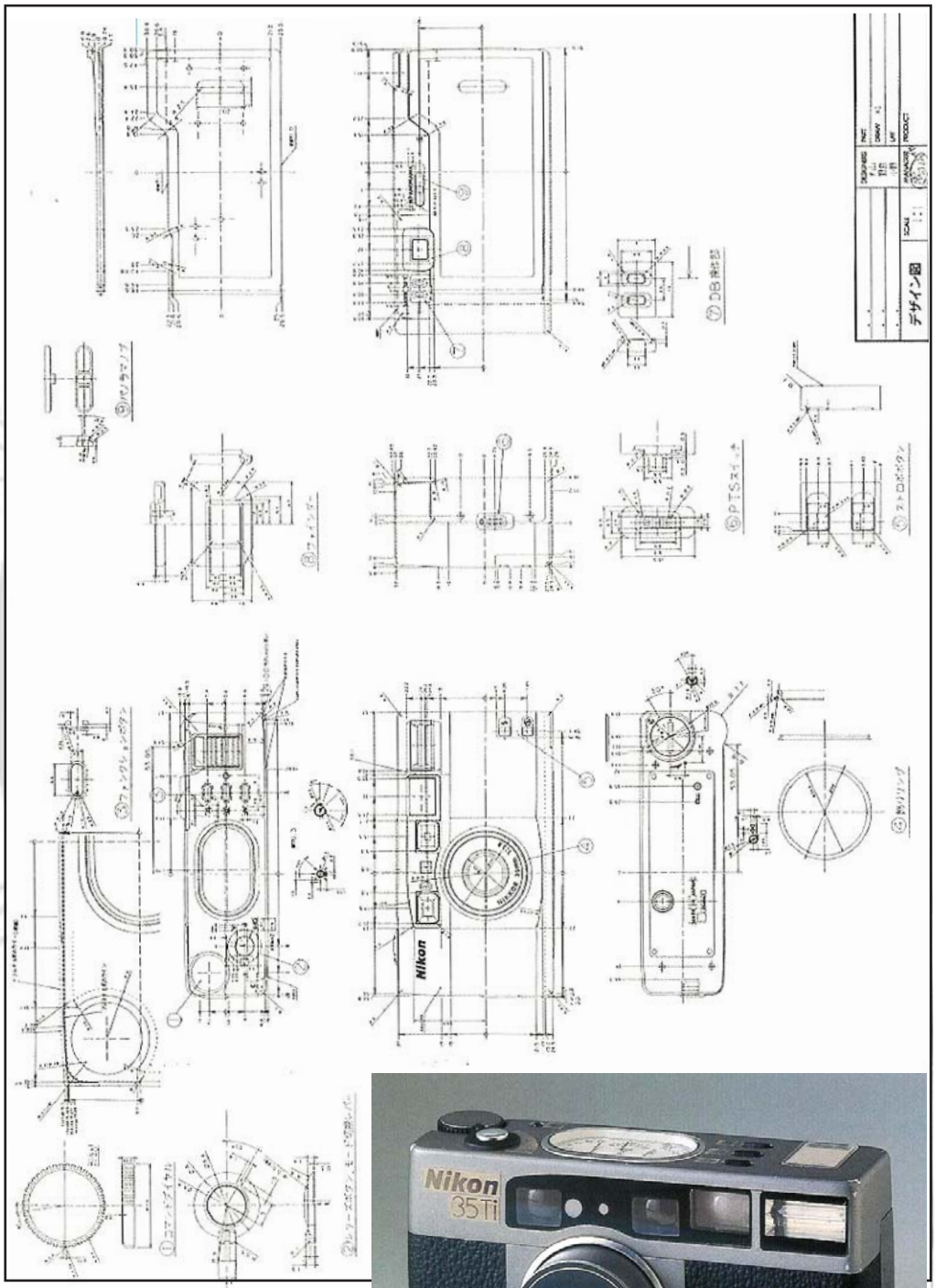
Figure 4.13: Stages in the development of the product - from concept to final prototype

Finished Models of camera

Concept alternatives

Figure 4.14: Finished mock up models of product concepts

Case example 3:
Final product on the market



Design drawing for manufacturing

Final Product

Figure 4.5: Selection of Digital camera for visual study

4.2 Section 2: User Centric Study

User Centric Study included the following aspects:

- Revisiting the objectives of the user study in the context of the chosen product - the digital camera
- Planning the methodology for the user centric study
- Instrument of measurement for the user centric study
- Design of the visual flip chart

4.2.1 Objectives of User Centric Study

The user centric study set out to seek answers for the following research queries:

- What are the consumer preferences with regard to products' overall form, surface characteristics including ornamentation, etc..?
- What are the consumer preferences with regard to details of form, shape, color, color saturation, value, texture, gloss levels, etc..?
- Do specific product features generally contribute to a higher perceived value of the product? What kind of features?

The inferences drawn based from these findings would help the designer on the following points:

- How should the designer translate the cultural needs or preferences of identified consumer segment in the design of the product form?
- What should be done differently in the design in order to meet the expectations of the identified consumer segment?

4.2.2 Planning the methodology for the user centric study

Considering the different methods outlined in the previuos chapter, it was evident that the parameters involved visual aspects and user perceptions of product form. Given the background and the objective of the research study, it was therefore considered appropriate to opt for a mixed method research approach drawing from qualitative methods and quantitative methods.

Research on user preferences for product appearances, product features, product colours was sought for the following:

- Preferences for shapes, formal elements and attributes,
- Preferences for spatial ambiences,
- Preferences for surface finishes,
- Preferences for screen layouts

The literature review indicated that 'image based approach rather than a 'text based' approach was more effective in sustaining user interest in such studies. It logically also seemed apt considering the nature of the study. This led to the design of a visual flip book for seeking users' response that would enable interaction with the respondents through visual cueing. The design of the flip chart and selection of the appropriate visuals and their sequencing was planned drawing from the 3 dimensional form analysis methodology adopted by Reed (Figure 4.16) to elicit user responses. It also ensured reduction of ambiguity and sustenance of interest of the respondents.

Research on socio-cultural and techno-cultural characteristics of users was gathered through the design of Questionnaire and through Direct Observation. This included:

- Photography and imaging habits
- Exposure and familiarity with technology as well as levels of operational comfort
- Users aspiration for product ownership.

Research on behavioral and visual idioms of the living environment was planned through photo documentation. Such an approach was planned to give a holistic perspective to the study of the product and the environment of its use.

4.2.3 Instrument of Measurement for the user centric study

Considering the different Quantitative and Qualitative methods reviewed in the earlier chapter it seemed the method of MaxDiff was appropriate as an instrument of measurement as it had the following advantages that met the research objectives. It was noted that MaxDiff questionnaires are relatively easy for most respondents to understand. Furthermore, humans are much better at judging items at extremes than in discriminating among items of middling importance or preference (Louviere 1993). And since the responses involve choices of items rather than expressing strength of preference, there is no opportunity for scale use bias as MaxDiff is "scale free" (Cohen and Markowitz 2002). This method was reported as an extremely valuable feature of the method for cross-cultural research studies. Further MaxDiff method is increasingly being used as an approach for obtaining preference/importance scores for multiple items

(brand preferences, brand images, product features, advertising claims, etc..) using marketing or social survey research. It could be used effectively to measure respondents' preferences for things such as brands, product features, or product packaging. It could also be used to prioritize a list of performance attributes or gauge the potential impact of different advertising claims. It seemed appropriate to be used for (best-worst scaling) experiments.

Based on the above considerations it was decided that the methods and instruments of measurement for the user centric study would be a mixed method involving a combination of Questionnaires, Direct observations and Interview Technique; and Quantitative method involving frequency of response, cross tabulation and MaxDiff method.

It was felt an on-line survey would help to scale up the sample size and the data statistically be subjected to analysis for a larger cross section of population. The outcome offered the possibility for future research that may seek cultural characteristics and preference patterns. The results of such large data and the inferences drawn from its analyses may prove useful to summarize recommendations for product form objectives to be met in the design and development of the selected product in the subsequent phase of design development.

Drawing inspiration from the approach followed by Reed and Kolner, the product under study was examined considering its elements line, plane and volume and the inter-relationship of these elements in the context of the overall form of the product. The elements were abstracted into basic geometric form inter-relationships considering the dominant, sub-dominant and tertiary form elements. Variations were generated modifying axis, proportions, orientation and surface texture to derive abstract representations of form sets. As articulated earlier the objective was to generate variations in specific syntactic elements of the form so that these images could be used to evaluate users' preference for the aesthetic parameters of the product form.

Based on Rowena Reed's classification of visual form elements

Basic Elements	***Dimensions of Elements***	***Variations of Dimensions***	***Form Characteristics***
Volume -	*3-D*		*Massive*
			Positive Elements
Plane -	*2-D*		*Superficial*
			Negative Element
Line –	*1-D*		*Extensional*
			Linear and Curvilinear
Point –	*0-D*		*-*

Principles

Proportion *Extensional; Superficial; Massive*

Movement
Axis - Primary; Secondary; Tertiary
Axial Movement: Inner; Continual; Directional

Forces
Strength - Weak Strong
Scope - Focused; Spread; Neutral
Directionality – Concave; Convex
Angularity,
Accentuated; Neutral
Relationship
Transitional Forces - Divide; Adapt; Merge; Distort
Order – Dominant; Sub dominant; Subordinate
Joining Relationship
Axial Relationship – Oppositional; Adjacent; Across; Parallel

Attributes

Heavy - Light
Fast - Slow
Static - Dynamic

Rhythm
Orientation
Integration / Differentiation
Form Transformation

Figure 4.16: Reed's classification of visual forms

Further study of the product could also be examined from another perspective as suggested by Lannoch (1989). He proposes that products could be examined from the point of view of six semantic dimensions outlined below:

1. Dimension of experiential qualities attributed to spatial forms based on an individual's immediate sensory experience. The product form could be angular, soft, rough, smooth, hard, heavy, strong, balanced, stable etc.

2. Dimensions of orientation where product form may contain directional assertions indicating the location or position of something relative to a typical user/ observer. Orientations characterize spatial form from a point of view that requires reference to the human body: front, behind, left, right, top, bottom etc.

3. The product form may state dimension / encompass alternate way of being - the different positions / state that something may occupy - locked, still, lying, standing, hanging, closed etc.

4. Dimension of comparative judgment entails expression of a form deviation of some aspects from the ideal or referent (typicality)

high – low
heavy – light
narrow – broad
loud - sober

5. Affordance Dimension is composed of how something can be used; what it does for someone; or what it is capable of performing in interaction with the user. For example gripable, turnable, detachable, portable, flexible etc.

6. Dimensions of value and conventions refer to statements that are derived from the assumptions of socially shared and conventional standards relative to which something is evaluated or apprised - beautiful, ugly, comfortable, practical etc.

These approaches indicate the possible ways in which the camera could be examined for its form and its use. A visual flip book was planned. Selections of visual elements and their variations to be presented to end users were incorporated.

4.2.4 Design of the Visual Flip Chart

Product centric studies undertaken in the earlier section revealed the necessity of including variations for the different elements of the product form in a strategic manner. Initially a collection of digital camera images of existing products were visually analyzed to identify the dominant and sub-dominant visual features and variations of their syntactic elements. This helped to identify the plan and order of the different product forms. Variations were inclusive and covered all identified syntactic elements and their attributes in the visuals selected for seeking user response.

These included product form, product features and product colors where the following aspects of the form could be examined:

- product shapes, their formal elements and attributes
- spatial organization
- colors and finishes
- study of visual surface elements such as screen layouts on the back of the camera, display and control elements etc.

However it was felt that the study of visual interface elements like screen layouts, display control elements involved more in-depth experiments that followed the norms and principles of usability and was outside the scope of this thesis. Studies in product color and finishes although well within the scope of this study, was also not taken up since it was a large domain that could be examined as a separate in-depth project study by itself. These two aspects were therefore not considered during the subsequent on-line phase of the study.

The first section essentially comprising the 'visual flip chart album' contained a series of three visual sets that were designed and identified as:

- Series 1: Formal Elements (FE)
- Series 2: Formal Attributes (FA)
- Series 3: Form Camera (FC)

Users' response was sought through the means of visual queuing. Variations were carefully built into the selection of the visuals and the pattern of questions to ensure an accurate degree of qualitative response from the respondents. The visuals were carefully classified and grouped into plates with choice of up to a maximum of five alternative visual choices for each attribute.

These different plates were arranged sequentially under the series FE, FA and FC respectively.

Following the MaxDiff method, the response to questions was elicited using a discrete choice method. The respondents were asked to select responses in terms of choice of 'most preferred' / 'least preferred'.

The purpose of this section was:

- to elicit responses the analysis of which would help in drawing inferences regarding preferences for product form
- to ascertain degrees of preferences
- to cross-confirm individual preferences and examine a specific pattern, if any.

4.2.4.1 Planning of Series 1: Form Elements (FE) series

Based on the approach followed by Reed and Kolner as outlined earlier in the chapter, a series of forms constituting the FE series were generated in which elements were abstracted into basic geometric form inter-relationships. These were generated considering the dominant, sub-dominant and tertiary form elements. Variations were generated modifying axis, proportions, orientation and surface texture to derive abstract representations of form sets.

4.2.4.2 Planning of Series 2: Form Attributes (FA) Series

Plate No.	Form Contour Characteristics
FE 1	Basic Primitive forms
FE 2	Orientation bias of forms (vertical / horizontal)
FE 3	Edge treatment of forms (sharp/rounded)
FE 4	Element emphasis characteristics (e.g. lens of camera)
FE 5	Contour characteristics of forms (double bend axis/convex/concave)
FE 6	Lay out of Element characteristics (balance, symmetry)
FE 7	Planar complexity of forms (integrated/differentiated)
FE 8	Horizontality/verticality of formal elements/features
FE 9	Edge characteristics of forms
FE 10	Visual metaphors on forms
FE 11	General forms

FE Series - Ordering and classification of abstracted form elements

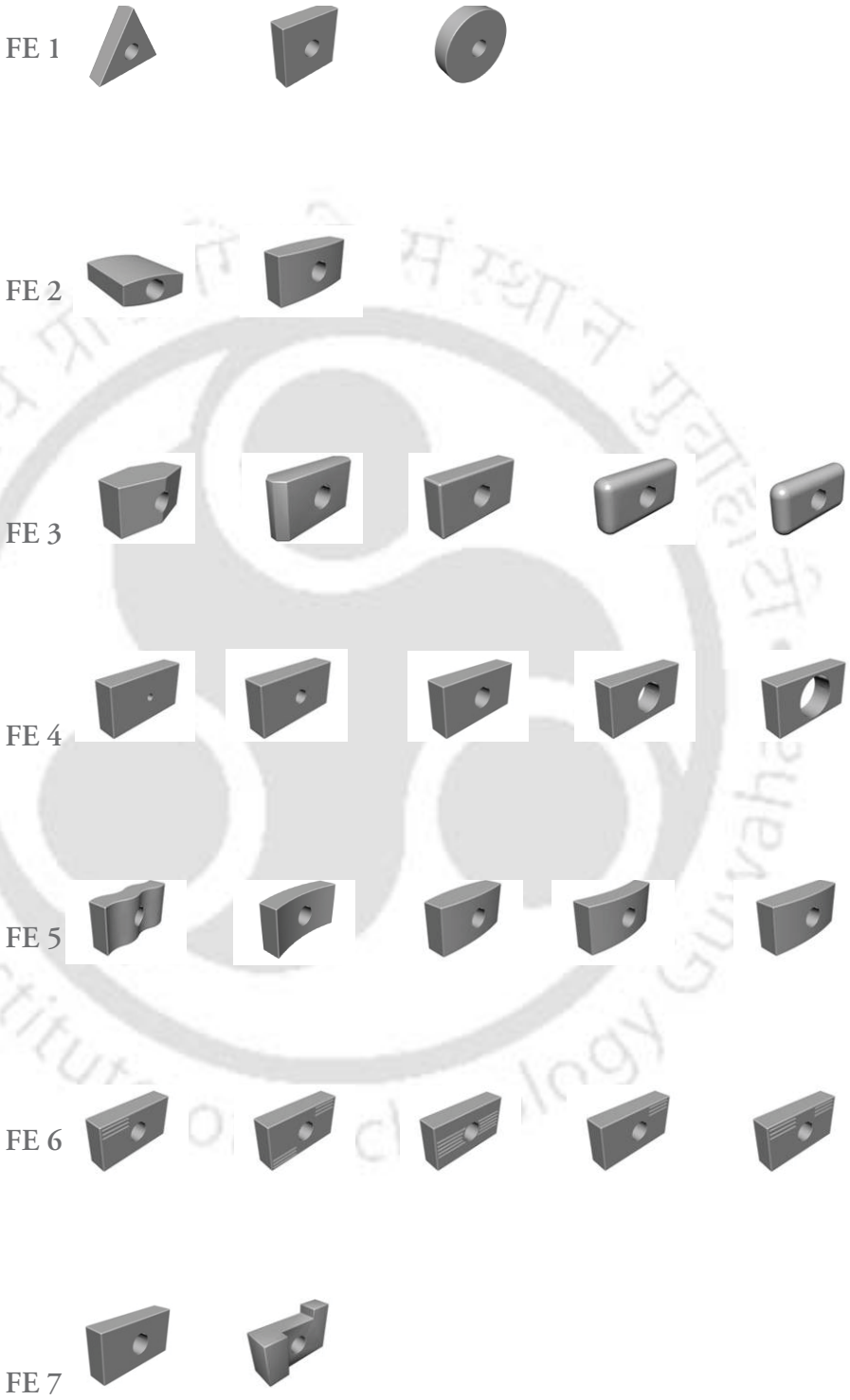


Figure 4.17: Ordering of form elements (FE Series)

FE 8 

FE 9 

FE 10 

FE 11 

In planning series 2- Form Attributes (FA) attempt was to re confirm user preferences for the visual characteristics of familiar product of everyday use.

In this section of the flip chart album, everyday products and familiar objects were carefully selected and presented to the respondents for their qualitative preferences in terms of perceived product image and its formal characteristics and attributes. Unlike preferences for specific features of form, as in series 1, here 'like most' in which '1st choice' and '2nd choice' was asked for. The entire series was presented in realistic colors. The following form attributes were examined through selection and grouping of a diverse range of everyday familiar products:

4.2.4.3 Planning of Series 3 - form preferences for digital camera (FC) series

Panel		Attributes_
FA1	-	Ornamental/contemporary/ classical/functional/modern
FA2	-	Product styles
FA3	-	Formal variations of axis: straight, bent, curved
FA4	-	Degree of ornamentation, visual metaphor, simplicity
FA5	-	Superficial variations of product elements
FA6	-	Layout of elements on screen
FA7	-	Variations of control elements
FA8	-	Futuristic options
FA9	-	Variations of display control elements
FA10	-	Style variations in environment of use
FA11	-	Color ways for product form
FA12	-	Color ways for personal wear
FA13	-	Form variations for domestic product
FA14	-	Style variations in ambience of interiors
FA15	-	Form variations for entertainment product

FA 1

Ornamental/contemporary/ classical/functional/modern

FA 2

Product styles

FA 3

Formal variations of axis: straight, bent, curved

FA 4

Degree of ornamentation, visual metaphor, simplicity

FA 5

Superficial variations of product elements

Figure 4.18: Ordering of products of everyday use based on product attributes (FA Series)

FA 6

Layout of elements on screen

FA 7

Variations of control elements

FA 8

Futuristic options

FA 9

Variations of display control elements

FA 10

Style variations in environment of use

FA 11

Color ways for product form

FA 12

Color ways for personal wear

FA 13

Style variations in environment of use

FA 14

Color ways for personal wear

FA 15

Form variations for entertainment product

In this series visual plates were prepared which included planned variations for the chosen product - the digital camera. The study aimed to focus specifically on the chosen product, and to examine if there was any pattern of preferences that would emerge from the specific product under consideration in comparison to other related products of everyday use examined under the FA series studied earlier.

The entire series was selected from realistic product images drawn from a product catalogue. The following form attributes were examined:

4.2.4.4 Design of Questionnaire

Panel		Attributes
FC 1	-	Form orientation: horizontal / vertical
FC 2	-	Surface finish
FC 3	-	Emphasis of 'eye' of the camera
FC 4	-	Degree of emphasis of form elements (Integration / Differentiation)
FC 5	-	Superficial treatment: simplicity/complexity (visual busyness)
FC 6	-	Grip and hold emphasis: degree of simplicity / complexity
FC 7	-	Visual image: trendy, sturdy, macho, unconventional, techno-image
FC 8	-	Superficial Monochrome combination
FC 9	-	Form style



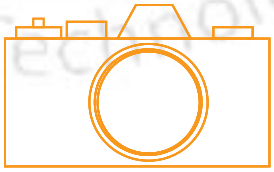




Figure 4.19: Ordering of digital cameras based on product attributes (FC Series)

Complementing the information sought on form preferences by means of the 'visual flip book album' that was designed above, additional information as related to the respondent's socioeconomic conditions and sociocultural values was also sought. The questionnaire specified data from respondents of their lifestyle and habits, preference for products of use of everyday objects, their personal data etc..

The questions were designed using a mix of choice based questions, rank based questions and preference based questions to elicit information from the user.

The section of the questionnaire sought to gather information that would subsequently be useful to map the preference pattern amongst different user segments. The objectives behind collecting and collating the information were:

- To map distinct sociocultural and socioeconomic variations in preference patterns
- To formulate a basis for target user segmentation
- To map photography habits of the respondents
- To map patterns of product ownership and ownership aspirations of respondents as groups and sub-groups
- To map comfort levels vis-à-vis products and technology.

The findings from the questionnaire would help to understand product ownership and usage patterns, brand awareness levels and typical habits of the respondents with respect to imaging styles. The respondents' familiarity with technology of related products could also be gauged.

Specific questions to be posed to the respondents for this study would focus on:
- Camera ownership
- Complexities of cameras owned
- Habit of taking photographs
- Kinds of photographs usually taken
- Usage and display of photographs
- Recall of camera brands.

The last section of the questionnaire sought personal information from the respondents. Here the respondents were requested for their personal details regarding their age, gender, education level, occupation, place of origin, monthly household expenditure. These would help build up the lifestyle profile of the respondents. (Appendix 1)

An individual 'research kit' was thus created which consisted of:

- a flip chart album
- a formatted questionnaire for each respondent, and
- pre-formatted response sheet to note down responses for each respondent.

4.2.4.5 Design of Response sheet

To keep the interaction simple to understand and use, the respondent data sheet was designed as a single sheet of paper that had tabulated response sheet for all the three categories – Series FE, Series FA and Series FC as distinct tables. The respondents had to see the visual flip book and circle the choice of preference.

Personal data of the respondent was sought which included variables of age group, gender, occupation, monthly income, education level and geographical region of origin. (Appendix 1)

4.3 Conclusions

In this chapter the planning of the experiment for conducting a users' study to measure the preferences for the visual aspects of the product form of the digital camera as the product under study has been outlined. The following chapter examines how the methodology was field tested.

Chapter 5 Conducting Empirical Studies

CONDUCTING EMPIRICAL STUDIES

5.0 Introduction

This chapter examines two field experiments that were conducted to test the methodology outlined in the previous chapter. These include the following:

Experiment 1: As a pilot study, focus group trials have been conducted using the visual flip chart and questionnaire designed for the experiment. Direct observations of users were also made during the process of conducting the experiment. Based on some of the findings and observations, the approach and methodology were further refined to overcome some of the lacunae identified therein.

Experiment 2: The experiment adopted a mixed method research approach that combined questionnaire and environment of use studies through direct observation. The MaxDiff analysis method, with a visual image based format was administered through an online survey seeking 'most liked' user preferences. The data was subsequently subjected to frequency and cross-tabulation measurement instruments for analysis, evaluation and drawing inferences.

5.1 Experiment 1: Planning and Conducting Focus Group Study

The experiment was conducted with an objective that it would give an opportunity to make direct observations of the user when they were administered the test. Through this approach it was possible to have one on one interaction with the user. Suitable prompts could be given whenever it was required by the user.

It was planned that a brief outline of the aims and objectives of the research study would be explained to the respondents. The sample sheet of the visuals from the visual flip book was shown and the attributes of the visual design elements of the selected product form (camera) were explained. The respondents were told the mode of circling against the identified visual in the response sheet.

The visuals were presented in the order FE Series, FA series followed by FC series and observations made of the respondents as they went through the visual flip book. The response sheet was collected at the end and the results were tabulated. The session would be concluded following an informal exchange seeking feedback of the respondent's experience. Verbal communication with the respondents was largely in English language.

5.1.1 Location of study

To test the methodology and approach it was felt convenient to conduct this research study on IIT Guwahati campus in the capital city of the state of Assam, located in the north eastern region of India. The user segment was identified from amongst design students and members of the staff and faculty of IIT Guwahati where a trial experiment was conducted to test the efficacy of the study. The sample size was around 51 people. Respondents comprised of both genders. They were in the range of 18 to 25 and 26 to 45 years of age. Being professionals and technocrats or service oriented respondents, they had varying degrees of familiarity and operational comfort with technology in general and digital technology in particular.

5.1.2 Identification of User segment and Respondent Profiling

The residential campus of the technical institution offered sampling advantages. Samples could be drawn comprising of members of its faculty, staff and students from across a broad cross section of respondents coming from various geographical regions of the country. The average literacy of the respondents was consistently high. It was possible to get back to the respondents for personal interviews later. The campus being residential in nature interactions with the respondents in their living environment and personal interview with other members of the family was also possible. Photo-documentation of their living environment was planned based on these factors.

A focus group approach was therefore adopted in which ten to twelve respondents were invited to participate at a time based on samples drawn from different age categories.

5.1.3 Administration of the Test for the Focus Group

For the purpose of conducting trials initially Form Element Series (FE series), Form Attribute Series (FA Series) and Form Camera (FC Series) was administered to the focus group. This was complemented by a questionnaire which sought information on the respondent's profile.

The users study was conducted for the respondents in their academic workplace and for some at their homes.

5.1.4 Summary of Responses of Focus Group Study

Tabulated below is the summary of the responses for the series FE in which the 'Most Preferred' and the 'Second Most Preferred' are highlighted and FA series and FC series in which the 'Most Preferred' are highlighted.

Table 5.1: Tabulation of results for Frequency distribution - FE series

Results of Pilot Study - Experiment 1
Sample Size: 51
Age Group: 18-45 years
Gender: Both Male and Female

Plate No.	Form Contour Characteristics
FE 1	Basic Inclination to form types (primitive forms)
FE 2	Orientation bias of forms (vertical)
FE 3	Edge treatment of forms (Sharp/Rounded)
FE 4	Element emphasis characteristics (e.g. lens of camera)
FE 5	Contour characteristics of forms (predominantly convex/concave) FE
FE 6	Element characteristics (balance, symmetry)
FE 7	Planar complexity of forms
FE 8	Horizontality/verticality of formal elements/features
FE 9	Edge characteristics of forms
FE 10	Visual metaphors on forms
FE 11	General forms

(---Table 5.1 continued on next page)

Table 5.1: Empirical study 1 - Frequency distribution for FE series

FE Series (Most Preferred)

Plate No.	1	2	3	4	5	None	Total
FE 1	18	8	**25**	0	0	0	51
FE 2	**32**	19	0	0	0	0	51
FE 3	3	4	12	**18**	14	0	51
FE 4	2	5	**21**	16	6	1	51
FE 5	6	8	9	**15**	13	0	51
FE 6	7	**16**	14	7	7	0	51
FE 7	**27**	23	0	0	0	1	51
FE 8	17	**28**	0	0	0	6	51
FE 9	9	8	**16**	7	10	1	51
FE 10	15	**35**	0	0	0	1	51
FE 11	0	15	5	11	**19**	1	51

FE Series (Second Most Preferred)

Plate No.	1	2	3	4	5	None	Total
FE 1	**18**	8	25	0	0	0	51
FE 2	32	**19**	0	0	0	0	51
FE 3	3	4	12	18	**14**	0	51
FE 4	2	5	21	**16**	6	1	51
FE 5	6	8	9	15	**13**	0	51
FE 6	7	16	**14**	7	7	0	51
FE 7	27	**23**	0	0	0	1	51
FE 8	**17**	28	0	0	0	6	51
FE 9	9	8	16	7	**10**	1	51
FE 10	**15**	35	0	0	0	1	51
FE 11	0	**15**	5	11	19	1	51

Table 5.1: Empirical study 1 - Frequency distribution for FE series

Table 5.2: Tabulation of results for Frequency distribution - FA series

Results of Pilot Study - Experiment 1
Sample Size: 61
Age Group: 18-45 years
Gender: Both Male and Female

Plate No.		Attributes
FA1	-	Ornamental/contemporary/ modern/retro/modern
FA2	-	Product styles
FA3	-	Formal variations of axis: straight, bent, curved
FA4	-	Degree of ornamentation, visual metaphor, simplicity
FA5	-	Superficial variations of product elements
FA6	-	Layout of elements on screen
FA7	-	Variations of control elements
FA8	-	Futuristic options
FA9	-	Variations of display control elements
FA10	-	Style variations in environment of use
FA11	-	Color ways for product form
FA12	-	Color ways for personal wear
FA13	-	Form variations for domestic product
FA14	-	Style variations in ambience of interiors
FA15	-	Form variations for entertainment product

(---Table 5.2 continued on next page)

Table 5.2: Empirical study 1 - Frequency distribution for FA series - First Preference

	Form Preference							
Plate No.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**None**
FA 1	20	**21**	5	3	9			3
FA 2	13	**15**	10	**15**	4	4		
FA 3	**21**	1	4	6	14	1	14	1
FA 4	8	8	15	10	**17**			3
FA 5	15	8	**17**	13	7			1
FA 6	8	3	20	**22**	8			
FA 7	4	7	5	**24**	20			1
FA 8	5	14	10	**24**	6			2
FA 9	6	14	11	**17**	13			
FA 10	**18**	5	16	9	8	4		1
FA 11	3	3	13	15	**25**			2
FA 12	4	2	1	16	**18**	13	6	1
FA 13	5	7	10	**25**	13			1
FA 14	12	4	9	**31**	3			2
FA 15	**16**	10	9	14	11			1

Frequency distribution for FA series - Second Preference

	Form Preference							
Plate No.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**None**
FA 1	13	13	10	8	**14**			
FA 2	12	**13**	9	7	7	7		3
FA 3	12	3	7	6	13	3	**16**	
FA 4	11	**16**	13	7	12			3
FA 5	12	**13**	10	12	11			2
FA 6	13	4	14	**17**	11			1
FA 7	9	6	**16**	9	**16**		1	
FA 8	11	9	5	**21**	10			2
FA 9	5	12	**20**	11	13			
FA 10	12	8	11	12	**17**			
FA 11	8	7	8	**27**	10			
FA 12	5	8	2	11	**13**	12	8	
FA 13	10	8	**16**	15	10			
FA 14	**28**	10	2	8	10			
FA 15	10	6	8	**17**	**17**			

Table 5.2: Empirical study 1 - Frequency distribution for FA series

Table 5.3: Tabulation of results for Frequency distribution - FC series

Summary of Users Response to the visual domain of Camera

Plate No.	Visual Characteristics of Camera Form
FC 1	Orientation of camera
FC2	Surface modulation
FC3	Eye of the camera
FC 4	Integrated / Differentiation of body
FC5	Degree of visual complexity / Visual busyness
FC 6	Gripability
FC7	Techno complexity

Sample Size: 41
Age Group: 18-45 years
Gender: Both Male and Female

Plate No.	**1**	**2**	**3**	**4**	**5**	**Total**
FC 1	9	**32**	0	0	0	41
FC2	18	**23**	0	0	0	41
FC3	**17**	12	12	0	0	41
FC 4	**28**	13	0	0	0	41
FC5	**14**	10	10	5	2	41
FC 6	5	9	5	**11**	**11**	41
FC7	8	4	3	**13**	12	41

Table 5.3: Empirical study 1 - Frequency distribution for FC series

Results of Table 5.1,5.2 and 5.3 can now be compared and cross confirmed for drawing inferences.

5.1.5 Some Observations on the Methodology and its limitations

It was observed that the average time consumed for the complete series was about 30 minutes. This proved to be too long and respondents were feeling fatigue towards the end.

The sample size was relatively too small (variying between 41 to 61 respondents) and the pilot study conducted at best gave indicative user preference patterns of overall likes and dislikes of the product forms. For more authentic results the sample size could be relatively large (around 200 Respondents).

The product form alternatives and the visual design parameters were too many. The visual parameter chosen for some of the plates did not contribute much to bring any interesting insights and these visuals could be eliminated as visuals from the visual flip chart. This would reduce the time for administering the test without compromising on the outcome of the results produced.

For the purpose of seeking overall preference indicators for product form, the respondents found the visual method easy and interesting. Further it was noted that these preference indicators would be useful in formulating a product brief for ideation of the visual features of the product.

However it was also noted that during the subsequent phase after ideation, when concept selection and validation was to be measured with respondents, more specific parameters of visual design consideration would be considered. These would have to be subject to the overall preference and also to a measure of 'likes' and 'dislikes'. This could be attempted at the product validation stage of any new product development process using conjoint method. This could be tested on conceptual models or beta level prototypes for preference with end users.

The experiment raised definite questions if such a qualitative approach to the study could be complemented by using a more rigorous mixed method of research for the measurement of the preference pattern. Could the considerations of measurement be based on tried and tested statistical methods of study adopted from other marketing domains as mentioned in the earlier approach by setting up another experiment?
Empirical study 2 was therefore planned for this purpose and has been outlined below.

5.2 Experiment 2 –Planning and Conducting On-line survey

While the qualitative methods considered in Experiment 1, seemed appropriate for concept validation stage, it was felt that there was need to give inputs (on users' preference for product form) to the product planning team for the stage 0 phase. This could be based on seeking users' response to the visual domain of product form based on a more rigorous statistical approach. Experiment 2 was planned to examine the same.

Considering that the sample size of the respondents would be higher it demanded the appropriate selection of a suitable software packages be made to seek user response through an on line survey. The data base generated could then be subjected both to frequency tabulation and to cross tabulation to get a measure of preference pattern for specific variables such as:

– age group
– geographical region of origin of respondent
– literacy level of respondent

Further since the objective was to get an overall measure of the preference pattern of users' response to the visual form of a camera, it was felt that the application of MaxDiff method was appropriate for the experiment. The following two software packages were used to set up the on line user survey - SSi Web offered by Sawtooth Inc. of the USA for conducting the on line survey, and SPSS software for statistical tabulation of results. SSi Web offered incorporation of visuals in its package for the online survey. The survey could be planned to include four section: visual section consisting of FE series and FC series for the camera as the product under study , followed by users' opinion and choice sought through the questionnaire format to study their usage pattern, likes and dislikes, general techno-awareness regarding photography practice and a final section that sought the respondents profile.

The data base so generated could be subsequently transferred to the SPSS software and be subjected to various statistical measurement instruments including frequency and cross tabulations to find 'indicative' patterns of users' preference.

5.2.1 Setting up the Experiment

It was noted that there was good cross representation of students, staff and teaching faculty from different parts of the country in the age group range 18-25 years and 25 to 45 years of age who could be approached to participate in this study. Their

technical awareness and comfort with the use of digital products of every day use including the use of digital camera was generally high.

The online survey title 'User survey for the preference of the visual characteristics of products of everyday use' (called USP) was designed carrying forward the outline planned in experiment 1 with suitable modifications. The modifications included the following aspects:

For the FC series visuals of existing cameras available in the market place were selected. These were screened and short listed from a selection of product images downloaded from the web after careful categorization based on identified visual attributes. These were grouped under plates FC1 to FC 9. The number of visuals chosen was in the range of 2 to 5 visuals per plate. The respondents were to choose the visual form they 'Like the Most'.

Questions formulated included preference for camera, photography habits, brand associations, and product feature where respondents were asked for their choice of most preferred/ most liked etc.

The last section sought data on user's personal profile. These included age range they belonged to, gender, educational backgrounds, region of origin in India that they belonged to etc.

The institute already had in place intranet connectivity to facilitate the online survey. The institute offered selection of a range of software including a statistical program like SPSS which was accessed for use for this experiment. On request Sawtooth software of the USA made available a demonstration software package comprising of SSi web to plan and outline the on line survey.

5.2.2 Conducting the experiment

The on-line survey was outlined in 4 sections: These include the FC series followed by the FE series. After which followed the questionnaire section which sought user response to choice based questions for the most preferred choices for cameras, modes of use and storage, transport, cost range, habits etc..

The last section sought responses to identify the respondents, their personal profile including age, gender, region of India they came from, their monthly expenses and contact e-mail address. The online survey was called 'User survey for preference of products of common use (USP).

Respondents were informed by giving prior invitation through e-mail marked to the various groups including members of the faculty, staff and students of the institute. They were informed the nature of the design research project and were invited to actively participate in the on line survey. Following which the online survey was launched through the Institute's intranet network. At the back end, the data was collated by writing a separate database program specifically for the purpose of this study using MySQL program.

5.2.3 Sample Size

Within the constraints of the time available and the cost of conducting such a survey, it seemed appropriate to scale up the experiment for a sample size of 250 respondents.

The survey was kept active online for the duration of 12 days and received 438 hits from a community of 3500 residents of the campus belonging to the three categories – faculty, students and staff. Of these, entries of 252 respondents were found to be complete in all aspects and were considered as the sample for evaluation.

5.2.4 Results of the On-line Survey

The on-line entry made by respondents was tabulated at the back end using the MySQL program and formed the data base. This data was transferred to the SPSS program and subjected to frequency tabulations and cross tabulation considering the different parameters. The results were then examined and inferences drawn of the 'indicative' preference pattern of the respondents.

The details of the results are tabulated as per the following list indicated below:

Category	**Table Number and Page No.**	**Description**
Profile of Respondents	Table 5.4 P 112 to 114	Profile of respondents - Age wise - Occupation wise - Gender wise - Education level wise - Geographical location of respondents

Category	Table Number and Page No.	Description
FC Series	Table 5.5 P 115 to 117	Empirical study 2: Frequency distribution table of form Preference for camera.
FE Series	Table 5.6 P 118 to 120	Empirical study 2: Frequency distribution table of form Preference for aspired form.
MaxDiff series	Table 5.7a P 121 to 123	Empirical study 2: Frequency distribution table based on questionnaire of preference for product use.
Pre Series	Table 5.7b P 124 to 126	Empirical study 2: Frequency distribution table based on questionnaire for most preferred features of camera
Cross Tabulation FC Series	Table 5.8 P 127 to 168	Summary of cross tabulation of Results of preference of camera form (FC Series) based on: - Age wise - Occupation wise - Gender wise - Education level wise - Geographical location of respondents
Cross Tabulation FE Series	Table 5.9 P 169 to 204	Summary of cross tabulation of Results of preference of aspired form (FE Series) based on: - Age wise - Occupation wise - Gender wise - Education level wise - Geographical location of respondents

Category	Table Number and Page No.	Description
Cross Tabulation MaxDiff Series	Table 5.10 P 205 to 243	Summary of cross tabulation of Results of preference for product use (MaxDiff Series) based on: - Age wise - Occupation wise - Gender wise - Education level wise - Geographical location of respondents
Cross Tabulation Pre Series	Table 5.11 P 244 to 267	Summary of cross tabulation of Results of preference for product features (Pre Series) based on: - Age wise - Occupation wise - Gender wise - Education level wise - Geographical location of respondents

Tabulated Results of Empirical Studies

Table 5.4: Empirical study 2 - Frequency Table of Profile of respondents

Tabulated below is the summary of the distribution pattern of respondents who participated in the on line users' survey. They outline the profile of respondents distributed on the following basis:

- Age group
- Gender
- Occupation
- Education level
- Average monthly expenditure
- Region of India they belong to

Age Group

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 18 years	3	1.2	1.2	1.2
	18 to 25 years	161	63.9	63.9	65.1
	25 to 45 years	80	31.7	31.7	96.8
	45 to 65 years	6	2.4	2.4	99.2
	More than 65 years	2	.8	.8	100.0
	Total	252	100.0	100.0	

Occupation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Student	187	74.2	74.2	74.2
	Service	56	22.2	22.2	96.4
	Business	1	.4	.4	96.8
	Self Employed	2	.8	.8	97.6
	Others	6	2.4	2.4	100.0
	Total	252	100.0	100.0	

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		2	.8	.8	.8
	Male	235	93.3	93.3	94.0
	Female	15	6.0	6.0	100.0
	Total	252	100.0	100.0	

Education Level

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		2	.8	.8	.8
	Up to School level	29	11.5	11.5	12.3
	Up to College Level	105	41.7	41.7	54.0
	Up to Post Graduate Studies Level	65	25.8	25.8	79.8
	Professional Course Level	34	13.5	13.5	93.3
	Others	17	6.7	6.7	100.0
	Total	252	100.0	100.0	

Average Monthly Expenditure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		11	4.4	4.4	4.4
	Less than Rs.5000	126	50.0	50.0	54.4
	Rs.5000 - Rs.15000	85	33.7	33.7	88.1
	Rs. 15000 - Rs. 25000	16	6.3	6.3	94.4
	Rs25000 - Rs.50000	6	2.4	2.4	96.8
	Rs.50000 and above	8	3.2	3.2	100.0
	Total	252	100.0	100.0	

Region of India that respondent belongs

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		2	.8	.8	.8
	Northern Region	57	22.6	22.6	23.4
	Southern Region	74	29.4	29.4	52.8
	North East Region	52	20.6	20.6	73.4
	Western Region	23	9.1	9.1	82.5
	Eastern Region	33	13.1	13.1	95.6
	Central Region	8	3.2	3.2	98.8
	Others	3	1.2	1.2	100.0
	Total	252	100.0	100.0	

Table 5.5: Empirical study 2: Frequency distribution table of form preference for camera - FC Series

Camera Form Orientation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		2	.8	.8	.8
	Vertical	45	17.9	17.9	18.7
	Horizontal	205	81.3	81.3	100.0
	Total	252	100.0	100.0	

Surface Finish

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		3	1.2	1.2	1.2
	Glossy Surface finish	85	33.7	33.7	34.9
	Matte surface finish	164	65.1	65.1	100.0
	Total	252	100.0	100.0	

Eye of the Camera

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		3	1.2	1.2	1.2
	Small Lens	89	35.3	35.3	36.5
	Medium Lens	89	35.3	35.3	71.8
	Large Lens	71	28.2	28.2	100.0
	Total	252	100.0	100.0	

Overall Form Treatment

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		2	.8	.8	.8
	Integrated Form	171	67.9	67.9	68.7
	Differentiated Form	79	31.3	31.3	100.0
	Total	252	100.0	100.0	

Surface Modulation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		3	1.2	1.2	1.2
	Plain Surface	110	43.7	43.7	44.8
	Simple Surface	30	11.9	11.9	56.7
	Medium Complex Surface	31	12.3	12.3	69.0
	Complex Surface	34	13.5	13.5	82.5
	Very Complex Surface	44	17.5	17.5	100.0
	Total	252	100.0	100.0	

Hand Grip Treatment

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		2	.8	.8	.8
	Integrated Hand Grip	78	31.0	31.0	31.7
	Subtle and Soft Hand Grip	69	27.4	27.4	59.1
	Geometric and Hard Hand Grip	16	6.3	6.3	65.5
	Complex Hand Grip	15	6.0	6.0	71.4
	Differentiated Hand Grip	72	28.6	28.6	100.0
	Total	252	100.0	100.0	

Overall Personality

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		1	.4	.4	.4
	Amateur Auto focus	60	23.8	23.8	24.2
	Conventional SLR	22	8.7	8.7	32.9
	Digital SLR	64	25.4	25.4	58.3
	Unconventional Digital	37	14.7	14.7	73.0
	Professional Digital SLR	68	27.0	27.0	100.0
	Total	252	100.0	100.0	

Body Color

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		4	1.6	1.6	1.6
	Silver Body	82	32.5	32.5	34.1
	Silver - Black Combination Body	104	41.3	41.3	75.4
	Black Body	62	24.6	24.6	100.0
	Total	252	100.0	100.0	

Body Style

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		2	.8	.8	.8
	Jazzy	29	11.5	11.5	12.3
	Smart	113	44.8	44.8	57.1
	Professional	74	29.4	29.4	86.5
	Bulky	10	4.0	4.0	90.5
	Classical	24	9.5	9.5	100.0
	Total	252	100.0	100.0	

Table 5.6: Empirical study 2 - Frequency distribution table of form preference for aspired form - FE Series

Form Orientation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		1	.4	.4	.4
	Horizontal	36	14.3	14.3	14.7
	Vertical	215	85.3	85.3	100.0
	Total	252	100.0	100.0	

Edge Treatment

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		3	1.2	1.2	1.2
	Sharp Bulky	10	4.0	4.0	5.2
	Sharp Linear	81	32.1	32.1	37.3
	Cuboidal	36	14.3	14.3	51.6
	Straight Edged	83	32.9	32.9	84.5
	Rounded Corners	39	15.5	15.5	100.0
	Large Rounded Corners	252	100.0	100.0	
	Total				

Form Modulation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		3	1.2	1.2	1.2
	Double bent Axis	21	8.3	8.3	9.5
	Single bent Axis	38	15.1	15.1	24.6
	Double Convex Straight Axis	53	21.0	21.0	45.6
	Single Convex Surface with Straight Axis	97	38.5	38.5	84.1
	Plain Cuboidal	40	15.9	15.9	100.0
	Total	252	100.0	100.0	

Layout of Elements

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		6	2.4	2.4	2.4
	Top Left Diagonal	19	7.5	7.5	9.9
	Top right and Bottom Left Symmetrical	65	25.8	25.8	35.7
	Central	48	19.0	19.0	54.8
	Top Right	66	26.2	26.2	81.0
	Top Right Top Left	48	19.0	19.0	100.0
	Total	252	100.0	100.0	

Lens of Camera

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		3	1.2	1.2	1.2
	Very Small	10	4.0	4.0	5.2
	Small Medium	36	14.3	14.3	19.4
	Medium	86	34.1	34.1	53.6
	Medium Large	79	31.3	31.3	84.9
	Large	38	15.1	15.1	100.0
	Total	252	100.0	100.0	

Body

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		2	.8	.8	.8
	Integrated	172	68.3	68.3	69.0
	Simple Differentiated	78	31.0	31.0	100.0
	Complex				
	Total	252	100.0	100.0	

Form Expression

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		2	.8	.8	.8
	Simple and Functional	128	50.8	50.8	51.6
	Unconventional and Metaphoric	122	48.4	48.4	100.0
	Total	252	100.0	100.0	

Table 5.7: Empirical study 2 - Frequency distribution table based on questionnaire of preference for product use - MaxDiff Series

Camera Possession 1_1 - Like Most

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Digital Camera	7	2.8	2.8	2.8
	Handy cam	160	63.5	63.5	66.3
	Mobile phone camera	61	24.2	24.2	90.5
	Total	24	9.5	9.5	100.0
		252	100.0	100.0	

Camera Possession 1_2 - Like Most

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Digital SLR camera	4	1.6	1.6	1.6
	Auto focus camera	130	51.6	51.6	53.2
	Underwater camera	95	37.7	37.7	90.9
	Total	23	9.1	9.1	100.0
		252	100.0	100.0	

Camera Purchase Consideration 2 _1 - Most Important

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Brand name	5	2.0	2.0	2.0
	Technical Features	52	20.6	20.6	22.6
	Ease of use of camera	146	57.9	57.9	80.6
	Total	49	19.4	19.4	100.0
		252	100.0	100.0	

Camera Purchase Consideration 3_1 - Most Important

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		4	1.6	1.6	1.6
	Look and image of camera	50	19.8	19.8	21.4
	After Sales Service of camera	189	75.0	75.0	96.4
	Cost of camera	9	3.6	3.6	100.0
	Total	252	100.0	100.0	

Mode of Photo storage 4_1 - Most Convenient

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		1	.4	.4	.4
	In Photo album	72	28.6	28.6	29.0
	On computer	110	43.7	43.7	72.6
	In Photo-frames	69	27.4	27.4	100.0
	Total	252	100.0	100.0	

Mode of Photo storage 5_1 - Most Convenient

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	In slide format	5	2.0	2.0	2.0
	On CD's/ Removable Pen drives	72	28.6	28.6	30.6
	None of the above	9	3.6	3.6	34.1
	Total	166	65.9	65.9	100.0
		252	100.0	100.0	

Convenience to Carry Camera m2_1 - Most Convenient

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	On Shoulder	43	17.1	17.1	17.1
	In Hand	89	35.3	35.3	52.4
	Around Waist	16	6.3	6.3	58.7
	Total	104	41.3	41.3	100.0
		252	100.0	100.0	

Convenience to Carry Camera m2_2 - Most Convenient

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	In bag	37	14.7	14.7	14.7
	Around neck	56	22.2	22.2	36.9
	Others	82	32.5	32.5	69.4
	Total	77	30.6	30.6	100.0
		252	100.0	100.0	

Type of Photo to Shoot m3_1 - Most Exciting

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		31	12.3	12.3	12.3
	Family	38	15.1	15.1	27.4
	Sports	16	6.3	6.3	33.7
	Outdoors	167	66.3	66.3	100.0
	Total	252	100.0	100.0	

Type of Photo to Shoot m5_1 - Most Exciting

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		29	11.5	11.5	11.5
	Events	43	17.1	17.1	28.6
	Ceremonies / Festivities	161	63.9	63.9	92.5
	Others	19	7.5	7.5	100.0
	Total	252	100.0	100.0	

Empirical study 2 - Frequency distribution table based on questionnaire of preference for product features - Pre Series

Willingness to purchase new camera

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Immediately	27	10.7	10.7	10.7
	Next Three months	109	43.3	43.3	54.0
	In next one year	109	43.3	43.3	97.2
	Not at all	7	2.8	2.8	100.0
	Total	252	100.0	100.0	

Willingness to pay for new camera

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		1	.4	.4	.4
	Rs. 2000 to Rs. 3500	26	10.3	10.3	10.7
	Rs.5000 to Rs. 8000	103	40.9	40.9	51.6
	Rs. 12000 to Rs. 18000	94	37.3	37.3	88.9
	More than Rs. 24000	28	11.1	11.1	100.0
	Total	252	100.0	100.0	

Camera as Personification

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		3	1.2	1.2	1.2
	Companion and soulmate	44	17.5	17.5	18.7
	Faithful pet	38	15.1	15.1	33.7
	Trusted Friend	127	50.4	50.4	84.1
	Cute child	40	15.9	15.9	100.0
	Total	252	100.0	100.0	

Mode of storage of images

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Photo album	64	25.4	25.4	25.4
	Photo prints	8	3.2	3.2	28.6
	On computer	171	67.9	67.9	96.4
	Photo frames	6	2.4	2.4	98.8
	None of the above	3	1.2	1.2	100.0
	Total	252	100.0	100.0	

Camera brand association

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		4	1.6	1.6	1.6
	Kodak	15	6.0	6.0	7.5
	Sony	88	34.9	34.9	42.5
	Canon	74	29.4	29.4	71.8
	Nikon	56	22.2	22.2	94.0
	Olympus	11	4.4	4.4	98.4
	Nokia	2	.8	.8	99.2
	Samsung	2	.8	.8	100.0
	Total	252	100.0	100.0	

FC 1 1   2

Table 5.8: Summary of cross tabulation of Results of preference of camera form (FC Series) based on:

- **Age wise**
- **Occupation wise**
- **Gender wise**
- **Education level wise**
- **Geographical location of respondents**

Frequency of Preference for FC Series

Count

Camera Form Orientation		Vertical	Horizontal	Total
Less than 18 years			3	3
18 to 25 years	2	30	129	161
25 to 45 years		14	66	80
45 to 65 years			6	6
More than 65 years		1	1	2

Sub group: FC 1

Frequency of Preference for FC Series

%

Camera Form Orientation		Vertical	Horizontal	Total
Less than 18 years			100.0%	100.0%
18 to 25 years	1.2%	18.6%	80.1%	100.0%
25 to 45 years		17.5%	82.5%	100.0%
45 to 65 years			100.0%	100.0%
More than 65 years		50.0%	50.0%	100.0%

Sub group: FC 1

Frequency of Preference for FC Series

Count

Camera Form Orientation		Vertical	Horizontal	Total
Student	2	33	152	187
Service		9	47	56
Business			1	1
Self Employed			2	2
Others		3	3	6

Sub group: FC 1

Frequency of Preference for FC Series

%

Camera Form Orientation		Vertical	Horizontal	Total
Student	1.1%	17.6%	81.3%	100.0%
Service		16.1%	83.9%	100.0%
Business			100.0%	100.0%
Self Employed			100.0%	100.0%
Others		50.0%	50.0%	100.0%

Sub group: FC 1

Frequency of Preference for FC Series

Count

Camera Form Orientation		Vertical	Horizontal	Total
			2	2
Male	2	41	192	235
Female		4	11	15

Sub group: FC 1

Frequency of Preference for FC Series

%

Camera Form Orientation		Vertical	Horizontal	Total
			100.0%	100.0%
Male	.9%	17.4%	81.7%	100.0%
Female		26.7%	73.3%	100.0%

Sub group: FC 1

Frequency of Preference for FC Series

Count

Camera Form Orientation		Vertical	Horizontal	Total
		1	1	2
Up to School level		6	23	29
Up to College Level	2	20	83	105
Up to Post Graduate Studies		10	55	65
Level Professional Course Level		5	29	34
Others		3	14	17

Sub group: FC 1

Frequency of Preference for FC Series

%

Camera Form Orientation		Vertical	Horizontal	Total
		50.0%	50.0%	100.0%
Up to School level		20.7%	79.3%	100.0%
Up to College Level	1.9%	19.0%	79.0%	100.0%
Up to Post Graduate Studies		15.4%	84.6%	100.0%
Level Professional Course Level		14.7%	85.3%	100.0%
Others		17.6%	82.4%	100.0%

Sub group: FC 1

Frequency of Preference for FC Series

Count

		Vertical	Horizontal	Total
			2	2
Northern Region		9	48	57
Southern Region	1	11	62	74
North East Region		12	40	52
Western Region	1	4	18	23
Eastern Region		5	28	33
Central Region		1	7	8
Others		3		3

Sub group: FC 1

Frequency of Preference for FC Series

%

		Vertical	Horizontal	Total
			100.0%	100.0%
Northern Region		15.8%	84.2%	100.0%
Southern Region	1.4%	14.9%	83.8%	100.0%
North East Region		23.1%	76.9%	100.0%
Western Region	4.3%	17.4%	78.3%	100.0%
Eastern Region		15.2%	84.8%	100.0%
Central Region		12.5%	87.5%	100.0%
Others		100.0%		100.0%

Sub group: FC 1

FC 2 1 2

Frequency of Preference for Series FC 2

Count

Surface Finish		Glossy Surface finish	Matte surface finish	Total
Less than 18 years		1	2	3
18 to 25 years	2	67	92	161
25 to 45 years	1	17	62	80
45 to 65 years			6	6
More than 65 years			2	2

Sub group: FC 2

Frequency of Preference for Series FC 2

%

Surface Finish		Glossy Surface finish	Matte surface finish	Total
Less than 18 years		33.3%	66.7%	100.0%
18 to 25 years	1.2%	41.6%	57.1%	100.0%
25 to 45 years	1.3%	21.3%	77.5%	100.0%
45 to 65 years			100.0%	100.0%
More than 65 years			100.0%	100.0%

Sub group: FC 2

Frequency of Preference for Series FC 2

Count

Surface Finish		Glossy Surface finish	Matte surface finish	Total
Student	2	73	112	187
Service	1	10	45	56
Business			1	1
Self Employed			2	2
Others		2	4	6

Sub group: FC 2

Frequency of Preference for Series FC 2

%

Surface Finish		Glossy Surface finish	Matte surface finish	Total
Student	1.1%	39.0%	59.9%	100.0%
Service	1.8%	17.9%	80.4%	100.0%
Business			100.0%	100.0%
Self Employed			100.0%	100.0%
Others		33.3%	66.7%	100.0%

Sub group: FC 2

Frequency of Preference for Series FC 2

Count

Surface Finish		Glossy Surface finish	Matte surface finish	Total
		1	1	2
Male	3	80	152	235
Female		4	11	15

Sub group: FC 2

Frequency of Preference for Series FC 2

%

Surface Finish		Glossy Surface finish	Matte surface finish	Total
		50.0%	50.0%	100.0%
Male	1.3%	34.0%	64.7%	100.0%
Female		26.7%	73.3%	100.0%

Sub group: FC 2

Frequency of Preference for Series FC 2

Count

Surface Finish			Glossy Surface finish	Matte surface finish	Total
	Surface Finish		1	1	2
Up to School level	Surface Finish		14	15	29
Up to College Level	Surface Finish	3	35	67	105
Up to Post Graduate Studies Level	Surface Finish		21	44	65
Professional Course Level	Surface Finish		8	26	34
Others	Surface Finish		6	11	17

Sub group: FC 2

Frequency of Preference for Series FC 2

%

Surface Finish			Glossy Surface finish	Matte surface finish	Total
	Surface Finish		50.0%	50.0%	100.0%
Up to School level	Surface Finish		48.3%	51.7%	100.0%
Up to College Level	Surface Finish	2.9%	33.3%	63.8%	100.0%
Up to Post Graduate Studies Level	Surface Finish		32.3%	67.7%	100.0%
Professional Course Level	Surface Finish		23.5%	76.5%	100.0%
Others	Surface Finish		35.3%	64.7%	100.0%

Sub group: FC 2

Frequency of Preference for Series FC 2

Count

Surface Finish			Glossy Surface finish	Matte surface finish	Total
	Surface Finish			2	2
Northern Region	Surface Finish		19	38	57
Southern Region	Surface Finish	1	29	44	74
North East Region	Surface Finish	1	14	37	52
Western Region	Surface Finish	1	9	13	23
Eastern Region	Surface Finish		7	26	33
Central Region	Surface Finish		5	3	8
Others	Surface Finish		2	1	3

Sub group: FC 2

Frequency of Preference for Series FC 2

%

Surface Finish		Glossy Surface finish	Matte surface finish	Total
			100.0%	100.0%
Northern Region		33.3%	66.7%	100.0%
Southern Region	1.4%	39.2%	59.5%	100.0%
North East Region	1.9%	26.9%	71.2%	100.0%
Western Region	4.3%	39.1%	56.5%	100.0%
Eastern Region		21.2%	78.8%	100.0%
Central Region		62.5%	37.5%	100.0%
Others		66.7%	33.3%	100.0%

Sub group: FC 2

FC 3 1 2 3

Cross tabulation of results for FC 3 series - Frequency and Percentage wise

Age Group		Eye of the Camera				Total
		Small Lens	Medium Lens	Large Lens		
Less than 18 years	Count	1	2	0	0	3
	%	33.3%	66.7%	.0%	.0%	100.0%
18 to 25 years	Count	59	58	41	3	161
	%	36.6%	36.0%	25.5%	1.9%	100.0%
25 to 45 years	Count	27	26	27	0	80
	%	33.8%	32.5%	33.8%	.0%	100.0%
45 to 65 years	Count	2	2	2	0	6
	%	33.3%	33.3%	33.3%	.0%	100.0%
More than 65 years	Count	0	1	1	0	2
	%	.0%	50.0%	50.0%	.0%	100.0%
Total	Count	89	89	71	3	252
	%	35.3%	35.3%	28.2%	1.2%	100.0%

Cross tabulation of results for FC 3 series - Frequency and Percentage wise

Occupation		Eye of the Camera				Total
		Small Lens	Medium Lens	Large Lens		
Student	Count	69	67	48	3	187
	%	36.9%	35.8%	25.7%	1.6%	100.0%
Service	Count	16	19	21	0	56
	%	28.6%	33.9%	37.5%	.0%	100.0%
Business	Count	0	0	1	0	1
	%	.0%	.0%	100.0%	.0%	100.0%
Self Employed	Count	0	2	0	0	2
	%	.0%	100.0%	.0%	.0%	100.0%
Others	Count	4	1	1	0	6
	%	66.7%	16.7%	16.7%	.0%	100.0%
Total	Count	89	89	71	3	252
	%	35.3%	35.3%	28.2%	1.2%	100.0%

Cross tabulation of results for FC 3 series - Frequency and Percentage wise

Gender		Eye of the Camera				Total
		Small Lens	Medium Lens	Large Lens		
Male	Count	83	82	67	3	235
	%	35.3%	34.9%	28.5%	1.3%	100.0%
Female	Count	6	6	3	0	15
	%	40.0%	40.0%	20.0%	.0%	100.0%
	Count	0	1	1	0	2
	%	.0%	50.0%	50.0%	.0%	100.0%
Total	Count	89	89	71	3	252
	%	35.3%	35.3%	28.2%	1.2%	100.0%

Cross tabulation of results for FC 3 series - Frequency and Percentage wise

Education Level		Eye of the Camera				Total
		Small Lens	Medium Lens	Large Lens		
Up to School level	Count	11	11	7	0	29
	%	37.9%	37.9%	24.1%	.0%	100.0%
Up to College Level	Count	36	36	30	3	105
	%	34.3%	34.3%	28.6%	2.9%	100.0%
Up to Post Graduate Studies Level	Count	20	27	18	0	65
	%	30.8%	41.5%	27.7%	.0%	100.0%
Professional Course Level	Count	15	10	9	0	34
	%	44.1%	29.4%	26.5%	.0%	100.0%
Others	Count	6	4	7	0	17
	%	35.3%	23.5%	41.2%	.0%	100.0%
	Count	1	1	0	0	2
	%	50.0%	50.0%	.0%	.0%	100.0%
Total	Count	89	89	71	3	252
	%	35.3%	35.3%	28.2%	1.2%	100.0%

Cross tabulation of results for FC 3 series - Frequency and Percentage wise

Region of India that respondent belongs		Eye of the Camera				Total
		Small Lens	Medium Lens	Large Lens		
Northern Region	Count	23	20	14	0	57
	%	40.4%	35.1%	24.6%	.0%	100.0%
Southern Region	Count	30	26	16	2	74
	%	40.5%	35.1%	21.6%	2.7%	100.0%
North East Region	Count	13	21	18	0	52
	%	25.0%	40.4%	34.6%	.0%	100.0%
Western Region	Count	9	4	9	1	23
	%	39.1%	17.4%	39.1%	4.3%	100.0%
Eastern Region	Count	10	13	10	0	33
	%	30.3%	39.4%	30.3%	.0%	100.0%
Central Region	Count	3	3	2	0	8
	%	37.5%	37.5%	25.0%	.0%	100.0%
Others	Count	0	1	2	0	3
	%	.0%	33.3%	66.7%	.0%	100.0%
	Count	1	1	0	0	2
	%	50.0%	50.0%	.0%	.0%	100.0%
	Count	89	89	71	3	252
	%	35.3%	35.3%	28.2%	1.2%	100.0%

FC 4 1 2

Frequency of Preference for Series FC 4

Count

Overall Form Treatment		Integrated Form	Differentiated Form	Total
Less than 18 years		1	2	3
18 to 25 years	1	116	44	161
25 to 45 years	1	48	31	80
45 to 65 years		4	2	6
More than 65 years		2		2

Sub group: FC 4

Frequency of Preference for Series FC 4

%

Overall Form Treatment		Integrated Form	Differentiated Form	Total
Less than 18 years		33.3%	66.7%	100.0%
18 to 25 years	.6%	72.0%	27.3%	100.0%
25 to 45 years	1.3%	60.0%	38.8%	100.0%
45 to 65 years		66.7%	33.3%	100.0%
More than 65 years		100.0%		100.0%

Sub group: FC 4

Frequency of Preference for Series FC 4

Count

Overall Form Treatment		Integrated Form	Differentiated Form	Total
Student	1	133	53	187
Service	1	34	21	56
Business		1		1
Self Employed			2	2
Others		3	3	6

Sub group: FC 4

Frequency of Preference for Series FC 4

%

Overall Form Treatment		Integrated Form	Differentiated Form	Total
Student	.5%	71.1%	28.3%	100.0%
Service	1.8%	60.7%	37.5%	100.0%
Business		100.0%		100.0%
Self Employed			100.0%	100.0%
Others		50.0%	50.0%	100.0%

Sub group: FC 4

Frequency of Preference for Series FC 4

Count

Overall Form Treatment		Integrated Form	Differentiated Form	Total
		2		2
Male	2	160	73	235
Female		9	6	15

Sub group: FC 4

Frequency of Preference for Series FC 4

%

Overall Form Treatment		Integrated Form	Differentiated Form	Total
		100.0%		100.0%
Male	.9%	68.1%	31.1%	100.0%
Female		60.0%	40.0%	100.0%

Sub group: FC 4

Frequency of Preference for Series FC 4

Count

Overall Form Treatment		Integrated Form	Differentiated Form	Total
			2	2
Up to School level		21	8	29
Up to College Level	2	75	28	105
Up to Post Graduate Studies Level		37	28	65
Professional Course Level		28	6	34
Others		10	7	17

Sub group: FC 4

Frequency of Preference for Series FC 4

%

Overall Form Treatment		Integrated Form	Differentiated Form	Total
			100.0%	100.0%
Up to School level		72.4%	27.6%	100.0%
Up to College Level	1.9%	71.4%	26.7%	100.0%
Up to Post Graduate Studies Level		56.9%	43.1%	100.0%
Professional Course Level		82.4%	17.6%	100.0%
Others		58.8%	41.2%	100.0%

Sub group: FC 4

Frequency of Preference for Series FC 4

Count

Overall Form Treatment		Integrated Form	Differentiated Form	Total
		1	1	2
Northern Region		43	14	57
Southern Region	1	54	19	74
North East Region	1	28	23	52
Western Region		15	8	23
Eastern Region		23	10	33
Central Region		4	4	8
Others		3		3

Sub group: FC 4

Frequency of Preference for Series FC 4

%

Overall Form Treatment		Integrated Form	Differentiated Form	Total
		50.0%	50.0%	100.0%
Northern Region		75.4%	24.6%	100.0%
Southern Region	1.4%	73.0%	25.7%	100.0%
North East Region	1.9%	53.8%	44.2%	100.0%
Western Region		65.2%	34.8%	100.0%
Eastern Region		69.7%	30.3%	100.0%
Central Region		50.0%	50.0%	100.0%
Others		100.0%		100.0%

Sub group: FC 4

1 2 3 4 5

FC 5

Frequency of Preference for Series FC 5

Count

Surface Modulation		Plain Surface	Simple Surface	Medium Complex Surface	Complex Surface	Very Complex Surface	Total
Less than 18 years		2				1	3
18 to 25 years		66	23	21	23	28	161
25 to 45 years	1	40	7	8	10	14	80
45 to 65 years	2	1		2	1		6
More than 65 years		1				1	2

Sub group: FC 5

Frequency of Preference for Series FC 5

%

Surface Modulation		Plain Surface	Simple Surface	Medium Complex Surface	Complex Surface	Very Complex Surface	Total
Less than 18 years		66.7%				33.3%	100.0%
18 to 25 years		41.0%	14.3%	13.0%	14.3%	17.4%	100.0%
25 to 45 years	1.3%	50.0%	8.8%	10.0%	12.5%	17.5%	100.0%
45 to 65 years	33.3%	16.7%		33.3%	16.7%		100.0%
More than 65 years		50.0%				50.0%	100.0%

Sub group: FC 5

Frequency of Preference for Series FC 5

Count

Surface Modulation		Plain Surface	Simple Surface	Medium Complex Surface	Complex Surface	Very Complex Surface	Total
Student		77	25	24	27	34	187
Service	3	26	4	7	7	9	56
Business		1					1
Self Employed		2					2
Others		4	1			1	6

Sub group: FC 5

Frequency of Preference for Series FC 5

%

Surface Modulation		Plain Surface	Simple Surface	Medium Complex Surface	Complex Surface	Very Complex Surface	Total
Student		41.2%	13.4%	12.8%	14.4%	18.2%	100 %
Service	5.4%	46.4%	7.1%	12.5%	12.5%	16.1%	100 %
Business		100.0%					100 %
Self Employed		100.0%					100 %
Others		66.7%	16.7%			16.7%	100 %

Sub group: FC 5

Frequency of Preference for Series FC 5

Count

Surface Modulation		Plain Surface	Simple Surface	Medium Complex Surface	Complex Surface	Very Complex Surface	Total
		1	1				2
Male	3	103	27	27	32	43	235
Female		6	2	4	2	1	15

Sub group: FC 5

Frequency of Preference for Series FC 5

%

Surface Modulation		Plain Surface	Simple Surface	Medium Complex Surface	Complex Surface	Very Complex Surface	Total
		50.0%	50.0%				100.0%
Male	1.3%	43.8%	11.5%	11.5%	13.6%	18.3%	100.0%
Female		40.0%	13.3%	26.7%	13.3%	6.7%	100.0%

Sub group: FC 5

Frequency of Preference for Series FC 5

Count

Surface Modulation		Plain Surface	Simple Surface	Medium Complex Surface	Complex Surface	Very Complex Surface	Total
		1				1	2
Up to School level		12	3	4	5	5	29
Up to College Level	1	39	17	13	15	20	105
Up to Post Graduate Studies Level	2	35	8	5	8	7	65
Professional Course Level		15	2	7	5	5	34
Others		8		2	1	6	17

Sub group: FC 5

Frequency of Preference for Series FC 5

%

Surface Modulation		Plain Surface	Simple Surface	Medium Complex Surface	Complex Surface	Very Complex Surface	Total
		50.0%				50.0%	100.0%
Up to School level		41.4%	10.3%	13.8%	17.2%	17.2%	100.0%
Up to College Level	1.0%	37.1%	16.2%	12.4%	14.3%	19.0%	100.0%
Up to Post Graduate Studies Level	3.1%	53.8%	12.3%	7.7%	12.3%	10.8%	100.0%
Professional Course Level		44.1%	5.9%	20.6%	14.7%	14.7%	100.0%
Others		47.1%		11.8%	5.9%	35.3%	100.0%

Sub group: FC 5

Frequency of Preference for Series FC 5

Count

Surface Modulation		Plain Surface	Simple Surface	Medium Complex Surface	Complex Surface	Very Complex Surface	Total
		2					2
Northern Region		23	8	5	11	10	57
Southern Region		30	9	12	9	14	74
North East Region	1	28	3	5	6	9	52
Western Region	2	7	3	2	3	6	23
Eastern Region		17	6	7	2	1	33
Central Region		3	1		1	3	8
Others					2	1	3

Sub group: FC 5

Frequency of Preference for Series FC 5

%

Surface Modulation		Plain Surface	Simple Surface	Medium Complex Surface	Complex Surface	Very Complex Surface	Total
		100.0%					100.0%
Northern Region		40.4%	14.0%	8.8%	19.3%	17.5%	100.0%
Southern Region		40.5%	12.2%	16.2%	12.2%	18.9%	100.0%
North East Region	1.9%	53.8%	5.8%	9.6%	11.5%	17.3%	100.0%
Western Region	8.7%	30.4%	13.0%	8.7%	13.0%	26.1%	100.0%
Eastern Region		51.5%	18.2%	21.2%	6.1%	3.0%	100.0%
Central Region		37.5%	12.5%		12.5%	37.5%	100.0%
Others					66.7%	33.3%	100.0%

Sub group: FC 5

1 2 3 4 5

FC 6

Frequency of Preference for Series FC 6

Count

Hand Grip Treatment		Integrated Hand Grip	Subtle and Soft Hand Grip	Geometric and Hard Hand Grip	Complex Hand Grip	Differentiated Hand Grip	Total
Less than 18 years		1				2	3
18 to 25 years	1	52	43	8	10	47	161
25 to 45 years	1	24	23	7	4	21	80
45 to 65 years		1	3	1	1		6
More than 65 years						2	2

Sub group: FC 6

Frequency of Preference for Series FC 6

%

Hand Grip Treatment		Integrated Hand Grip	Subtle and Soft Hand Grip	Geometric and Hard Hand Grip	Complex Hand Grip	Differentiated Hand Grip	Total
Less than 18 years		33.3%				66.7%	100.0%
18 to 25 years	.6%	32.3%	26.7%	5.0%	6.2%	29.2%	100.0%
25 to 45 years	1.3%	30.0%	28.8%	8.8%	5.0%	26.3%	100.0%
45 to 65 years		16.7%	50.0%	16.7%	16.7%		100.0%
More than 65 years						100.0%	100.0%

Sub group: FC 6

Frequency of Preference for Series FC 6

Count

Hand Grip Treatment		Integrated Hand Grip	Subtle and Soft Hand Grip	Geometric and Hard Hand Grip	Complex Hand Grip	Differentiated Hand Grip	Total
Student	1	60	51	8	12	55	187
Service	1	15	18	8	3	11	56
Business						1	1
Self Employed						2	2
Others		3				3	6

Sub group: FC 6

Frequency of Preference for Series FC 6

%

Hand Grip Treatment		Integrated Hand Grip	Subtle and Soft Hand Grip	Geometric and Hard Hand Grip	Complex Hand Grip	Differentiated Hand Grip	Total
Student	.5%	32.1%	27.3%	4.3%	6.4%	29.4%	100.0%
Service	1.8%	26.8%	32.1%	14.3%	5.4%	19.6%	100.0%
Business						100.0%	100.0%
Self Employed						100.0%	100.0%
Others		50.0%				50.0%	100.0%

Sub group: FC 6

Frequency of Preference for Series FC 6

Count

Hand Grip Treatment		Integrated Hand Grip	Subtle and Soft Hand Grip	Geometric and Hard Hand Grip	Complex Hand Grip	Differentiated Hand Grip	Total
Male	2	71	69	1 12	14	1 67	2 235
Female		7		3	1	4	15

Sub group: FC 6

Frequency of Preference for Series FC 6

%

Hand Grip Treatment		Integrated Hand Grip	Subtle and Soft Hand Grip	Geometric and Hard Hand Grip	Complex Hand Grip	Differentiated Hand Grip	Total
Male	.9%	30.2%	29.4%	50.0% 5.1%	6.0%	50.0% 28.5%	100.0% 100.0%
Female		46.7%		20.0%	6.7%	26.7%	100.0%

Sub group: FC 6

Frequency of Preference for Series FC 6

Count

Hand Grip Treatment		Integrated Hand Grip	Subtle and Soft Hand Grip	Geometric and Hard Hand Grip	Complex Hand Grip	Differentiated Hand Grip	Total
Up to School level	1	1 9	4	1	1	14	2 29
Up to College Level	1	35	29	5	7	28	105
Up to Post Graduate Studies Level		17	22	6	6	14	65
Professional Course Level		10	13	3		8	34
Others		6	1	1	1	8	17

Sub group: FC 6

Frequency of Preference for Series FC 6

%

Hand Grip Treatment		Integrated Hand Grip	Subtle and Soft Hand Grip	Geometric and Hard Hand Grip	Complex Hand Grip	Differentiated Hand Grip	Total
Up to School level	3.4%	50.0% 31.0%	13.8%	50.0%	3.4%	48.3%	100.0% 100.0%
Up to College Level	1.0%	33.3%	27.6%	4.8%	6.7%	26.7%	100.0%
Up to Post Graduate Studies Level		26.2%	33.8%	9.2%	9.2%	21.5%	100.0%
Professional Course Level		29.4%	38.2%	8.8%		23.5%	100.0%
Others		35.3%	5.9%	5.9%	5.9%	47.1%	100.0%

Sub group: FC 6

Frequency of Preference for Series FC 6

Count

Hand Grip Treatment		Integrated Hand Grip	Subtle and Soft Hand Grip	Geometric and Hard Hand Grip	Complex Hand Grip	Differentiated Hand Grip	Total
		1				1	2
Northern Region	1	24	17	2	1	12	57
Southern Region		23	17	4	4	26	74
North East Region	1	13	10	6	6	16	52
Western Region		4	11	1	2	5	23
Eastern Region		10	13	2		8	33
Central Region		1	1	1	2	3	8
Others		2				1	3

Sub group: FC 6

Frequency of Preference for Series FC 6

%

Hand Grip Treatment		Integrated Hand Grip	Subtle and Soft Hand Grip	Geometric and Hard Hand Grip	Complex Hand Grip	Differentiated Hand Grip	Total
		50.0%				50.0%	100.0%
Northern Region	1.8%	42.1%	29.8%	3.5%	1.8%	21.1%	100.0%
Southern Region		31.1%	23.0%	5.4%	5.4%	35.1%	100.0%
North East Region	1.9%	25.0%	19.2%	11.5%	11.5%	30.8%	100.0%
Western Region		17.4%	47.8%	4.3%	8.7%	21.7%	100.0%
Eastern Region		30.3%	39.4%	6.1%		24.2%	100.0%
Central Region		12.5%	12.5%	12.5%	25.0%	37.5%	100.0%
Others		66.7%				33.3%	100.0%

Sub group: FC 6

1 2 3 4 5

FC 7

Frequency of Preference for Series FC 7

Count

Overall Personality		Amateur Auto focus	Conventional SLR	Digital SLR	Unconventional Digital	Professional Digital SLR	Total
Less than 18 years		1				2	3
18 to 25 years		38	9	48	24	42	161
25 to 45 years	1	21	11	14	13	20	80
45 to 65 years			1	2		3	6
More than 65 years			1			1	2

Sub group: FC 7

Frequency of Preference for Series FC 7

%

Overall Personality		Amateur Auto focus	Conventional SLR	Digital SLR	Unconventional Digital	Professional Digital SLR	Total
Less than 18 years		33.3%				66.7%	100.0%
18 to 25 years		23.6%	5.6%	29.8%	14.9%	26.1%	100.0%
25 to 45 years	1.3%	26.3%	13.8%	17.5%	16.3%	25.0%	100.0%
45 to 65 years			16.7%	33.3%		50.0%	100.0%
More than 65 years			50.0%			50.0%	100.0%

Sub group: FC 7

Frequency of Preference for Series FC 7

Count

Overall Personality		Amateur Auto focus	Conventional SLR	Digital SLR	Unconventional Digital	Professional Digital SLR	Total
Student		44	12	54	27	50	187
Service	1	14	9	5	10	17	56
Business						1	1
Self Employed				2			2
Others		2	1	3			6

Sub group: FC 7

Frequency of Preference for Series FC 7

%

Overall Personality		Amateur Auto focus	Conventional SLR	Digital SLR	Unconventional Digital	Professional Digital SLR	Total
Student		23.5%	6.4%	28.9%	14.4%	26.7%	100.0%
Service	1.8%	25.0%	16.1%	8.9%	17.9%	30.4%	100.0%
Business						100.0%	100.0%
Self Employed				100.0%			100.0%
Others		33.3%	16.7%	50.0%			100.0%

Sub group: FC 7

Frequency of Preference for Series FC 7

Count

Overall Personality		Amateur Auto focus	Conventional SLR	Digital SLR	Unconventional Digital	Professional Digital SLR	Total
Male	1	57	20	58	36	63	235
Female		3	2	5	1	4	15
				1		1	2

Sub group: FC 7

Frequency of Preference for Series FC 7

%

Overall Personality		Amateur Auto focus	Conventional SLR	Digital SLR	Unconventional Digital	Professional Digital SLR	Total
Male	.4%	24.3%	8.5%	24.7%	15.3%	26.8%	100.0%
Female		20.0%	13.3%	33.3%	6.7%	26.7%	100.0%
				50.0%		50.0%	100.0%

Sub group: FC 7

Frequency of Preference for Series FC 7

Count

Overall Personality		Amateur Auto focus	Conventional SLR	Digital SLR	Unconventional Digital	Professional Digital SLR	Total
Up to School level		5	3	9	4	8	29
Up to College Level	1	25	5	31	20	23	105
Up to Post Graduate Studies Level		17	8	15	4	21	65
Professional Course Level		10	4	7	4	9	34
Others		3	2	1	5	6	17
				1		1	2

Sub group: FC 7

Frequency of Preference for Series FC 7

%

Overall Personality		Amateur Auto focus	Conventional SLR	Digital SLR	Unconventional Digital	Professional Digital SLR	Total
Up to School level		17.2%	10.3%	50.0% 31.0%	13.8%	50.0% 27.6%	100.0% 100.0%
Up to College Level	1.0%	23.8%	4.8%	29.5%	19.0%	21.9%	100.0%
Up to Post Graduate Studies Level		26.2%	12.3%	23.1%	6.2%	32.3%	100.0%
Professional Course Level		29.4%	11.8%	20.6%	11.8%	26.5%	100.0%
Others		17.6%	11.8%	5.9%	29.4%	35.3%	100.0%

Sub group: FC 7

Frequency of Preference for Series FC 7

Count

Overall Personality		Amateur Auto focus	Conventional SLR	Digital SLR	Unconventional Digital	Professional Digital SLR	Total
				2			2
Northern Region		18	5	14	9	11	57
Southern Region		18	2	22	8	24	74
North East Region	1	14	7	10	6	14	52
Western Region		1	5	7	5	5	23
Eastern Region		7	2	8	6	10	33
Central Region n		2		1	1	4	8
Others			1		2		3

Sub group: FC 7

Frequency of Preference for Series FC 7

%

		Amateur Auto focus	Conventional SLR	Digital SLR	Unconventional Digital	Professional Digital SLR	Total
Northern Region		31.6%	8.8%	100.0% 24.6%	15.8%	19.3%	100.0% 100.0%
Southern Region		24.3%	2.7%	29.7%	10.8%	32.4%	100.0%
North East Region	1.9%	26.9%	13.5%	19.2%	11.5%	26.9%	100.0%
Western Region		4.3%	21.7%	30.4%	21.7%	21.7%	100.0%
Eastern Region		21.2%	6.1%	24.2%	18.2%	30.3%	100.0%
Central Region		25.0%		12.5%	12.5%	50.0%	100.0%
Others			33.3%		66.7%		100.0%

Sub group: FC



1 2 3

FC 8

Frequency of Preference for Series FC 8

Count

Body Color		Silver Body	Silver - Black Combination Body	Black Body	Total
Less than 18 years		1	1	1	3
18 to 25 years	1	56	65	39	161
25 to 45 years	3	23	36	18	80
45 to 65 years		1	2	3	6
More than 65 years		1		1	2

Sub group: FC 8

Frequency of Preference for Series FC 8

%

Body Color		Silver Body	Silver - Black Combination Body	Black Body	Total
Less than 18 years		33.3%	33.3%	33.3%	100.0%
18 to 25 years	.6%	34.8%	40.4%	24.2%	100.0%
25 to 45 years	3.8%	28.8%	45.0%	22.5%	100.0%
45 to 65 years		16.7%	33.3%	50.0%	100.0%
More than 65 years		50.0%		50.0%	100.0%

Sub group: FC 8

Frequency of Preference for Series FC 8

Count

Body Color		Silver Body	Silver - Black Combination Body	Black Body	Total
Student	1	64	80	42	187
Service	3	12	23	18	56
Business				1	1
Self Employed		2			2
Others		4	1	1	6

Sub group: FC 8

Frequency of Preference for Series FC 8

%

Body Color		Silver Body	Silver - Black Combination Body	Black Body	Total
Student	.5%	34.2%	42.8%	22.5%	100.0%
Service	5.4%	21.4%	41.1%	32.1%	100.0%
Business				100.0%	100.0%
Self Employed		100.0%			100.0%
Others		66.7%	16.7%	16.7%	100.0%

Sub group: FC 8

Frequency of Preference for Series FC 8

Count

Body Color		Silver Body	Silver - Black Combination Body	Black Body	Total
Male	4	74	98	2 59	2 235
Female		8	6	1	15

Sub group: FC 8

Frequency of Preference for Series FC 8

%

Body Color		Silver Body	Silver - Black Combination Body	Black Body	Total
Male				100.0%	100.0%
Female	1.7%	31.5%	41.7%	25.1%	100.0%
		53.3%	40.0%	6.7%	100.0%

Sub group: FC 8

Frequency of Preference for Series FC 8

Count

Body Color		Silver Body	Silver - Black Combination Body	Black Body	Total
Up to School level		1		1	2
		9	14	6	29
Up to College Level	2	36	39	28	105
Up to Post Graduate Studies Level		21	31	13	65
Professional Course Level	2	10	11	11	34
Others		5	9	3	17

Sub group: FC 8

Frequency of Preference for Series FC 8

%

Body Color		Silver Body	Silver - Black Combination Body	Black Body	Total
Up to School level		50.0%		50.0%	100.0%
Up to College Level		31.0%	48.3%	20.7%	100.0%
Up to Post Graduate Studies Level	1.9%	34.3%	37.1%	26.7%	100.0%
Professional Course Level		32.3%	47.7%	20.0%	100.0%
Others	5.9%	29.4%	32.4%	32.4%	100.0%
		29.4%	52.9%	17.6%	100.0%

Sub group: FC 8

Frequency of Preference for Series FC 8

Count

Body Color		Silver Body	Silver - Black Combination Body	Black Body	Total
Northern Region		2			2
Southern Region		23	19	15	57
North East Region	1	26	32	15	74
Western Region	3	17	18	14	52
Eastern Region		2	13	8	23
Central Region		8	17	8	33
Others		1	5	2	8
		3			3

Sub group: FC 8

Frequency of Preference for Series FC 8

%

Body Color		Silver Body	Silver - Black Combination Body	Black Body	Total
Northern Region		100.0% 40.4%	33.3%	26.3%	100.0% 100.0%
Southern Region	1.4%	35.1%	43.2%	20.3%	100.0%
North East Region	5.8%	32.7%	34.6%	26.9%	100.0%
Western Region		8.7%	56.5%	34.8%	100.0%
Eastern Region		24.2%	51.5%	24.2%	100.0%
Central Region		12.5%	62.5%	25.0%	100.0%
Others		100.0%			100.0%

Sub group: FC 8

1 2 3 4 5

FC 9

Frequency of Preference for Series FC 9

Count

Body Style		Jazzy	Smart	Professional	Bulky	Classical	Total
Less than 18 years			1	1		1	3
18 to 25 years	1	25	74	40	9	12	161
25 to 45 years	1	4	34	30	1	10	80
45 to 65 years			3	3			6
More than 65 years			1			1	2

Sub group: FC 9

Frequency of Preference for Series FC 9

%

Body Style		Jazzy	Smart	Professional	Bulky	Classical	Total
Less than 18 years			33.3%	33.3%		33.3%	100.0%
18 to 25 years	.6%	15.5%	46.0%	24.8%	5.6%	7.5%	100.0%
25 to 45 years	1.3%	5.0%	42.5%	37.5%	1.3%	12.5%	100.0%
45 to 65 years			50.0%	50.0%			100.0%
More than 65 years			50.0%			50.0%	100.0%

Sub group: FC 9

Frequency of Preference for Series FC 9

Count

Body Style		Jazzy	Smart	Professional	Bulky	Classical	Total
Student	1	26	85	48	9	18	187
Service	1	3	23	23	1	5	56
Business			1				1
Self Employed			2				2
Others			2	3		1	6

Sub group: FC 9

Frequency of Preference for Series FC 9

%

Body Style		Jazzy	Smart	Professional	Bulky	Classical	Total
Student	.5%	13.9%	45.5%	25.7%	4.8%	9.6%	100.0%
Service	1.8%	5.4%	41.1%	41.1%	1.8%	8.9%	100.0%
Business			100.0%				100.0%
Self Employed			100.0%				100.0%
Others			33.3%	50.0%		16.7%	100.0%

Sub group: FC 9

Frequency of Preference for Series FC 9

Count

Body Style		Jazzy	Smart	Professional	Bulky	Classical	Total
Male	2	28	106	2 68	8	23	2 235
Female		1	7	4	2	1	15

Sub group: FC 9

Frequency of Preference for Series FC 9

%

Body Style		Jazzy	Smart	Professional	Bulky	Classical	Total
Male	.9%	11.9%	45.1%	100.0% 28.9%	3.4%	9.8%	100.0% 100.0%
Female		6.7%	46.7%	26.7%	13.3%	6.7%	100.0%

Sub group: FC 9

Frequency of Preference for Series FC 9

Count

Body Style		Jazzy	Smart	Professional	Bulky	Classical	Total
Up to School level	1	2	13	1 11		3	2 29
Up to College Level	1	19	46	24	6	9	105
Up to Post Graduate Studies Level		3	33	23		6	65
Others		3 2	17 4	9 6	2 2	3 3	34 17

Sub group: FC 9

Frequency of Preference for Series FC 9

%

Body Style		Jazzy	Smart	Professional	Bulky	Classical	Total
Up to School level	50.0%	6.9%	44.8%	50.0% 37.9%		10.3%	100.0% 100.0%
Up to College Level	1.0%	18.1%	43.8%	22.9%	5.7%	8.6%	100.0%
Up to Post Graduate Studies Level		4.6%	50.8%	35.4%		9.2%	100.0%
Professional Course Level		8.8%	50.0%	26.5%	5.9%	8.8%	100.0%
Others		11.8%	23.5%	35.3%	11.8%	17.6%	100.0%

Sub group: FC 9

Frequency of Preference for Series FC 9

Count

Body Style		Jazzy	Smart	Professional	Bulky	Classical	Total
			1	1			2
Northern Region		11	27	9	2	8	57
Southern Region	1	6	38	21	5	3	74
North East Region	1	5	21	20		5	52
Western Region		6	9	6	1	1	23
Eastern Region		1	13	14	1	4	33
Central Region			4	3	1		8
Others						3	3

Sub group: FC 9

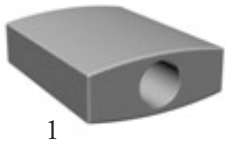
Frequency of Preference for Series FC 9

%

Body Style		Jazzy	Smart	Professional	Bulky	Classical	Total
			50.0%	50.0%			100.0%
Northern Region		19.3%	47.4%	15.8%	3.5%	14.0%	100.0%
Southern Region	1.4%	8.1%	51.4%	28.4%	6.8%	4.1%	100.0%
North East Region	1.9%	9.6%	40.4%	38.5%		9.6%	100.0%
Western Region		26.1%	39.1%	26.1%	4.3%	4.3%	100.0%
Eastern Region		3.0%	39.4%	42.4%	3.0%	12.1%	100.0%
Central Region			50.0%	37.5%	12.5%		100.0%
Others						100.0%	100.0%

Sub group: FC 9

FE 1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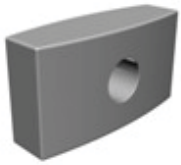
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Table 5.9: Summary of cross tabulation of Results of preference of aspired form (FE Series) based on:

- Age wise
- Occupation wise
- Gender wise
- Education level wise
- Geographical location of respondents

Frequency of Preference for Series FE 1

Count

Form Orientation		Horizontal	Vertical	Total
Less than 18 years	1	2	3	
18 to 25 years	21	140	161	
25 to 45 years	13	66	80	
45 to 65 years		6	6	
More than 65 years	1	1	2	

Sub group: FE 01

Frequency of Preference for Series FE 1

%

Form Orientation		Horizontal	Vertical	Total
Less than 18 years	1.3%	33.3%	66.7%	100.0%
18 to 25 years		13.0%	87.0%	100.0%
25 to 45 years		16.3%	82.5%	100.0%
45 to 65 years			100.0%	100.0%
More than 65 years		50.0%	50.0%	100.0%

Sub group: FE 01

Frequency of Preference for Series FE 1

Count

Form Orientation		Horizontal	Vertical	Total
Student		24	163	187
Service	1	9	46	56
Business			1	1
Self Employed			2	2
Others		3	3	6

Sub group: FE 01

Frequency of Preference for Series FE 1

%

Form Orientation		Horizontal	Vertical	Total
Student		12.8%	87.2%	100.0%
Service	1.8%	16.1%	82.1%	100.0%
Business			100.0%	100.0%
Self Employed			100.0%	100.0%
Others		50.0%	50.0%	100.0%

Sub group: FE 01

Frequency of Preference for Series FE 1

Count

Form Orientation		Horizontal	Vertical	Total
Male		1	1	2
Female	1	32	202	235
		3	12	15

Sub group: FE 01

Frequency of Preference for Series FE 1

%

Form Orientation		Horizontal	Vertical	Total
Male		50.0%	50.0%	100.0%
Female	.4%	13.6%	86.0%	100.0%
		20.0%	80.0%	100.0%

Sub group: FE 01

Frequency of Preference for Series FE 1

Count

Form Orientation		Horizontal	Vertical	Total
		1	1	2
Up to School level		2	27	29
Up to College Level	1	15	89	105
Up to Post Graduate		9	56	65
Studies Level Professional Course		6	28	34
Level Others		3	14	17

Sub group: FE 01

Frequency of Preference for Series FE 1

%

Form Orientation		Horizontal	Vertical	Total
		50.0%	50.0%	100.0%
Up to School level		6.9%	93.1%	100.0%
Up to College Level	1.0%	14.3%	84.8%	100.0%
Up to Post Graduate		13.8%	86.2%	100.0%
Studies Level Professional Course		17.6%	82.4%	100.0%
Level Others		17.6%	82.4%	100.0%

Sub group: FE 01

Frequency of Preference for Series FE 1

Count

Form Orientation		Horizontal	Vertical	Total
		1	1	2
Up to School level		2	27	29
Up to College Level	1	15	89	105
Up to Post Graduate Studies Level		9	56	65
Professional Course Level		6	28	34
Others		3	14	17

Sub group: FE 01

Frequency of Preference for Series FE 1

%

Form Orientation		Horizontal	Vertical	Total
		50.0%	50.0%	100.0%
Up to School level		6.9%	93.1%	100.0%
Up to College Level	1.0%	14.3%	84.8%	100.0%
Up to Post Graduate Studies Level		13.8%	86.2%	100.0%
Professional Course Level		17.6%	82.4%	100.0%
Others		17.6%	82.4%	100.0%

Sub group: FE 01

Frequency of Preference for Series FE 1

Count

Form Orientation		Horizontal	Vertical	Total
		1	1	2
Northern Region		7	50	57
Southern Region		10	64	74
North East Region	1	10	41	52
Western Region		4	19	23
Eastern Region		3	30	33
Central Region			8	8
Others		1	2	3

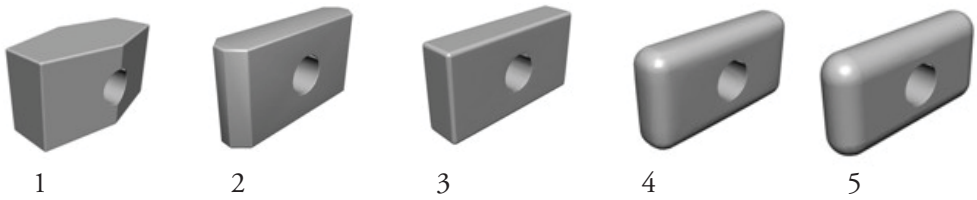
Sub group: FE 01

Frequency of Preference for Series FE 1

%

Form Orientation		Horizontal	Vertical	Total
		50.0%	50.0%	100.0%
Northern Region		12.3%	87.7%	100.0%
Southern Region		13.5%	86.5%	100.0%
North East Region	1.9%	19.2%	78.8%	100.0%
Western Region		17.4%	82.6%	100.0%
Eastern Region		9.1%	90.9%	100.0%
Central Region			100.0%	100.0%
Others		33.3%	66.7%	100.0%

Sub group: FE 01



1 2 3 4 5

FE 2

Frequency of Preference for Series FE 2

Count

Edge Treatment		Sharp Bulky	Sharp Linear	Cuboidal Straight Edged	Rounded Corners	Large Rounded Corners	Total
Less than 18 years					3		3
18 to 25 years	2	3	57	20	50	29	161
25 to 45 years	1	6	24	14	27	8	80
45 to 65 years				1	3	2	6
More than 65 years		1		1			2

Sub group: FE 2

Frequency of Preference for Series FE 2

%

Edge Treatment		Sharp Bulky	Sharp Linear	Cuboidal Straight Edged	Rounded Corners	Large Rounded Corners	Total
Less than 18 years					100.0%		100.0%
18 to 25 years	1.2%	1.9%	35.4%	12.4%	31.1%	18.0%	100.0%
25 to 45 years	1.3%	7.5%	30.0%	17.5%	33.8%	10.0%	100.0%
45 to 65 years				16.7%	50.0%	33.3%	100.0%
More than 65 years		50.0%		50.0%			100.0%

Sub group: FE 2

Frequency of Preference for Series FE 2

Count

Edge Treatment		Sharp Bulky	Sharp Linear	Cuboidal Straight Edged	Rounded Corners	Large Rounded Corners	Total
Student	2	3	66	25	61	30	187
Service	1	6	12	9	20	8	56
Business				1			1
Self Employed			2				2
Others		1	1	1	2	1	6

Sub group: FE 2

Frequency of Preference for Series FE 2

%

Edge Treatment		Sharp Bulky	Sharp Linear	Cuboidal Straight Edged	Rounded Corners	Large Rounded Corners	Total
Student	1.1%	1.6%	35.3%	13.4%	32.6%	16.0%	100.0%
Service	1.8%	10.7%	21.4%	16.1%	35.7%	14.3%	100.0%
Business				100.0%			100.0%
Self Employed			100.0%				100.0%
Others		16.7%	16.7%	16.7%	33.3%	16.7%	100.0%

Sub group: FE 2

Frequency of Preference for Series FE 2

Count

Edge Treatment		Sharp Bulky	Sharp Linear	Cuboidal Straight Edged	Rounded Corners	Large Rounded Corners	Total
Male	3	10	1 77	35	78	1 32	2 235
Female			3	1	5	6	15

Sub group: FE 2

Frequency of Preference for Series FE 2

%

Edge Treatment		Sharp Bulky	Sharp Linear	Cuboidal Straight Edged	Rounded Corners	Large Rounded Corners	Total
Male	1.3%	4.3%	50.0% 32.8%	14.9%	33.2%	50.0% 13.6%	100.0% 100.0%
Female			20.0%	6.7%	33.3%	40.0%	100.0%

Sub group: FE 2

Frequency of Preference for Series FE 2

Count

Edge Treatment		Sharp Bulky	Sharp Linear	Cuboidal Straight Edged	Rounded Corners	Large Rounded Corners	Total
			1	1			2
Up to School level		2	8	4	12	3	29
Up to College Level	3	1	39	13	30	19	105
Up to Post Graduate Studies Level		3	19	8	27	8	65
Professional Course Level		2	10	7	9	6	34
Others		2	4	3	5	3	17

Sub group: FE 2

Frequency of Preference for Series FE 2

%

Edge Treatment		Sharp Bulky	Sharp Linear	Cuboidal Straight Edged	Rounded Corners	Large Rounded Corners	Total
			50.0%	50.0%			100.0%
Up to School level		6.9%	27.6%	13.8%	41.4%	10.3%	100.0%
Up to College Level	2.9%	1.0%	37.1%	12.4%	28.6%	18.1%	100.0%
Up to Post Graduate Studies Level		4.6%	29.2%	12.3%	41.5%	12.3%	100.0%
Professional Course Level		5.9%	29.4%	20.6%	26.5%	17.6%	100.0%
Others		11.8%	23.5%	17.6%	29.4%	17.6%	100.0%

Sub group: FE 2

Frequency of Preference for Series FE 2

Count

Edge Treatment		Sharp Bulky	Sharp Linear	Cuboidal Straight Edged	Rounded Corners	Large Rounded Corners	Total
				1	1		2
Northern Region	1	1	19	7	21	8	57
Southern Region		1	26	9	24	14	74
North East Region	1	5	13	5	15	13	52
Western Region	1	2	3	3	12	2	23
Eastern Region			17	11	5		33
Central Region			3		3	2	8
Others		1			2		3

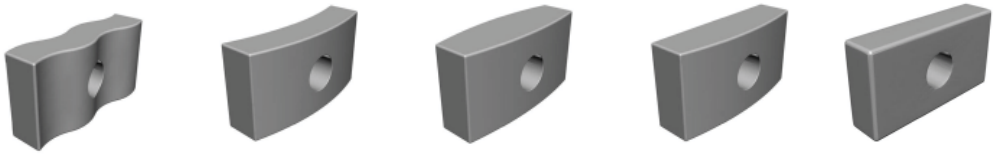
Sub group: FE 2

Frequency of Preference for Series FE 2

%

		Sharp Bulky	Sharp Linear	Cuboidal Straight Edged	Rounded Corners	Large Rounded Corners	Total
				50.0%	50.0%		100.0%
Northern Region	1.8%	1.8%	33.3%	12.3%	36.8%	14.0%	100.0%
Southern Region		1.4%	35.1%	12.2%	32.4%	18.9%	100.0%
North East Region	1.9%	9.6%	25.0%	9.6%	28.8%	25.0%	100.0%
Western Region	4.3%	8.7%	13.0%	13.0%	52.2%	8.7%	100.0%
Eastern Region			51.5%	33.3%	15.2%		100.0%
Central Region			37.5%		37.5%	25.0%	100.0%
Others		33.3%			66.7%		100.0%

Sub group: FE 2



1 2 3 4 5

FE 3

Frequency of Preference for Series FE 3

Count

		Double bent Axis	Single bent Axis	Double Convex Straight Axis	Single Convex with Straight Axis	Plain Cuboidal	Total
Less than 18 years			1		2		3
18 to 25 years	2	13	25	31	65	25	161
25 to 45 years	1	7	12	20	25	15	80
45 to 65 years				2	4		6
More than 65 years		1			1		2

Sub group: FE 3

Frequency of Preference for Series FE 3

%

		Double bent Axis	Single bent Axis	Double Convex Straight Axis	Single Convex with Straight Axis	Plain Cuboidal	Total
Less than 18 years			33.3%		66.7%		100.0%
18 to 25 years	1.2%	8.1%	15.5%	19.3%	40.4%	15.5%	100.0%
25 to 45 years	1.3%	8.8%	15.0%	25.0%	31.3%	18.8%	100.0%
45 to 65 years				33.3%	66.7%		100.0%
More than 65 years		50.0%			50.0%		100.0%

Sub group: FE 3

Frequency of Preference for Series FE 3

Count

		Double bent Axis	Single bent Axis	Double Convex Straight Axis	Single Convex with Straight Axis	Plain Cuboidal	Total
Student	2	14	29	37	71	34	187
Service	1	6	6	15	22	6	56
Business					1		1
Self Employed					2		2
Others		1	3	1	1		6

Sub group: FE 3

Frequency of Preference for Series FE 3

%

		Double bent Axis	Single bent Axis	Double Convex Straight Axis	Single Convex Surface with Straight Axis	Plain Cuboidal	Total
Student	1.1%	7.5%	15.5%	19.8%	38.0%	18.2%	100.0%
Service	1.8%	10.7%	10.7%	26.8%	39.3%	10.7%	100.0%
Business					100.0%		100.0%
Self Employed					100.0%		100.0%
Others		16.7%	50.0%	16.7%	16.7%		100.0%

Sub group: FE 3

Frequency of Preference for Series FE 3

Count

Form Modulation		Double bent Axis	Single bent Axis	Double Convex Straight Axis	Single Convex with Straight Axis	Plain Cuboidal	Total
Male	3	21	37	47	91	36	235
Female			1	6	5	3	15

Sub group: FE 3

Frequency of Preference for Series FE 3

%

Form Modulation		Double bent Axis	Single bent Axis	Double Convex Straight Axis	Single Convex Surface with Straight Axis	Plain Cuboidal	Total
Male	1.3%	8.9%	15.7%	20.0%	38.7%	15.3%	100.0%
Female			6.7%	40.0%	33.3%	20.0%	100.0%

Sub group: FE 3

Frequency of Preference for Series FE 3

Count

Form Modulation		Double bent Axis	Single bent Axis	Double Convex Straight Axis	Single Convex Surface with Straight Axis	Plain Cuboidal	Total
			1		1		2
Up to School level	1	2		7	16	3	29
Up to College Level	1	12	19	18	38	17	105
Up to Post Graduate Studies Level		3	11	14	26	11	65
Professional course Level	1	3	3	10	10	7	34
Others		1	4	4	6	2	17

Sub group: FE 3

Frequency of Preference for Series FE 3

%

Form Modulation		Double bent Axis	Single bent Axis	Double Convex Straight Axis	Single Convex with Straight Axis	Plain Cuboidal	Total
			50.0%		50.0%		100.0%
Up to School level	3.4%	6.9%		24.1%	55.2%	10.3%	100.0%
Up to College Level	1.0%	11.4%	18.1%	17.1%	36.2%	16.2%	100.0%
Up to Post Graduate Studies Level		4.6%	16.9%	21.5%	40.0%	16.9%	100.0%
Professional Course Level	2.9%	8.8%	8.8%	29.4%	29.4%	20.6%	100.0%
Others		5.9%	23.5%	23.5%	35.3%	11.8%	100.0%

Sub group: FE 3

Frequency of Preference for Series FE 3

Count

		Double bent Axis	Single bent Axis	Double Convex Straight Axis	Single Convex Surface with Straight Axis	Plain Cuboidal	Total
			1		1		2
Northern Region	1	3	9	12	22	10	57
Southern Region		5	13	19	26	11	74
North East Region	1	4	9	12	21	5	52
Western Region		6		5	9	3	23
Eastern Region	1	2	6	4	11	9	33
Central Region				1	5	2	8
Others		1			2		3

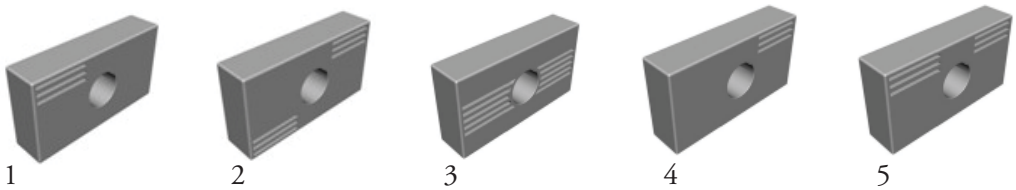
Sub group: FE 3

Frequency of Preference for Series FE 3

%

		Double bent Axis	Single bent Axis	Double Convex Straight Axis	Single Convex Surface with Straight Axis	Plain Cuboidal	Total
Northern Region			50.0%		50.0%		100.0%
	1.8%	5.3%	15.8%	21.1%	38.6%	17.5%	100.0%
Southern Region		6.8%	17.6%	25.7%	35.1%	14.9%	100.0%
North East Region	1.9%	7.7%	17.3%	23.1%	40.4%	9.6%	100.0%
Western Region		26.1%		21.7%	39.1%	13.0%	100.0%
Eastern Region	3.0%	6.1%	18.2%	12.1%	33.3%	27.3%	100.0%
Central Region				12.5%	62.5%	25.0%	100.0%
Others		33.3%			66.7%		100.0%

Sub group: FE 3



1 2 3 4 5

FE 4

Frequency of Preference for Series FE 4

Count

Layout of Elements		Top Left	Diagonal Top right and Bottom Left	Symmetrical Central	Top Right	Top Right Top Left	Total
Less than 18 years	1			1	1		3
18 to 25 years	2	10	40	29	45	35	161
25 to 45 years	1	8	24	16	19	12	80
45 to 65 years	2	1	1	1	1		6
More than 65 years				1		1	2

Sub group: FE 4

Frequency of Preference for Series FE 4

%

Layout of Elements		Top Left	Diagonal Top right and Bottom Left	Symmetrical Central	Top Right	Top Right Top Left	Total
Less than 18 years	33.3%			33.3%	33.3%		100.0%
18 to 25 years	1.2%	6.2%	24.8%	18.0%	28.0%	21.7%	100.0%
25 to 45 years	1.3%	10.0%	30.0%	20.0%	23.8%	15.0%	100.0%
45 to 65 years	33.3%	16.7%	16.7%	16.7%	16.7%		100.0%
More than 65 years				50.0%		50.0%	100.0%

Sub group: FE 4

Frequency of Preference for Series FE 4

Count

Layout of Elements			Top Left	Diagonal Top right and Bottom Left	Symmetrical Central	Top Right	Top Right Top Left	Total
Student	Layout of Elements	3	13	51	31	49	40	187
Service	Layout of Elements	3	6	13	10	17	7	56
Business	Layout of Elements						1	1
Self Employed	Layout of Elements				2			2
Others	Layout of Elements			1	5			6

Sub group: FE 4

Frequency of Preference for Series FE 4

%

Layout of Elements		Top Left	Diagonal Top right and Bottom Left	Symmetrical Central	Top Right	Top Right Top Left	Total
Student	1.6%	7.0%	27.3%	16.6%	26.2%	21.4%	100.0%
Service	5.4%	10.7%	23.2%	17.9%	30.4%	12.5%	100.0%
Business						100.0%	100.0%
Self Employed				100.0%			100.0%
Others			16.7%	83.3%			100.0%

Sub group: FE 4

Frequency of Preference for Series FE 4

Count

		Top Left	Diagonal Top right and Bottom Left	Symmetrical Central	Top Right	Top Right Top Left	Total
				1	1		2
Male	6	18	64	40	61	46	235
Female		1	1	7	4	2	15

Sub group: FE 4

Frequency of Preference for Series FE 4

%

Layout of Elements		Top Left	Diagonal Top right and Bottom Left	Symmetrical Central	Top Right	Top Right Top Left	Total
				50.0%	50.0%		100.0%
Male	2.6%	7.7%	27.2%	17.0%	26.0%	19.6%	100.0%
Female		6.7%	6.7%	46.7%	26.7%	13.3%	100.0%

Sub group: FE 4

Frequency of Preference for Series FE 4

Count

Layout of Elements		Top Left	Diagonal Top right and Bottom Left	Symmetrical Central	Top Right	Top Right Top Left	Total
				1	1		2
Up to School level		3	4	9	9	4	29
Up to College Level	1	7	30	19	24	24	105
Up to Post Graduate Studies Level	5	5	15	9	24	7	65
Professional Course Level		4	8	7	7	8	34
Others			8	3	1	5	17

Sub group: FE 4

Frequency of Preference for Series FE 4

%

Layout of Elements		Top Left	Diagonal Top right and Bottom Left	Symmetrical Central	Top Right	Top Right Top Left	Total
				50.0%	50.0%		100.0%
Up to School level		10.3%	13.8%	31.0%	31.0%	13.8%	100.0%
Up to College Level	1.0%	6.7%	28.6%	18.1%	22.9%	22.9%	100.0%
Up to Post Graduate Studies Level	7.7%	7.7%	23.1%	13.8%	36.9%	10.8%	100.0%
Professional Course Level		11.8%	23.5%	20.6%	20.6%	23.5%	100.0%
Others			47.1%	17.6%	5.9%	29.4%	100.0%

Sub group: FE 4

Frequency of Preference for Series FE 4

Count

Layout of Elements		Top Left	Diagonal Top right and Bottom Left	Symmetrical Central	Top Right	Top Right Top Left	Total
				1	1		2
Northern Region		3	13	13	14	14	57
Southern Region	1	3	20	12	20	18	74
North East Region	1	6	15	11	13	6	52
Western Region	2		4	3	7	7	23
Eastern Region		6	11	4	9	3	33
Central Region	2	1	2	1	2		8
Others				3			3

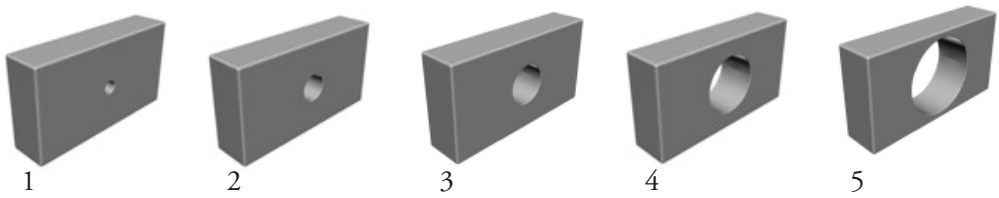
Sub group: FE 4

Frequency of Preference for Series FE 4

%

		Top Left	Diagonal Top right and Bottom Left	Symmetrical Central	Top Right	Top Right Top Left	Total
				50.0%	50.0%		100.0%
Northern Region		5.3%	22.8%	22.8%	24.6%	24.6%	100.0%
Southern Region	1.4%	4.1%	27.0%	16.2%	27.0%	24.3%	100.0%
North East Region	1.9%	11.5%	28.8%	21.2%	25.0%	11.5%	100.0%
Western Region	8.7%		17.4%	13.0%	30.4%	30.4%	100.0%
Eastern Region		18.2%	33.3%	12.1%	27.3%	9.1%	100.0%
Central Region	25.0%	12.5%	25.0%	12.5%	25.0%		100.0%
Others				100.0%			100.0%

Sub group: FE 4



FE 5

Frequency of Preference for Series FE 5

Count

Lens of Camera		Very Small	Small Medium	Medium	Medium Large	Large	Total
Less than 18 years			1		2		3
18 to 25 years	2	6	23	53	56	21	161
25 to 45 years	1	4	11	30	20	14	80
45 to 65 years			1	3		2	6
More than 65 years					1	1	2

Sub group: FE 5

Frequency of Preference for Series FE 5

%

Lens of camera		Very Small	Small Medium	Medium	Medium Large	Large	Total
Less than 18 years			33.3%		66.7%		100.0%
18 to 25 years	1.2%	3.7%	14.3%	32.9%	34.8%	13.0%	100.0%
25 to 45 years	1.3%	5.0%	13.8%	37.5%	25.0%	17.5%	100.0%
45 to 65 years			16.7%	50.0%		33.3%	100.0%
More than 65 years					50.0%	50.0%	100.0%

Sub group: FE 5

Frequency of Preference for Series FE 5

Count

Lens of camera		Very Small	Small Medium	Medium	Medium Large	Large	Total
Student	2	7	27	65	61	25	187
Service	1	3	6	19	16	11	56
Business					1		1
Self Employed			2				2
Others			1	2	1	2	6

Sub group: FE 5

Frequency of Preference for Series FE 5

%

Lens of camera		Very Small	Small Medium	Medium	Medium Large	Large	Total
Student	1.1%	3.7%	14.4%	34.8%	32.6%	13.4%	100.0%
Service	1.8%	5.4%	10.7%	33.9%	28.6%	19.6%	100.0%
Business					100.0%		100.0%
Self Employed			100.0%				100.0%
Others			16.7%	33.3%	16.7%	33.3%	100.0%

Sub group: FE 5

Frequency of Preference for Series FE 5

Count

Lens of camera		Very Small	Small Medium	Medium	Medium Large	Large	Total
			1		1		2
Male	3	10	30	81	76	35	235
Female			5	5	2	3	15

Sub group: FE 5

Frequency of Preference for Series FE 5

%

Lens of camera		Very Small	Small Medium	Medium	Medium Large	Large	Total
			50.0%		50.0%		100.0%
Male	1.3%	4.3%	12.8%	34.5%	32.3%	14.9%	100.0%
Female			33.3%	33.3%	13.3%	20.0%	100.0%

Sub group: FE 5

Frequency of Preference for Series FE 5

Count

Lens of camera		Very Small	Small Medium	Medium	Medium Large	Large	Total
			1		1		2
Up to School level			3	10	11	5	29
Up to College Level	3	5	16	32	32	17	105
Up to Post Graduate Studies Level		1	11	26	18	9	65
Professional Course Level		3	2	12	14	3	34
Others		1	3	6	3	4	17

Sub group: FE 5

Frequency of Preference for Series FE 5

%

Lens of camera		Very Small	Small Medium	Medium	Medium Large	Large	Total
			50.0%		50.0%		100.0%
Up to School level			10.3%	34.5%	37.9%	17.2%	100.0%
Up to College Level	2.9%	4.8%	15.2%	30.5%	30.5%	16.2%	100.0%
Up to Post Graduate Studies Level		1.5%	16.9%	40.0%	27.7%	13.8%	100.0%
Professional Course Level		8.8%	5.9%	35.3%	41.2%	8.8%	100.0%
Others		5.9%	17.6%	35.3%	17.6%	23.5%	100.0%

Sub group: FE 5

Frequency of Preference for Series FE 5

Count

Lens of camera		Very Small	Small Medium	Medium	Medium Large	Large	Total
				1	1		2
Northern Region	1	4	6	23	19	4	57
Southern Region		2	13	31	22	6	74
North East Region	1	2	10	15	10	14	52
Western Region		1	2	3	10	7	23
Eastern Region		1	3	13	12	4	33
Central Region	1		2		3	2	8
Others					2	1	3

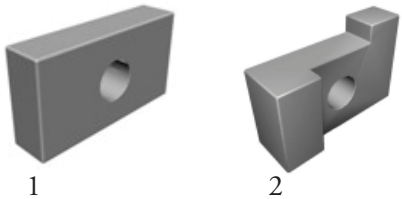
Sub group: FE 5

Frequency of Preference for Series FE 5

%

Lens of camera		Very Small	Small Medium	Medium	Medium Large	Large	Total
				50.0%	50.0%		100.0%
Northern Region	1.8%	7.0%	10.5%	40.4%	33.3%	7.0%	100.0%
Southern Region		2.7%	17.6%	41.9%	29.7%	8.1%	100.0%
North East Region	1.9%	3.8%	19.2%	28.8%	19.2%	26.9%	100.0%
Western Region		4.3%	8.7%	13.0%	43.5%	30.4%	100.0%
Eastern Region		3.0%	9.1%	39.4%	36.4%	12.1%	100.0%
Central Region	12.5%		25.0%		37.5%	25.0%	100.0%
Others					66.7%	33.3%	100.0%

Sub group: FE 5



1 2

FE 6

Frequency of Preference for Series FE 6

Count

Body		Integrated Simple	Differentiated Complex	Total
Less than 18 years		1	2	3
18 to 25 years	1	113	47	161
25 to 45 years	1	53	26	80
45 to 65 years		4	2	6
More than 65 years		1	1	2

Sub group: FE 6

Frequency of Preference for Series FE 6

%

Body		Integrated Simple	Differentiated Complex	Total
Less than 18 years		33.3%	66.7%	100.0%
18 to 25 years	.6%	70.2%	29.2%	100.0%
25 to 45 years	1.3%	66.3%	32.5%	100.0%
45 to 65 years		66.7%	33.3%	100.0%
More than 65 years		50.0%	50.0%	100.0%

Sub group: FE 6

Frequency of Preference for Series FE 6

Count

Body		Integrated Simple	Differentiated Complex	Total
Student	1	131	55	187
Service	1	38	17	56
Business		1		1
Self Employed			2	2
Others		2	4	6

Sub group: FE 6

Frequency of Preference for Series FE 6

%

Body		Integrated Simple	Differentiated Complex	Total
Student	.5%	70.1%	29.4%	100.0%
Service	1.8%	67.9%	30.4%	100.0%
Business		100.0%		100.0%
Self Employed			100.0%	100.0%
Others		33.3%	66.7%	100.0%

Sub group: FE 6

Frequency of Preference for Series FE 6

Count

Body		Integrated Simple	Differentiated Complex	Total
		1	1	2
Male	2	164	69	235
Female		7	8	15

Sub group: FE 6

Frequency of Preference for Series FE 6

%

Body		Integrated Simple	Differentiated Complex	Total
		50.0%	50.0%	100.0%
Male	.9%	69.8%	29.4%	100.0%
Female		46.7%	53.3%	100.0%

Sub group: FE 6

Frequency of Preference for Series FE 6

Count

Body		Integrated Simple	Differentiated Complex	Total
			2	2
Up to School level		18	11	29
Up to College Level	1	77	27	105
Up to Post Graduate Studies Level	1	39	25	65
Professional Course Level		26	8	34
Others		12	5	17

Sub group: FE 6

Frequency of Preference for Series FE 6

%

Body		Integrated Simple	Differentiated Complex	Total
			100.0%	100.0%
Up to School level		62.1%	37.9%	100.0%
Up to College Level	1.0%	73.3%	25.7%	100.0%
Up to Post Graduate Studies Level	1.5%	60.0%	38.5%	100.0%
Professional Course Level		76.5%	23.5%	100.0%
Others		70.6%	29.4%	100.0%

Sub group: FE 6

Frequency of Preference for Series FE 6

Count

Body		Integrated Simple	Differentiated Complex	Total
		1	1	2
Northern Region		40	17	57
Southern Region		56	18	74
North East Region	1	33	18	52
Western Region		13	10	23
Eastern Region		24	9	33
Central Region	1	3	4	8
Others		2	1	3

Sub group: FE 6

Frequency of Preference for Series FE 6

%

Body		Integrated Simple	Differentiated Complex	Total
		50.0%	50.0%	100.0%
Northern Region		70.2%	29.8%	100.0%
Southern Region		75.7%	24.3%	100.0%
North East Region	1.9%	63.5%	34.6%	100.0%
Western Region		56.5%	43.5%	100.0%
Eastern Region		72.7%	27.3%	100.0%
Central Region	12.5%	37.5%	50.0%	100.0%
Others		66.7%	33.3%	100.0%

Sub group: FE 6

1 2

FE 7

Frequency of Preference for Series FE 7

Count

Form Expression		Simple and Functional	Unconventional and Metaphoric	Total
Less than 18 years		3		3
18 to 25 years		71	90	161
25 to 45 years	2	49	29	80
45 to 65 years		4	2	6
More than 65 years		1	1	2

Sub group: FE 7

Frequency of Preference for Series FE 7

%

Form Expression		Simple and Functional	Unconventional and Metaphoric	Total
Less than 18 years		100.0%		100.0%
18 to 25 years		44.1%	55.9%	100.0%
25 to 45 years	2.5%	61.3%	36.3%	100.0%
45 to 65 years		66.7%	33.3%	100.0%
More than 65 years		50.0%	50.0%	100.0%

Sub group: FE 7

Frequency of Preference for Series FE 7

Count

Form Expression		Simple and Functional	Unconventional and Metaphoric	Total
Student	1	86	100	187
Service	1	38	17	56
Business		1		1
Self Employed			2	2
Others		3	3	6

Sub group: FE 7

Frequency of Preference for Series FE 7

%

Form Expression		Simple and Functional	Unconventional and Metaphoric	Total
Student	.5%	46.0%	53.5%	100.0%
Service	1.8%	67.9%	30.4%	100.0%
Business		100.0%		100.0%
Self Employed			100.0%	100.0%
Others		50.0%	50.0%	100.0%

Sub group: FE 7

Frequency of Preference for Series FE 7

Count

Form Expression		Simple and Functional	Unconventional and Metaphoric	Total
		1	1	2
Male	2	119	114	235
Female		8	7	15

Sub group: FE 7

Frequency of Preference for Series FE 7

%

Form Expression		Simple and Functional	Unconventional and Metaphoric	Total
		50.0%	50.0%	100.0%
Male	.9%	50.6%	48.5%	100.0%
Female		53.3%	46.7%	100.0%

Sub group: FE 7

Frequency of Preference for Series FE 7

Count

Form Expression		Simple and Functional	Unconventional and Metaphoric	Total
			2	2
Up to School level		16	13	29
Up to College Level	1	46	58	105
Up to Post Graduate Studies Level	1	31	33	65
Professional Course Level		24	10	34
Others		11	6	17

Sub group: FE 7

Frequency of Preference for Series FE 7

%

Form Expression		Simple and Functional	Unconventional and Metaphoric	Total
			100.0%	100.0%
Up to School level		55.2%	44.8%	100.0%
Up to College Level	1.0%	43.8%	55.2%	100.0%
Up to Post Graduate Studies Level	1.5%	47.7%	50.8%	100.0%
Professional Course Level		70.6%	29.4%	100.0%
Others		64.7%	35.3%	100.0%

Sub group: FE 7

Frequency of Preference for Series FE 7

Count

Form Expression		Simple and Functional	Unconventional and Metaphoric	Total
		1	1	2
Northern Region	1	28	28	57
Southern Region		34	40	74
North East Region	1	29	22	52
Western Region		14	9	23
Eastern Region		20	13	33
Central Region		2	6	8
Others			3	3

Sub group: FE 7

Frequency of Preference for Series FE 7

%

Form Expression		Simple and Functional	Unconventional and Metaphoric	Total
		50.0%	50.0%	100.0%
Northern Region	1.8%	49.1%	49.1%	100.0%
Southern Region		45.9%	54.1%	100.0%
North East Region	1.9%	55.8%	42.3%	100.0%
Western Region		60.9%	39.1%	100.0%
Eastern Region		60.6%	39.4%	100.0%
Central Region		25.0%	75.0%	100.0%
Others			100.0%	100.0%

Sub group: FE 7

Table 5.10: Summary of cross tabulation of Results based on questionnaire of preference for product use (MaxDiff Series):

- **Age wise**
- **Occupation wise**
- **Gender wise**
- **Education level wise**
- **Geographical location of respondents**

Frequency of Preference for Series MaxDiff 1_1

Count

Camera Possession		Digital Camera	Handy cam	Mobile phone camera	Total
Less than 18 years		2		1	3
18 to 25 years	3	106	40	12	161
25 to 45 years	3	49	18	10	80
45 to 65 years	1	3	2		6
More than 65 years			1	1	2

Sub group: MaxDiff 1_1

Frequency of Preference for Series MaxDiff 1_1

%

Camera Possession		Digital Camera	Handy cam	Mobile phone camera	Total
Less than 18 years		66.7%		33.3%	100.0%
18 to 25 years	1.9%	65.8%	24.8%	7.5%	100.0%
25 to 45 years	3.8%	61.3%	22.5%	12.5%	100.0%
45 to 65 years	16.7%	50.0%	33.3%		100.0%
More than 65 years			50.0%	50.0%	100.0%

Sub group: MaxDiff 1_1

Frequency of Preference for Series MaxDiff 1_1

Count

Camera Possession		Digital Camera	Handy cam	Mobile phone camera	Total
Student	3	123	47	14	187
Service	4	32	11	9	56
Business			1		1
Self Employed		2			2
Others		3	2	1	6

Sub group: MaxDiff 1_1

Frequency of Preference for Series MaxDiff 1_1

%

Camera Possession		Digital Camera	Handy cam	Mobile phone camera	Total
Student	1.6%	65.8%	25.1%	7.5%	100.0%
Service	7.1%	57.1%	19.6%	16.1%	100.0%
Business			100.0%		100.0%
Self Employed		100.0%			100.0%
Others		50.0%	33.3%	16.7%	100.0%

Sub group: MaxDiff 1_1

Frequency of Preference for Series MaxDiff 1_1

Count

Camera Possession		Digital Camera	Handy cam	Mobile phone camera	Total
		1	1		2
Male	6	151	55	23	235
Female	1	8	5	1	15

Sub group: MaxDiff 1_1

Frequency of Preference for Series MaxDiff 1_1

%

Camera Possession		Digital Camera	Handy cam	Mobile phone camera	Total
		50.0%	50.0%		100.0%
Male	2.6%	64.3%	23.4%	9.8%	100.0%
Female	6.7%	53.3%	33.3%	6.7%	100.0%

Sub group: MaxDiff 1_1

Frequency of Preference for Series MaxDiff 1_1

Count

Camera Possession		Digital Camera	Handy cam	Mobile phone camera	Total
	1	1			2
Up to School level		17	7	5	29
Up to College Level	2	73	23	7	105
Up to Post Graduate Studies Level	2	40	16	7	65
Professional Course Level	1	20	9	4	34
Others	1	9	6	1	17

Sub group: MaxDiff 1_1

Frequency of Preference for Series MaxDiff 1_1

%

Camera Possession		Digital Camera	Handy cam	Mobile phone camera	Total
	50.0%	50.0%			100.0%
Up to School level		58.6%	24.1%	17.2%	100.0%
Up to College Level	1.9%	69.5%	21.9%	6.7%	100.0%
Up to Post Graduate Studies Level	3.1%	61.5%	24.6%	10.8%	100.0%
Professional Course Level	2.9%	58.8%	26.5%	11.8%	100.0%
Others	5.9%	52.9%	35.3%	5.9%	100.0%

Sub group: MaxDiff 1_1

Frequency of Preference for Series MaxDiff 1_1

Count

Camera Possession		Digital Camera	Handy cam	Mobile phone camera	Total
		2			2
Northern Region	1	38	12	6	57
Southern Region	2	46	22	4	74
North East Region	4	33	11	4	52
Western Region		13	5	5	23
Eastern Region		23	8	2	33
Central Region		3	3	2	8
Others		2		1	3

Sub group: MaxDiff 1_1

Frequency of Preference for Series MaxDiff 1_1

%

Camera Possession		Digital Camera	Handy cam	Mobile phone camera	Total
		100.0%			100.0%
Northern Region	1.8%	66.7%	21.1%	10.5%	100.0%
Southern Region	2.7%	62.2%	29.7%	5.4%	100.0%
North East Region	7.7%	63.5%	21.2%	7.7%	100.0%
Western Region		56.5%	21.7%	21.7%	100.0%
Eastern Region		69.7%	24.2%	6.1%	100.0%
Central Region		37.5%	37.5%	25.0%	100.0%
Others		66.7%		33.3%	100.0%

Sub group: MaxDiff 1_1

Frequency of Preference for Series MaxDiff 1_2

Count

Camera Possession		Digital SLR camera	Auto focus camera	Underwater camera	Total
Less than 18 years		1		2	3
18 to 25 years	1	80	67	13	161
25 to 45 years	3	43	27	7	80
45 to 65 years		6			6
More than 65 years			1	1	2

Sub group: MaxDiff 1_2

Frequency of Preference for Series MaxDiff 1_2

%

Camera Possession		Digital SLR camera	Auto focus camera	Underwater camera	Total
Less than 18 years		33.3%		66.7%	100.0%
18 to 25 years	.6%	49.7%	41.6%	8.1%	100.0%
25 to 45 years	3.8%	53.8%	33.8%	8.8%	100.0%
45 to 65 years		100.0%			100.0%
More than 65 years			50.0%	50.0%	100.0%

Sub group: MaxDiff 1_2

Frequency of Preference for Series MaxDiff 1_2

Count

Camera Possession		Digital SLR camera	Auto focus camera	Underwater camera	Total
Student	1	95	72	19	187
Service	3	30	20	3	56
Business			1		1
Self Employed		2			2
Others		3	2	1	6

Sub group: MaxDiff 1_2

Frequency of Preference for Series MaxDiff 1_2

%

Camera Possession		Digital SLR camera	Auto focus camera	Underwater camera	Total
Student	.5%	50.8%	38.5%	10.2%	100.0%
Service	5.4%	53.6%	35.7%	5.4%	100.0%
Business			100.0%		100.0%
Self Employed		100.0%			100.0%
Others		50.0%	33.3%	16.7%	100.0%

Sub group: MaxDiff 1_2

Frequency of Preference for Series MaxDiff 1_2

Count

Camera Possession		Digital SLR camera	Auto focus camera	Underwater camera	Total
			2		2
Male	4	122	87	22	235
Female		8	6	1	15

Sub group: MaxDiff 1_2

Frequency of Preference for Series MaxDiff 1_2

%

Camera Possession		Digital SLR camera	Auto focus camera	Underwater camera	Total
			100.0%		100.0%
Male	1.7%	51.9%	37.0%	9.4%	100.0%
Female		53.3%	40.0%	6.7%	100.0%

Sub group: MaxDiff 1_2

Frequency of Preference for Series MaxDiff 1_2

Count

Camera Possession		Digital SLR camera	Auto focus camera	Underwater camera	Total
		1	1		2
Up to School level		12	15	2	29
Up to College Level	1	57	38	9	105
Up to Post Graduate Studies Level	1	33	22	9	65
Professional Course Level	1	16	15	2	34
Others	1	11	4	1	17

Sub group: MaxDiff 1_2

Frequency of Preference for Series MaxDiff 1_2

%

Camera Possession		Digital SLR camera	Auto focus camera	Underwater camera	Total
		50.0%	50.0%		100.0%
Up to School level		41.4%	51.7%	6.9%	100.0%
Up to College Level	1.0%	54.3%	36.2%	8.6%	100.0%
Up to Post Graduate Studies Level	1.5%	50.8%	33.8%	13.8%	100.0%
Professional Course Level	2.9%	47.1%	44.1%	5.9%	100.0%
Others	5.9%	64.7%	23.5%	5.9%	100.0%

Sub group: MaxDiff 1_2

Frequency of Preference for Series MaxDiff 1_2

Count

Camera Possession		Digital SLR camera	Auto focus camera	Underwater camera	Total
		2			2
Northern Region	1	24	31	1	57
Southern Region		40	26	8	74
North East Region	3	27	14	8	52
Western Region		13	9	1	23
Eastern Region		20	12	1	33
Central Region		4	1	3	8
Others			2	1	3

Sub group: MaxDiff 1_2

Frequency of Preference for Series MaxDiff 1_2

%

Camera Possession		Digital SLR camera	Auto focus camera	Underwater camera	Total
		100.0%			100.0%
Northern Region	1.8%	42.1%	54.4%	1.8%	100.0%
Southern Region		54.1%	35.1%	10.8%	100.0%
North East Region	5.8%	51.9%	26.9%	15.4%	100.0%
Western Region		56.5%	39.1%	4.3%	100.0%
Eastern Region		60.6%	36.4%	3.0%	100.0%
Central Region		50.0%	12.5%	37.5%	100.0%
Others			66.7%	33.3%	100.0%

Sub group: MaxDiff 1_2

Frequency of Preference for Series MaxDiff 2_1

Count

Camera purchase considerations		Brand name	Technical Features	Ease of use of camera	Total
Less than 18 years		1	1	1	3
18 to 25 years	1	32	97	31	161
25 to 45 years	4	15	45	16	80
45 to 65 years		3	2	1	6
More than 65 years		1	1		2

Sub group: MaxDiff 2_1

Frequency of Preference for Series MaxDiff 2_1

%

Camera purchase considerations		Brand name	Technical Features	Ease of use of camera	Total
Less than 18 years		33.3%	33.3%	33.3%	100.0%
18 to 25 years	.6%	19.9%	60.2%	19.3%	100.0%
25 to 45 years	5.0%	18.8%	56.3%	20.0%	100.0%
45 to 65 years		50.0%	33.3%	16.7%	100.0%
More than 65 years		50.0%	50.0%		100.0%

Sub group: MaxDiff 2_1

Frequency of Preference for Series MaxDiff 2_1

Count

Camera purchase considerations		Brand name	Technical Features	Ease of use of camera	Total
Student	2	39	108	38	187
Service	3	11	31	11	56
Business			1		1
Self Employed			2		2
Others		2	4		6

Sub group: MaxDiff 2_1

Frequency of Preference for Series MaxDiff 2_1

%

Camera purchase considerations		Brand name	Technical Features	Ease of use of camera	Total
Student	1.1%	20.9%	57.8%	20.3%	100.0%
Service	5.4%	19.6%	55.4%	19.6%	100.0%
Business			100.0%		100.0%
Self Employed			100.0%		100.0%
Others		33.3%	66.7%		100.0%

Sub group: MaxDiff 2_1

Frequency of Preference for Series MaxDiff 2_1

Count

Camera purchase considerations		Brand name	Technical Features	Ease of use of camera	Total
				2	2
Male	5	49	136	45	235
Female		3	10	2	15

Sub group: MaxDiff 2_1

Frequency of Preference for Series MaxDiff 2_1

%

Camera purchase considerations		Brand name	Technical Features	Ease of use of camera	Total
				100.0%	100.0%
Male	2.1%	20.9%	57.9%	19.1%	100.0%
Female		20.0%	66.7%	13.3%	100.0%

Sub group: MaxDiff 2_1

Frequency of Preference for Series MaxDiff 2_1

Count

Camera purchase considerations		Brand name	Technical Features	Ease of use of camera	Total
			1	1	2
Up to School level		5	21	3	29
Up to College Level	2	21	63	19	105
Up to Post Graduate Studies Level	1	16	33	15	65
Professional Course Level	1	8	16	9	34
Others	1	2	12	2	17

Sub group: MaxDiff 2_1

Frequency of Preference for Series MaxDiff 2_1

%

Camera purchase considerations		Brand name	Technical Features	Ease of use of camera	Total
			50.0%	50.0%	100.0%
Up to School level		17.2%	72.4%	10.3%	100.0%
Up to College Level	1.9%	20.0%	60.0%	18.1%	100.0%
Up to Post Graduate Studies Level	1.5%	24.6%	50.8%	23.1%	100.0%
Professional course Level	2.9%	23.5%	47.1%	26.5%	100.0%
Others	5.9%	11.8%	70.6%	11.8%	100.0%

Sub group: MaxDiff 2_1

Frequency of Preference for Series MaxDiff 2_1

Count

Camera purchase considerations		Brand name	Technical Features	Ease of use of camera	Total
		1	1		2
Northern Region		16	32	9	57
Southern Region	1	11	51	11	74
North East Region	3	8	27	14	52
Western Region		5	15	3	23
Eastern Region	1	7	15	10	33
Central Region		3	3	2	8
Others		1	2		3

Sub group: MaxDiff 2_1

Frequency of Preference for Series MaxDiff 2_1

%

Camera purchase considerations		Brand name	Technical Features	Ease of use of camera	Total
		50.0%	50.0%		100.0%
Northern Region		28.1%	56.1%	15.8%	100.0%
Southern Region	1.4%	14.9%	68.9%	14.9%	100.0%
North East Region	5.8%	15.4%	51.9%	26.9%	100.0%
Western Region		21.7%	65.2%	13.0%	100.0%
Eastern Region	3.0%	21.2%	45.5%	30.3%	100.0%
Central Region		37.5%	37.5%	25.0%	100.0%
Others		33.3%	66.7%		100.0%

Sub group: MaxDiff 2_1

Frequency of Preference for Series MaxDiff 3_1

Count

Camera purchase consideration		Look and image of camera	After Sales Service of camera	In photo-frames	Total
Less than 18 years		2	1		3
18 to 25 years	1	28	125	7	161
25 to 45 years	3	20	55	2	80
45 to 65 years			6		6
More than 65 years			2		2

Sub group: MaxDiff 3_1

Frequency of Preference for Series MaxDiff 3_1

%

Camera purchase consideration		Look and image of camera	After Sales Service of camera	In photo-frames	Total
Less than 18 years		66.7%	33.3%		100.0%
18 to 25 years	.6%	17.4%	77.6%	4.3%	100.0%
25 to 45 years	3.8%	25.0%	68.8%	2.5%	100.0%
45 to 65 years			100.0%		100.0%
More than 65 years			100.0%		100.0%

Sub group: MaxDiff 3_1

Frequency of Preference for Series MaxDiff 3_1

Count

Camera purchase consideration		Look and image of camera	After Sales Service of camera	In photo-frames	Total
Student	1	33	144	9	187
Service	3	16	37		56
Business			1		1
Self Employed			2		2
Others		1	5		6

Sub group: MaxDiff 3_1

Frequency of Preference for Series MaxDiff 3_1

%

Camera purchase consideration		Look and image of camera	After Sales Service of camera	In photo-frames	Total
Student	.5%	17.6%	77.0%	4.8%	100.0%
Service	5.4%	28.6%	66.1%		100.0%
Business			100.0%		100.0%
Self Employed			100.0%		100.0%
Others		16.7%	83.3%		100.0%

Sub group: MaxDiff 3_1

Frequency of Preference for Series MaxDiff 3_1

Count

Camera purchase consideration		Look and image of camera	After Sales Service of camera	In photo-frames	Total
			2		2
Male	4	46	176	9	235
Female		4	11		15

Sub group: MaxDiff 3_1

Frequency of Preference for Series MaxDiff 3_1

%

Camera purchase consideration		Look and image of camera	After Sales Service of camera	In photo-frames	Total
			100.0%		100.0%
Male	1.7%	19.6%	74.9%	3.8%	100.0%
Female		26.7%	73.3%		100.0%

Sub group: MaxDiff 3_1

Frequency of Preference for Series MaxDiff 3_1

Count

Camera purchase consideration		Look and image of camera	After Sales Service of camera	In photo-frames	Total
			1	1	2
Up to School level		6	23		29
Up to College Level	2	18	82	3	105
Up to Post Graduate Studies Level	1	17	42	5	65
Professional Course Level		5	29		34
Others	1	4	12		17

Sub group: MaxDiff 3_1

Frequency of Preference for Series MaxDiff 3_1

%

Camera purchase consideration		Look and image of camera	After Sales Service of camera	In photo-frames	Total
			50.0%	50.0%	100.0%
Up to School level		20.7%	79.3%		100.0%
Up to College Level	1.9%	17.1%	78.1%	2.9%	100.0%
Up to Post Graduate Studies Level	1.5%	26.2%	64.6%	7.7%	100.0%
Professional Course Level		14.7%	85.3%		100.0%
Others	5.9%	23.5%	70.6%		100.0%

Sub group: MaxDiff 3_1

Frequency of Preference for Series MaxDiff 3_1

Count

Camera purchase consideration		Look and image of camera	After Sales Service of camera	In photo-frames	Total
			2		2
Northern Region		14	43		57
Southern Region	1	9	60	4	74
North East Region	3	14	32	3	52
Western Region		6	17		23
Eastern Region		6	25	2	33
Central Region		1	7		8
Others			3		3

Sub group: MaxDiff 3_1

Frequency of Preference for Series MaxDiff 3_1

%

Camera purchase consideration		Look and image of camera	After Sales Service of camera	In photo-frames	Total
			100.0%		100.0%
Northern Region		24.6%	75.4%		100.0%
Southern Region	1.4%	12.2%	81.1%	5.4%	100.0%
North East Region	5.8%	26.9%	61.5%	5.8%	100.0%
Western Region		26.1%	73.9%		100.0%
Eastern Region		18.2%	75.8%	6.1%	100.0%
Central Region		12.5%	87.5%		100.0%
Others			100.0%		100.0%

Sub group: MaxDiff 3_1

Frequency of Preference for Series MaxDiff 4_1

Count

Mode of Photo storage		In Photo album	On computer	In Photo-frames	Total
Less than 18 years		1	1	1	3
18 to 25 years	1	39	70	51	161
25 to 45 years		30	33	17	80
45 to 65 years		2	4		6
More than 65 years			2		2

Sub group: MaxDiff 4_1

Frequency of Preference for Series MaxDiff 4_1

%

Mode of Photo storage		In Photo album	On computer	In Photo-frames	Total
Less than 18 years		33.3%	33.3%	33.3%	100.0%
18 to 25 years	.6%	24.2%	43.5%	31.7%	100.0%
25 to 45 years		37.5%	41.3%	21.3%	100.0%
45 to 65 years		33.3%	66.7%		100.0%
More than 65 years			100.0%		100.0%

Sub group: MaxDiff 4_1

Frequency of Preference for Series MaxDiff 4_1

Count

Mode of Photo storage		In Photo album	On computer	In Photo-frames	Total
Student	1	45	82	59	187
Service		24	25	7	56
Business			1		1
Self Employed				2	2
Others		3	2	1	6

Sub group: MaxDiff 4_1

Frequency of Preference for Series MaxDiff 4_1

%

Mode of Photo storage		In Photo album	On computer	In Photo-frames	Total
Student	.5%	24.1%	43.9%	31.6%	100.0%
Service		42.9%	44.6%	12.5%	100.0%
Business			100.0%		100.0%
Self Employed				100.0%	100.0%
Others		50.0%	33.3%	16.7%	100.0%

Sub group: MaxDiff 4_1

Frequency of Preference for Series MaxDiff 4_1

Count

Mode of Photo storage		In Photo album	On computer	In Photo-frames	Total
		1		1	2
Male	1	64	105	65	235
Female		7	5	3	15

Sub group: MaxDiff 4_1

Frequency of Preference for Series MaxDiff 4_1

%

Mode of Photo storage		In Photo album	On computer	In Photo-frames	Total
		50.0%		50.0%	100.0%
Male	.4%	27.2%	44.7%	27.7%	100.0%
Female		46.7%	33.3%	20.0%	100.0%

Sub group: MaxDiff 4_1

Frequency of Preference for Series MaxDiff 4_1

Count

Mode of Photo storage		In Photo album	On computer	In Photo-frames	Total
				2	2
Up to School level		10	13	6	29
Up to College Level	1	22	46	36	105
Up to Post Graduate Studies Level		20	31	14	65
Professional Course Level		14	14	6	34
Others		6	6	5	17

Sub group: MaxDiff 4_1

Frequency of Preference for Series MaxDiff 4_1

%

Mode of Photo storage		In Photo album	On computer	In Photo-frames	Total
				100.0%	100.0%
Up to School level		34.5%	44.8%	20.7%	100.0%
Up to College Level	1.0%	21.0%	43.8%	34.3%	100.0%
Up to Post Graduate Studies Level		30.8%	47.7%	21.5%	100.0%
Professional Course Level		41.2%	41.2%	17.6%	100.0%
Others		35.3%	35.3%	29.4%	100.0%

Sub group: MaxDiff 4_1

Frequency of Preference for Series MaxDiff 4_1

Count

Mode of Photo storage		In Photo album	On computer	In Photo-frames	Total
			1	1	2
Northern Region		11	27	19	57
Southern Region		25	31	18	74
North East Region	1	17	22	12	52
Western Region		11	9	3	23
Eastern Region		6	17	10	33
Central Region		2	2	4	8
Others			1	2	3

Sub group: MaxDiff 4_1

Frequency of Preference for Series MaxDiff 4_1

%

Mode of Photo storage		In Photo album	On computer	In Photo-frames	Total
			50.0%	50.0%	100.0%
Northern Region		19.3%	47.4%	33.3%	100.0%
Southern Region		33.8%	41.9%	24.3%	100.0%
North East Region	1.9%	32.7%	42.3%	23.1%	100.0%
Western Region		47.8%	39.1%	13.0%	100.0%
Eastern Region		18.2%	51.5%	30.3%	100.0%
Central Region		25.0%	25.0%	50.0%	100.0%
Others			33.3%	66.7%	100.0%

Sub group: MaxDiff 4_1

Frequency of Preference for Series M 2_1

Count

Most convenient mode to carry		On Shoulder	In Hand	Around Waist	Total
Less than 18 years		1	1	1	3
18 to 25 years	19	55	13	74	161
25 to 45 years	19	31	2	28	80
45 to 65 years	5	1			6
More than 65 years		1		1	2

Sub group: M 2_1

Frequency of Preference for Series M 2_1

%

Most convenient mode to carry		On Shoulder	In Hand	Around Waist	Total
Less than 18 years		33.3%	33.3%	33.3%	100.0%
18 to 25 years	11.8%	34.2%	8.1%	46.0%	100.0%
25 to 45 years	23.8%	38.8%	2.5%	35.0%	100.0%
45 to 65 years	83.3%	16.7%			100.0%
More than 65 years		50.0%		50.0%	100.0%

Sub group: M 2_1

Frequency of Preference for Series M 2_1

Count

Most convenient mode to carry		On Shoulder	In Hand	Around Waist	Total
Student	21	64	15	87	187
Service	19	24	1	12	56
Business		1			1
Self Employed				2	2
Others	3			3	6

Sub group: M 2_1

Frequency of Preference for Series M 2_1

%

Most convenient mode to carry		On Shoulder	In Hand	Around Waist	Total
Student	11.2%	34.2%	8.0%	46.5%	100.0%
Service	33.9%	42.9%	1.8%	21.4%	100.0%
Business		100.0%			100.0%
Self Employed				100.0%	100.0%
Others	50.0%			50.0%	100.0%

Sub group: M 2_1

Frequency of Preference for Series M 2_1

Count

Most convenient mode to carry		On Shoulder	In Hand	Around Waist	Total
		2			2
Male	39	81	16	99	235
Female	4	6		5	15

Sub group: M 2_1

Frequency of Preference for Series M 2_1

%

Most convenient mode to carry		On Shoulder	In Hand	Around Waist	Total
		100.0%			100.0%
Male	16.6%	34.5%	6.8%	42.1%	100.0%
Female	26.7%	40.0%		33.3%	100.0%

Sub group: M 2_1

Frequency of Preference for Series M 2_1

Count

Most convenient mode to carry		On Shoulder	In Hand	Around Waist	Total
	1			1	2
Up to School level	3	12	2	12	29
Up to College Level	12	34	10	49	105
Up to Post Graduate Studies Level	9	29	2	25	65
Professional Course Level	9	11	1	13	34
Others	9	3	1	4	17

Sub group: M 2_1

Frequency of Preference for Series M 2_1

%

Most convenient mode to carry		On Shoulder	In Hand	Around Waist	Total
	50.0%			50.0%	100.0%
Up to School level	10.3%	41.4%	6.9%	41.4%	100.0%
Up to College Level	11.4%	32.4%	9.5%	46.7%	100.0%
Up to Post Graduate Studies Level	13.8%	44.6%	3.1%	38.5%	100.0%
Professional Course Level	26.5%	32.4%	2.9%	38.2%	100.0%
Others	52.9%	17.6%	5.9%	23.5%	100.0%

Sub group: M 2_1

Frequency of Preference for Series M 2_1

Count

Most convenient mode to carry		On Shoulder	In Hand	Around Waist	Total
	1		1		2
Northern Region	5	22	6	24	57
Southern Region	13	19	3	39	74
North East Region	14	22	2	14	52
Western Region	4	10		9	23
Eastern Region	6	12	3	12	33
Central Region		4	1	3	8
Others				3	3

Sub group: M 2_1

Frequency of Preference for Series M 2_1

%

Most convenient mode to carry		On Shoulder	In Hand	Around Waist	Total
	50.0%		50.0%		100.0%
Northern Region	8.8%	38.6%	10.5%	42.1%	100.0%
Southern Region	17.6%	25.7%	4.1%	52.7%	100.0%
North East Region	26.9%	42.3%	3.8%	26.9%	100.0%
Western Region	17.4%	43.5%		39.1%	100.0%
Eastern Region	18.2%	36.4%	9.1%	36.4%	100.0%
Central Region		50.0%	12.5%	37.5%	100.0%
Others				100.0%	100.0%

Sub group: M 2_1

Frequency of Preference for Series M 3_1

Count

Type of Photo to Shoot		Family	Sports	Outdoors	Total
Less than 18 years		1	1	1	3
18 to 25 years	11	24	11	115	161
25 to 45 years	15	13	4	48	80
45 to 65 years	5			1	6
More than 65 years				2	2

Sub group: M 3_1

Frequency of Preference for Series M 3_1

%

Type of Photo to Shoot		Family	Sports	Outdoors	Total
Less than 18 years		33.3%	33.3%	33.3%	100.0%
18 to 25 years	6.8%	14.9%	6.8%	71.4%	100.0%
25 to 45 years	18.8%	16.3%	5.0%	60.0%	100.0%
45 to 65 years	83.3%			16.7%	100.0%
More than 65 years				100.0%	100.0%

Sub group: M 3_1

Frequency of Preference for Series M 3_1

Count

Type of Photo to Shoot		Family	Sports	Outdoors	Total
Student	17	27	11	132	187
Service	14	8	4	30	56
Business				1	1
Self Employed		2			2
Others		1	1	4	6

Sub group: M 3_1

Frequency of Preference for Series M 3_1

%

Type of Photo to Shoot		Family	Sports	Outdoors	Total
Student	9.1%	14.4%	5.9%	70.6%	100.0%
Service	25.0%	14.3%	7.1%	53.6%	100.0%
Business				100.0%	100.0%
Self Employed		100.0%			100.0%
Others		16.7%	16.7%	66.7%	100.0%

Sub group: M 3_1

Frequency of Preference for Series M 3_1

Count

Type of Photo to Shoot		Family	Sports	Outdoors	Total
		1		1	2
Male	29	33	15	158	235
Female	2	4	1	8	15

Sub group: M 3_1

Frequency of Preference for Series M 3_1

%

Type of Photo to Shoot		Family	Sports	Outdoors	Total
		50.0%		50.0%	100.0%
Male	12.3%	14.0%	6.4%	67.2%	100.0%
Female	13.3%	26.7%	6.7%	53.3%	100.0%

Sub group: M 3_1

Frequency of Preference for Series M 3_1

Count

Type of Photo to Shoot		Family	Sports	Outdoors	Total
			1	1	2
Up to School level	4	4	2	19	29
Up to College Level	5	17	7	76	105
Up to Post Graduate Studies	11	10	5	39	65
Level Professional Course Level	5	7	1	21	34
Others	6			11	17

Sub group: M 3_1

Frequency of Preference for Series M 3_1

%

Type of Photo to Shoot		Family	Sports	Outdoors	Total
			50.0%	50.0%	100.0%
Up to School level	13.8%	13.8%	6.9%	65.5%	100.0%
Up to College Level	4.8%	16.2%	6.7%	72.4%	100.0%
Up to Post Graduate Studies Level	16.9%	15.4%	7.7%	60.0%	100.0%
Professional Course Level	14.7%	20.6%	2.9%	61.8%	100.0%
Others	35.3%			64.7%	100.0%

Sub group: M 3_1

Frequency of Preference for Series M 3_1

Count

Type of Photo to Shoot		Family	Sports	Outdoors	Total
			1	1	2
Northern Region	4	6	4	43	57
Southern Region	9	13	4	48	74
North East Region	9	8	6	29	52
Western Region	3	4	1	15	23
Eastern Region	6	5		22	33
Central Region		2		6	8
Others				3	3

Sub group: M 3_1

Frequency of Preference for Series M 3_1

%

Type of Photo to Shoot		Family	Sports	Outdoors	Total
			50.0%	50.0%	100.0%
Northern Region	7.0%	10.5%	7.0%	75.4%	100.0%
Southern Region	12.2%	17.6%	5.4%	64.9%	100.0%
North East Region	17.3%	15.4%	11.5%	55.8%	100.0%
Western Region	13.0%	17.4%	4.3%	65.2%	100.0%
Eastern Region	18.2%	15.2%		66.7%	100.0%
Central Region		25.0%		75.0%	100.0%
Others				100.0%	100.0%

Sub group: M 3_1

Frequency of Preference for Series M 5_1

Count

Type of Photo to Shoot		Events	Ceremonies / Festivities	Others	Total
Less than 18 years			3		3
18 to 25 years	16	32	99	14	161
25 to 45 years	12	10	53	5	80
45 to 65 years	1		5		6
More than 65 years		1	1		2

Sub group: M 5_1

Frequency of Preference for Series M 5_1

%

Type of Photo to Shoot		Events	Ceremonies / Festivities	Others	Total
Less than 18 years			100.0%		100.0%
18 to 25 years	9.9%	19.9%	61.5%	8.7%	100.0%
25 to 45 years	15.0%	12.5%	66.3%	6.3%	100.0%
45 to 65 years	16.7%		83.3%		100.0%
More than 65 years		50.0%	50.0%		100.0%

Sub group: M 5_1

Frequency of Preference for Series M 5_1

Count

Type of Photo to Shoot		Events	Ceremonies / Festivities	Others	Total
Student	19	33	120	15	187
Service	10	8	35	3	56
Business			1		1
Self Employed			2		2
Others		2	3	1	6

Sub group: M 5_1

Frequency of Preference for Series M 5_1

%

Type of Photo to Shoot		Events	Ceremonies / Festivities	Others	Total
Student	10.2%	17.6%	64.2%	8.0%	100.0%
Service	17.9%	14.3%	62.5%	5.4%	100.0%
Business			100.0%		100.0%
Self Employed			100.0%		100.0%
Others		33.3%	50.0%	16.7%	100.0%

Sub group: M 5_1

Frequency of Preference for Series M 5_1

Count

Type of Photo to Shoot		Events	Ceremonies / Festivities	Others	Total
		1		1	2
Male	27	42	149	17	235
Female	2		12	1	15

Sub group: M 5_1

Frequency of Preference for Series M 5_1

%

Type of Photo to Shoot		Events	Ceremonies / Festivities	Others	Total
		50.0%		50.0%	100.0%
Male	11.5%	17.9%	63.4%	7.2%	100.0%
Female	13.3%		80.0%	6.7%	100.0%

Sub group: M 5_1

Frequency of Preference for Series M 5_1

Count

Type of Photo to Shoot		Events	Ceremonies / Festivities	Others	Total
			1	1	2
Up to School level	4	5	20		29
Up to College Level	9	23	61	12	105
Up to Post Graduate Studies Level	6	7	47	5	65
Professional Course Level	4	7	22	1	34
Others	6	1	10		17

Sub group: M 5_1

Frequency of Preference for Series M 5_1

%

Type of Photo to Shoot		Events	Ceremonies / Festivities	Others	Total
			50.0%	50.0%	100.0%
Up to School level	13.8%	17.2%	69.0%		100.0%
Up to College Level	8.6%	21.9%	58.1%	11.4%	100.0%
Up to Post Graduate Studies Level	9.2%	10.8%	72.3%	7.7%	100.0%
Professional Course Level	11.8%	20.6%	64.7%	2.9%	100.0%
Others	35.3%	5.9%	58.8%		100.0%

Sub group: M 5_1

Frequency of Preference for Series M 5_1

Count

Type of Photo to Shoot		Events	Ceremonies / Festivities	Others	Total
			1	1	2
Northern Region	5	9	38	5	57
Southern Region	12	13	43	6	74
North East Region	6	10	33	3	52
Western Region	1	4	16	2	23
Eastern Region	5	6	22		33
Central Region			6	2	8
Others		1	2		3

Sub group: M 5_1

Frequency of Preference for Series M 5_1

%

Type of Photo to Shoot		Events	Ceremonies / Festivities	Others	Total
			50.0%	50.0%	100.0%
Northern Region	8.8%	15.8%	66.7%	8.8%	100.0%
Southern Region	16.2%	17.6%	58.1%	8.1%	100.0%
North East Region	11.5%	19.2%	63.5%	5.8%	100.0%
Western Region	4.3%	17.4%	69.6%	8.7%	100.0%
Eastern Region	15.2%	18.2%	66.7%		100.0%
Central Region			75.0%	25.0%	100.0%
Others		33.3%	66.7%		100.0%

Sub group: M 5_1

Table 5.11: Summary of cross tabulation of Results based on questionnaire of preference for product features (Preference Series):

- **Age wise**
- **Occupation wise**
- **Gender wise**
- **Education level wise**
- **Geographical location of respondents**

Frequency of Preference for Series Pre 2

Count

Willingness to purchase new camera	Immediately	Next Three months	In next one year	Not at all	Total
Less than 18 years		1	1	1	3
18 to 25 years	15	64	77	5	161
25 to 45 years	10	39	30	1	80
45 to 65 years		5	1		6
More than 65 years	2				2

Sub group: Pre 2

Frequency of Preference for Series Pre 2

%

Willingness to purchase new camera	Immediately	Next Three months	In next one year	Not at all	Total
Less than 18 years		33.3%	33.3%	33.3%	100.0%
18 to 25 years	9.3%	39.8%	47.8%	3.1%	100.0%
25 to 45 years	12.5%	48.8%	37.5%	1.3%	100.0%
45 to 65 years		83.3%	16.7%		100.0%
More than 65 years	100.0%				100.0%

Sub group: Pre 2

Frequency of Preference for Series Pre 2

Count

Willingness to purchase new camera	Immediately	Next Three months	In next one year	Not at all	Total
Student	18	77	87	5	187
Service	7	29	19	1	56
Business	1				1
Self Employed		2			2
Others	1	1	3	1	6

Sub group: Pre 2

Frequency of Preference for Series Pre 2

%

Willingness to purchase new camera	Immediately	Next Three months	In next one year	Not at all	Total
Student	9.6%	41.2%	46.5%	2.7%	100.0%
Service	12.5%	51.8%	33.9%	1.8%	100.0%
Business	100.0%				100.0%
Self Employed		100.0%			100.0%
Others	16.7%	16.7%	50.0%	16.7%	100.0%

Sub group: Pre 2

Frequency of Preference for Series Pre 2

Count

Willingness to purchase new camera	Immediately	Next Three months	In next one year	Not at all	Total
		1	1		2
Male	25	100	103	7	235
Female	2	8	5		15

Sub group: Pre 2

Frequency of Preference for Series Pre 2

%

Willingness to purchase new camera	Immediately	Next Three months	In next one year	Not at all	Total
		50.0%	50.0%		100.0%
Male	10.6%	42.6%	43.8%	3.0%	100.0%
Female	13.3%	53.3%	33.3%		100.0%

Sub group: Pre 2

Frequency of Preference for Series Pre 2

Count

Willingness to purchase new camera	Immediately	Next Three months	In next one year	Not at all	Total
			1	1	2
Up to School level	2	10	16	1	29
Up to College Level	9	43	50	3	105
Up to Post Graduate Studies Level	8	31	24	2	65
Professional Course Level	5	19	10		34
Others	3	6	8		17

Sub group: Pre 2

Frequency of Preference for Series Pre 2

%

Willingness to purchase new camera	Immediately	Next Three months	In next one year	Not at all	Total
			50.0%	50.0%	100.0%
Up to School level	6.9%	34.5%	55.2%	3.4%	100.0%
Up to College Level	8.6%	41.0%	47.6%	2.9%	100.0%
Up to Post Graduate Studies Level	12.3%	47.7%	36.9%	3.1%	100.0%
Professional Course Level	14.7%	55.9%	29.4%		100.0%
Others	17.6%	35.3%	47.1%		100.0%

Sub group: Pre 2

Frequency of Preference for Series Pre 2

Count

Willingness to purchase new camera	Immediately	Next Three months	In next one year	Not at all	Total
			1	1	2
Northern Region	7	23	25	2	57
Southern Region	5	25	43	1	74
North East Region	6	30	15	1	52
Western Region	2	13	6	2	23
Eastern Region	4	13	16		33
Central Region	2	3	3		8
Others	1	2			3

Sub group: Pre 2

Frequency of Preference for Series Pre 2

%

Willingness to purchase new camera	Immediately	Next Three months	In next one year	Not at all	Total
			50.0%	50.0%	100.0%
Northern Region	12.3%	40.4%	43.9%	3.5%	100.0%
Southern Region	6.8%	33.8%	58.1%	1.4%	100.0%
North East Region	11.5%	57.7%	28.8%	1.9%	100.0%
Western Region	8.7%	56.5%	26.1%	8.7%	100.0%
Eastern Region	12.1%	39.4%	48.5%		100.0%
Central Region	25.0%	37.5%	37.5%		100.0%
Others	33.3%	66.7%			100.0%

Sub group: Pre 2

Frequency of Preference for Series Pre 3

Count

Willingness to pay for new camera		Rs. 2000 to Rs. 3500	Rs.5000 to Rs. 8000	Rs. 12000 to Rs. 18000	More than Rs. 24000	Total
Less than 18 years			2		1	3
18 to 25 years	1	17	69	60	14	161
25 to 45 years		8	31	32	9	80
45 to 65 years		1	1	2	2	6
More than 65 years					2	2

Sub group: Pre 3

Frequency of Preference for Series Pre 3

%

Willingness to pay for new camera		Rs. 2000 to Rs. 3500	Rs.5000 to Rs. 8000	Rs. 12000 to Rs. 18000	More than Rs. 24000	Total
Less than 18 years			66.7%		33.3%	100.0%
18 to 25 years	.6%	10.6%	42.9%	37.3%	8.7%	100.0%
25 to 45 years		10.0%	38.8%	40.0%	11.3%	100.0%
45 to 65 years		16.7%	16.7%	33.3%	33.3%	100.0%
More than 65 years					100.0%	100.0%

Sub group: Pre 3

Frequency of Preference for Series Pre 3

Count

Willingness to pay for new camera		Rs. 2000 to Rs. 3500	Rs.5000 to Rs. 8000	Rs. 12000 to Rs. 18000	More than Rs. 24000	Total
Student	1	17	78	75	16	187
Service		7	22	17	10	56
Business					1	1
Self Employed		2				2
Others			3	2	1	6

Sub group: Pre 3

Frequency of Preference for Series Pre 3

%

Willingness to pay for new camera		Rs. 2000 to Rs. 3500	Rs.5000 to Rs. 8000	Rs. 12000 to Rs. 18000	More than Rs. 24000	Total
Student	.5%	9.1%	41.7%	40.1%	8.6%	100.0%
Service		12.5%	39.3%	30.4%	17.9%	100.0%
Business					100.0%	100.0%
Self Employed		100.0%				100.0%
Others			50.0%	33.3%	16.7%	100.0%

Sub group: Pre 3

Frequency of Preference for Series Pre 3

Count

Willingness to pay for new camera		Rs. 2000 to Rs. 3500	Rs.5000 to Rs. 8000	Rs. 12000 to Rs. 18000	More than Rs. 24000	Total
			1		1	2
Male	1	23	96	89	26	235
Female		3	6	5	1	15

Sub group: Pre 3

Frequency of Preference for Series Pre 3

%

Willingness to pay for new camera		Rs. 2000 to Rs. 3500	Rs.5000 to Rs. 8000	Rs. 12000 to Rs. 18000	More than Rs. 24000	Total
Male	.4%	9.8%	50.0% 40.9%	37.9%	50.0% 11.1%	100.0% 100.0%
Female		20.0%	40.0%	33.3%	6.7%	100.0%

Sub group: Pre 3

Frequency of Preference for Series Pre 3

Count

Willingness to pay for new camera		Rs. 2000 to Rs. 3500	Rs.5000 to Rs. 8000	Rs. 12000 to Rs. 18000	More than Rs. 24000	Total
			2			2
Up to School level		4	13	7	5	29
Up to College Level	1	11	46	40	7	105
Up to Post Graduate Studies Level		6	23	28	8	65
Professional Course Level		4	12	14	4	34
Others		1	7	5	4	17

Sub group: Pre 3

Frequency of Preference for Series Pre 3

%

Willingness to pay for new camera		Rs. 2000 to Rs. 3500	Rs.5000 to Rs. 8000	Rs. 12000 to Rs. 18000	More than Rs. 24000	Total
			100.0%			100.0%
Up to School level		13.8%	44.8%	24.1%	17.2%	100.0%
Up to College Level	1.0%	10.5%	43.8%	38.1%	6.7%	100.0%
Up to Post Graduate Studies Level		9.2%	35.4%	43.1%	12.3%	100.0%
Professional Course Level		11.8%	35.3%	41.2%	11.8%	100.0%
Others		5.9%	41.2%	29.4%	23.5%	100.0%

Sub group: Pre 3

Frequency of Preference for Series Pre 3

Count

Willingness to pay for new camera		Rs. 2000 to Rs. 3500	Rs.5000 to Rs. 8000	Rs. 12000 to Rs. 18000	More than Rs. 24000	Total
			2			2
Northern Region	1	7	21	20	8	57
Southern Region		7	30	32	5	74
North East Region		6	21	18	7	52
Western Region		2	8	11	2	23
Eastern Region		3	15	10	5	33
Central Region		1	4	3		8
Others			2		1	3

Sub group: Pre 3

Frequency of Preference for Series Pre 3

%

Willingness to pay for new camera		Rs. 2000 to Rs. 3500	Rs.5000 to Rs. 8000	Rs. 12000 to Rs. 18000	More than Rs. 24000	Total
			100.0%			100.0%
Northern Region	1.8%	12.3%	36.8%	35.1%	14.0%	100.0%
Southern Region		9.5%	40.5%	43.2%	6.8%	100.0%
North East Region		11.5%	40.4%	34.6%	13.5%	100.0%
Western Region		8.7%	34.8%	47.8%	8.7%	100.0%
Eastern Region		9.1%	45.5%	30.3%	15.2%	100.0%
Central Region		12.5%	50.0%	37.5%		100.0%
Others			66.7%		33.3%	100.0%

Sub group: Pre 3

Frequency of Preference for Series Pre 4

Count

Camera as Personification		Companion and soul mate	Faithful pet	Trusted Friend	Cute child	Total
Less than 18 years				2	1	3
18 to 25 years	2	33	24	79	23	161
25 to 45 years	1	11	12	41	15	80
45 to 65 years				5	1	6
More than 65 years			2			2

Sub group: Pre 4

Frequency of Preference for Series Pre 4

%

Camera as Personification		Companion and soul mate	Faithful pet	Trusted Friend	Cute child	Total
Less than 18 years				66.7%	33.3%	100.0%
18 to 25 years	1.2%	20.5%	14.9%	49.1%	14.3%	100.0%
25 to 45 years	1.3%	13.8%	15.0%	51.3%	18.8%	100.0%
45 to 65 years				83.3%	16.7%	100.0%
More than 65 years			100.0%			100.0%

Sub group: Pre 4

Frequency of Preference for Series Pre 4

Count

Camera as Personification		Companion and soul mate	Faithful pet	Trusted Friend	Cute child	Total
Student	3	35	28	91	30	187
Service		8	6	36	6	56
Business			1			1
Self Employed					2	2
Others		1	3		2	6

Sub group: Pre 4

Frequency of Preference for Series Pre 4

%

Camera as Personification		Companion and soul mate	Faithful pet	Trusted Friend	Cute child	Total
Student	1.6%	18.7%	15.0%	48.7%	16.0%	100.0%
Service		14.3%	10.7%	64.3%	10.7%	100.0%
Business			100.0%			100.0%
Self Employed					100.0%	100.0%
Others		16.7%	50.0%		33.3%	100.0%

Sub group: Pre 4

Frequency of Preference for Series Pre 4

Count

Camera as Personification		Companion and soul mate	Faithful pet	Trusted Friend	Cute child	Total
				1	1	2
Male	3	41	37	119	35	235
Female		3	1	7	4	15

Sub group: Pre 4

Frequency of Preference for Series Pre 4

%

Camera as Personification		Companion and soul mate	Faithful pet	Trusted Friend	Cute child	Total
				50.0%	50.0%	100.0%
Male	1.3%	17.4%	15.7%	50.6%	14.9%	100.0%
Female		20.0%	6.7%	46.7%	26.7%	100.0%

Sub group: Pre 4

Frequency of Preference for Series Pre 4

Count

Camera as Personification		Companion and soul mate	Faithful pet	Trusted Friend	Cute child	Total
		1			1	2
Up to School level		8	2	14	5	29
Up to College Level	2	16	20	51	16	105
Up to Post Graduate Studies Level		11	7	36	11	65
Professional Course Level	1	5	7	17	4	34
Others		3	2	9	3	17

Sub group: Pre 4

Frequency of Preference for Series Pre 4

%

Camera as Personification		Companion and soul mate	Faithful pet	Trusted Friend	Cute child	Total
		50.0%			50.0%	100.0%
Up to School level		27.6%	6.9%	48.3%	17.2%	100.0%
Up to College Level	1.9%	15.2%	19.0%	48.6%	15.2%	100.0%
Up to Post Graduate Studies Level		16.9%	10.8%	55.4%	16.9%	100.0%
Professional Course Level	2.9%	14.7%	20.6%	50.0%	11.8%	100.0%
Others		17.6%	11.8%	52.9%	17.6%	100.0%

Sub group: Pre 4

Frequency of Preference for Series Pre 4

Count

Camera as Personification		Companion and soulmate	Faithful pet	Trusted Friend	Cute child	Total
		1			1	2
Northern Region	2	12	12	23	8	57
Southern Region	1	12	11	38	12	74
North East Region		10	4	27	11	52
Western Region		5	2	15	1	23
Eastern Region		4	7	15	7	33
Central Region			1	7		8
Others			1	2		3

Sub group: Pre 4

Frequency of Preference for Series Pre 4

%

Camera as Personification		Companion and soul mate	Faithful pet	Trusted Friend	Cute child	Total
		50.0%			50.0%	100.0%
Northern Region	3.5%	21.1%	21.1%	40.4%	14.0%	100.0%
Southern Region	1.4%	16.2%	14.9%	51.4%	16.2%	100.0%
North East Region		19.2%	7.7%	51.9%	21.2%	100.0%
Western Region		21.7%	8.7%	65.2%	4.3%	100.0%
Eastern Region		12.1%	21.2%	45.5%	21.2%	100.0%
Central Region			12.5%	87.5%		100.0%
Others			33.3%	66.7%		100.0%

Sub group: Pre 4

Frequency of Preference for Series Pre 6

Count

Mode of storage of images	Photo album	Photo prints	On computer	Photo frames	None of the above	Total
Less than 18 years	1		1	1		3
18 to 25 years	37	5	116	2	1	161
25 to 45 years	26	2	49	2	1	80
45 to 65 years		1	4	1		6
More than 65 years			1		1	2

Sub group: Pre 6

Frequency of Preference for Series Pre 6

%

Mode of storage of images	Photo album	Photo prints	On computer	Photo frames	None of the above	Total
Less than 18 years	33.3%		33.3%	33.3%		100.0%
18 to 25 years	23.0%	3.1%	72.0%	1.2%	.6%	100.0%
25 to 45 years	32.5%	2.5%	61.3%	2.5%	1.3%	100.0%
45 to 65 years		16.7%	66.7%	16.7%		100.0%
More than 65 years			50.0%		50.0%	100.0%

Sub group: Pre 6

Frequency of Preference for Series Pre 6

Count

Mode of storage of images	Photo album	Photo prints	On computer	Photo frames	None of the above	Total
Student	43	5	135	4		187
Service	21	3	29	2	1	56
Business					1	1
Self Employed			2			2
Others			5		1	6

Sub group: Pre 6

Frequency of Preference for Series Pre 6

%

Mode of storage of images	Photo album	Photo prints	On computer	Photo frames	None of the above	Total
Student	23.0%	2.7%	72.2%	2.1%		100.0%
Service	37.5%	5.4%	51.8%	3.6%	1.8%	100.0%
Business					100.0%	100.0%
Self Employed			100.0%			100.0%
Others			83.3%		16.7%	100.0%

Sub group: Pre 6

Frequency of Preference for Series Pre 6

Count

Mode of storage of images	Photo album	Photo prints	On computer	Photo frames	None of the above	Total
			2			2
Male	60	7	161	4	3	235
Female	4	1	8	2		15

Sub group: Pre 6

Frequency of Preference for Series Pre 6

%

Mode of storage of images	Photo album	Photo prints	On computer	Photo frames	None of the above	Total
			100.0%			100.0%
Male	25.5%	3.0%	68.5%	1.7%	1.3%	100.0%
Female	26.7%	6.7%	53.3%	13.3%		100.0%

Sub group: Pre 6

Frequency of Preference for Series Pre 6

Count

Mode of storage of images	Photo album	Photo prints	On computer	Photo frames	None of the above	Total
				1	1	2
Up to School level	5	2	22			29
Up to College Level	28	2	74	1		105
Up to Post Graduate Studies Level	19		42	3	1	65
Professional Course Level	6	4	22	1	1	34
Others	6		11			17

Sub group: Pre 6

Frequency of Preference for Series Pre 6

%

Mode of storage of images	Photo album	Photo prints	On computer	Photo frames	None of the above	Total
				50.0%	50.0%	100.0%
Up to School level	17.2%	6.9%	75.9%			100.0%
Up to College Level	26.7%	1.9%	70.5%	1.0%		100.0%
Up to Post Graduate Studies Level	29.2%		64.6%	4.6%	1.5%	100.0%
Professional Course Level	17.6%	11.8%	64.7%	2.9%	2.9%	100.0%
Others	35.3%		64.7%			100.0%

Sub group: Pre 6

Frequency of Preference for Series Pre 6

Count

Mode of storage of images	Photo album	Photo prints	On computer	Photo frames	None of the above	Total
			1		1	2
Northern Region	20	2	34		1	57
Southern Region	11	1	61	1		74
North East Region	18	2	27	4	1	52
Western Region	6	2	15			23
Eastern Region	8	1	23	1		33
Central Region	1		7			8
Others			3			3

Sub group: Pre 6

Frequency of Preference for Series Pre 6

%

Mode of storage of images	Photo album	Photo prints	On computer	Photo frames	None of the above	Total
			50.0%		50.0%	100.0%
Northern Region	35.1%	3.5%	59.6%		1.8%	100.0%
Southern Region	14.9%	1.4%	82.4%	1.4%		100.0%
North East Region	34.6%	3.8%	51.9%	7.7%	1.9%	100.0%
Western Region	26.1%	8.7%	65.2%			100.0%
Eastern Region	24.2%	3.0%	69.7%	3.0%		100.0%
Central Region	12.5%		87.5%			100.0%
Others			100.0%			100.0%

Sub group: Pre 6

Frequency of Preference for Series Pre 7

Count

Camera brand association		Kodak	Sony	Canon	Nikon	Olympus	Nokia	Samsung	Total
Less than 18 years		1		1			1		3
18 to 25 years	4	6	57	50	34	8		2	161
25 to 45 years		8	28	22	19	3			80
45 to 65 years			2	1	3				6
More than 65 years			1				1		2

Sub group: Pre 7

Frequency of Preference for Series Pre 7

%

Camera brand association		Kodak	Sony	Canon	Nikon	Olympus	Nokia	Samsung	Total
Less than 18 years		33.3%		33.3%			33.3%		100.0%
18 to 25 years	2.5%	3.7%	35.4%	31.1%	21.1%	5.0%		1.2%	100.0%
25 to 45 years		10.0%	35.0%	27.5%	23.8%	3.8%			100.0%
45 to 65 years			33.3%	16.7%	50.0%				100.0%
More than 65 years			50.0%				50.0%		100.0%

Sub group: Pre 7

Frequency of Preference for Series Pre 7

Count

Camera brand association		Kodak	Sony	Canon	Nikon	Olympus	Nokia	Samsung	Total
Student	4	11	67	54	39	9	1	2	187
Service		4	18	16	16	2			56
Business			1						1
Self Employed				2					2
Others			2	2	1		1		6

Sub group: Pre 7

Frequency of Preference for Series Pre 7

%

Camera brand association		Kodak	Sony	Canon	Nikon	Olympus	Nokia	Samsung	Total
Student	2.1%	5.9%	35.8%	28.9%	20.9%	4.8%	.5%	1.1%	100.0%
Service		7.1%	32.1%	28.6%	28.6%	3.6%			100.0%
Business			100.0%						100.0%
Self Employed				100.0%					100.0%
Others			33.3%	33.3%	16.7%		16.7%		100.0%

Sub group: Pre 7

Frequency of Preference for Series Pre 7

Count

Camera brand association		Kodak	Sony	Canon	Nikon	Olympus	Nokia	Samsung	Total
			2						2
Male	3	13	80	71	54	10	2	2	235
Female	1	2	6	3	2	1			15

Sub group: Pre 7

Frequency of Preference for Series Pre 7

%

Camera brand association		Kodak	Sony	Canon	Nikon	Olympus	Nokia	Samsung	Total
			100%						100%
Male	1.3%	5.5%	34.0%	30.2%	23.0%	4.3%	.9%	.9%	100.0%
Female	6.7%	13.3%	40.0%	20.0%	13.3%	6.7%			100.0%

Sub group: Pre 7

Frequency of Preference for Series Pre 7

Count

Camera brand association		Kodak	Sony	Canon	Nikon	Olympus	Nokia	Samsung	Total
				1	1				2
Up to School level	2	1	9	11	4	1	1		29
Up to College level	2	3	37	36	24	3			105
Up to Post Graduate Studies level		7	22	13	16	5	1	1	65
Professional Course level		4	12	8	8	1		1	34
Others			8	5	3	1			17

Sub group: Pre 7

Frequency of Preference for Series Pre 7

%

Camera brand association		Kodak	Sony	Canon	Nikon	Olympus	Nokia	Samsung	Total
				50.0%	50.0%				100.0%
Up to School level	6.9%	3.4%	31.0%	37.9%	13.8%	3.4%	3.4%		100.0%
Up to College level	1.9%	2.9%	35.2%	34.3%	22.9%	2.9%			100.0%
Up to Post Graduate Studies level		10.8%	33.8%	20.0%	24.6%	7.7%	1.5%	1.5%	100.0%
Professional Course level		11.8%	35.3%	23.5%	23.5%	2.9%		2.9%	100.0%
Others			47.1%	29.4%	17.6%	5.9%			100.0%

Sub group: Pre 7

Frequency of Preference for Series Pre 7

Count

Camera brand association		Kodak	Sony	Canon	Nikon	Olympus	Nokia	Samsung	Total
			1		1				2
North Region	2	5	19	18	9	4			57
Southern Region	2	4	24	23	15	4		2	74
North East Region		3	21	15	11	1	1		52
Western Region		1	6	7	9				23
Eastern Region		1	13	6	11	2			33
Central Region		1	4	3					8
Others				2			1		3

Sub group: Pre 7

Frequency of Preference for Series Pre 7

%

Camera brand association		Kodak	Sony	Canon	Nikon	Olympus	Nokia	Samsung	Total
Northern Region			50.0%		50.0%				100.0%
Southern Region	3.5%	8.8%	33.3%	31.6%	15.8%	7.0%			100.0%
North East Region	2.7%	5.4%	32.4%	31.1%	20.3%	5.4%		2.7%	100.0%
Western Region		5.8%	40.4%	28.8%	21.2%	1.9%	1.9%		100.0%
Eastern Region		4.3%	26.1%	30.4%	39.1%				100.0%
Central Region		3.0%	39.4%	18.2%	33.3%	6.1%			100.0%
Others		12.5%	50.0%	37.5%					100.0%
				66.7%			33%		100.0%

Sub group: Pre 7

5.3 Conclusions

In this chapter, the details of the two empirical studies that were conducted to seek users response to their preference for visual form of the digital camera were outlined. The frequency distribution and cross tabulation of their responses with reference to the different parameters of the user profile were recorded in the different tables.

These results have subsequently been analyzed and inferences drawn in the next chapter.

Chapter 6 Inferences and Conclusions

INFERENCES AND CONCLUSIONS

6.0 Introduction

The methodology evolved strategically seeks user response to the visual domain of product form elements, product attributes and product features for the digital camera from three positions:

- The FC series accomplishes the user response to the product under study.
- The FE Series introduces visual cueing to the user and attempts to draw the imagined associations with respect to the camera and its product attributes.
- The questionnaire seeks user response to product features as experiences aspired for by them. These include preferences and aspirations for aspects of the product's overall features, product use and the product's connotative expectations.

Inferences were drawn from the results of the experiments that were tabulated in the previous section. These responses indicate the profile of the users and their preference patterns outlined below.

6.1 Profile of the User

From the frequency tabulation of results shown in the previous chapter, some inferences may be drawn from this sample study that point towards the following user profile:

- The respondents are predominantly male (93.3%) and educated (college level and above).
- Respondents majorly belong to the follwing two age groups 18 to 25 years (64%) and 25 to 45 years of age (32 %).
- Respondents were distributed across East India/ North East India, South India, North India, West India and Central India representing a cross section of the different geographical regions of the country.

6.2 User aspirations for the visual appearance of camera and its usage

The results of the two empirical studies were analysed through frequency analysis and comparison. Comparison of cross tabulated results of preference pattern of the different parameters of the respondents showed the following common preferences amongst the different user segments. These are summarized below:

- From the study it is evident that the form and appearance of the digital camera should reflect sophistication and a 'high tech' image. It must represent visually strong connotations of 'uniqueness' and sophistication but have an uncomplicated and clean image.

- The lens of the camera should be prominent and of medium to medium-large in size. It should be a distinct 'visual' feature of the camera.

- The body of the camera must differentiate itself in a matte finish or in a combination of matte finish with glossy trims. The aspiration was for a formal yet contemporary, smart and sturdy look.

- The form should be - clean and uncomplicated to look at
  - simple and functional to use
  - expressive
- It should not be flashy and loud.

- Ornamentation may be added to the protective casing only.

- Hot / humid weather conditions in India result in sweaty palms and fingers during product use. Users voiced the need for these considerations in design and selection of textures and material aspects of the camera. The camera therefore should look strong / rugged, tropicalized. It should be possible to use it in dusty and humid environment.

- The camera must lend itself to easy repair and maintainability and should fit into the service-oriented network of the Indian society.

- It should be possible to sling the camera from the shoulders rather than have it hanging by the strap from the neck. Increasingly many people prefer to strap the camera around the waist and hold it in their hand. Perhaps this is partially due to the shift in the nature of use of the product. While earlier the mode of user interaction with the camera was to look through it which has shifted with the coming in of the digital camera where one looks at the LCD screen of the camera rather than through the eye piece.

- Applying 'what if' creativity technique seems to throw up new product opportunities. For example the user response indicates that storage of images in the traditional photo-frames is the least preferred option and storage on the computer the most preferred. This offers the possibility of considering 'what if' photo-frames could store digital images which could be put up for display, and could be dynamically changed. This idea has today been translated in the new product on offer by Philips.

6.3 Users perceptions and expectations of the camera and its usage

- The camera is perceived to be a 'serious' product with a high degree of 'pride of ownership'. The product expectations are 'formal and functional'.

- The product is looked as a 'trusted friend' and is therefore in the category of an 'associate' one is comfortable being with. This is unlike a personal product such as a spectacle frame which is indispensable and an extension of the user's personality.

- Overall there is a high degree of 'techno-comfort' and 'techno-literacy' in the awareness and use of the digital camera. There are two distinct user categories: the serious 'aspiring to be professional' and the 'amateur' who aspires to own the camera for its materialistic status. Both categories show distinct preference for the camera as a discreet and unique product

- Users are not inclined towards a 'combination' product with multiple features such as mobile phone and camera combined.

- Culturally the 'amateur novice' user, through the capture and means of the image, considers photography as an extension of the self 'looking in a mirror'.

- In contrast the 'serious knowledgeable' professional user considers the capture of the image more as an art form engaging 'drawing with light'.

- The users' indicated a preference for simple and direct use of the camera. These instinctive characteristic features need to be built into the product.

- Typically, while purchasing a camera, the visual parameters are lower in priority. The user relies on 'word of mouth' enquiry from close friends / family members. The user expects 'maximum value for money' as far as technical features are concerned and seeks assurances for good after sales service.

6.4 Inferences from Cross Tabulation of Parameters

The inferences drawn from cross tabulation of results can be fine tuned to gain further insight into the preference patterns amongst user segments. For example considering the diversity of cultural communities, geographical terrains and variations in the literacy levels of end users, sub categorization of data could be done on the basis of cross tabulation such as:

- Geographical region to which the respondent belongs vis-à-vis the preference for product form and product features
- Education level and techno-comfort level of user vis-à-vis the preference for product form and product features

Such an attempt was made tabulating the data of the user's response and drawing inferences there in. These are summarized below.

6.41 Summary of inferences of geographical region to which the respondent belongs and the product form and feature preference

Through the questionnaire and tabulation of data the 252 respondents were identified and categorized into seven geographical locations as following:

Region of India	Number of Respondents	Percentage
Northern	57	22.5
Southern	74	30
North Eastern	52	20.5
Western	23	9
Eastern	33	13

Central	8	3
Others	5	2
Total	**252**	100

The findings were the following:

- Representations from the geographical regions of the southern, northern and north eastern regions were higher. The central, western as also the eastern regions were less represented.

- The users from the southern region preferred the camera lens in a combination of small or medium size unlike users from the northern and north eastern region who preferred a medium to medium large lens for the camera.

- The users from the north eastern region preferred the camera orientation in a horizontal orientation and a vertical orientation in comparable measure unlike respondents from the other regions who distinctly preferred a horizontal orientation.

- There seems a distinct 'no nonsense and clearly functional' connotative form expression preferred by the northern and eastern region users. The users from the southern region showed more openness to a metaphoric and expressive connotation in the form of the product.

- However, respondents from the eastern and northern region indicated a preference for clean and defined edges. The respondents from the southern region indicated a preference for soft rounded edges.

- A large percentage of respondents across all geographical regions had a few common preferences:

  i) The horizontal cuboidal camera form in landscape format.
  ii) That the product form should be visually uncluttered with the flash element laid out in the conventional top right corner when seen facing the camera.
  iii) That the overall form should be with a single convex surface set on a straight axis.

- The respondents from the southern region preferred a combination of matte and glossy surface finish interplay. The other regions preferred an all matte surface finish.

- Photography as an activity is associated predominantly as an outdoor social activity. It is an activity that goes with festivities, celebrations and outings, during tours and travels, reflecting an inclination towards trying to capture images more as an extension of looking at them at a later period in time.

- All respondents showed a high degree of techno-awareness and techno-comfort in the use of digital camera across all geographical regions.

- There was a clear indication that the camera is preferred to be a 'unique, discreet and stand alone' product. By and large respondents did not prefer a multi-functional combination product such as a cell phone camera.

- The purchase decision for a digital camera is based on two important criteria:
  - its technical features
  - good after-sales service

- The connotative meaning associated with a digital camera is that of a 'trusted friend' indicating that the product needs to arouse reliability and handiness during use. In a sense implying that the connotative association of a camera as a product would not fall in the category of a personal product like a spectacle frame, which as mentioned earlier is an extension of the users 'self'.

6.42 Summary of inferences of educational/literacy levels to which the respondent belongs and the Product form and feature preference

Through the questionnaire and tabulation of data the 252 respondents were identified and categorized into the five educational levels as follows:

Education level of Respondent	Number of Respondents	Percentage
High school level	29	11.5
College Degree level	105	42
Post graduate Studies level	65	26
Professional Education Program level	34	13.5
Others	17	7
Total	**252**	100

The findings were the following:

- The following preferences were indicated across all educational levels:
  i) A desire to possess a digital camera.

  ii) A high degree of techno-awareness and techno-comfort in the use of the digital camera by the respondents.
  This was indicated both in the choice of storage of images through the use of computers and the choice of the digital camera as a product choice for purchase.

iii) In the context of the visual features, the camera body was preferred in the conventional horizontal orientation.

iv) The camera body was preferred to be a single convex or double convex form oriented around a straight axis.

v) A formal look with the body possessing clean straight edges or a soft look with rounded edges.

vi) The grip was preferred to be underplayed and to look subtle.

vii) The overall camera body was expected to look smart, clean and sophisticated.

- The young and youthful college going user distinctly indicated a preference for a light colored body and not an all black body. However the knowledgeable and serious photographer did not show the same degree of aversion towards a black camera body. It was also observed that the preference pattern shifted from an amateur digital camera towards a professional digital camera as the choice amongst respondents with higher educational qualification. It needs to be further explored if there are any cultural connotation associated with the color black which may have influenced preference pattern..

- Brand name was not an important criterion for purchase decision. Rather technical features and the assurance of a good after sales service were considered more important in the purchase decision. This is indicative of the serious 'value for money' expectations. The possession of the camera is more an 'investment' that is to be put to good use.

- Amongst the brand names across all educational levels, Sony and Canon were more recognized / accepted as compared to the other brands.

- Photography as an activity is still associated with a more youthful predisposition of character. This is indicated by the mode of carrying the camera around the 'waist amongst the young college going user as also an openness shown by the more middle aged user.

6.43 Mapping the product profile for the digital camera

Considering the observations and inferences drawn from cross tabulation of the different parameters an attempt could be made to broadly map the visual preference for the digital camera amongst male users in the age groups: 18-25 years and 25-45 years of age, highlighting subtle differences in the preference pattern variations expected for the different geographical regions of India.

For example, from the results of the tabulated results it is evident that the college going youth from the north show a preference for a digital camera form that should be a bit of a show piece, in horizontal format, with a glossy and showy look that is smart /jazzy and attractive in a black and silver combination or an all black body possessing a distinct medium to medium-large lens with a distinctly integrated body.
In summary, conventional and showy look for the youth from the North.

For the college going youth from the south - a camera form that should be smart, professional and distinctly functional. Oriented in horizontal format, the body should possess a glossy look that is techno-smart and attractive in a black and silver combination or all silver body. It should possess a distinct medium lens with a distinctly integrated body with soft rounded edges.

It may also be observed from the results that there is a distinct shift towards a professional look with differentiated grip and all black body for the digital camera by users in the age group 25-45 years from the southern region.
In summary, conventional and techno-functional with an image of 'value for money' for the demanding user from the South.

For the exploratory and experimental youth of the north east, the camera could be unconventional and unexpected in form and shape. It should extend as an 'image of the self'. It should possess a medium large or large lens, with a distinct black and silver or all silver body.

With data from a larger sample size, attempt could be made to map the preference for the visual form of the camera for the western and central regions. This has not been attempted but could be mapped with a larger respondent base.

6.5 Limitations of study and scope for further research

As seen from the two experiments attempt was made to evolve a methodology that was able to study users' preference for product form as interfaced through product features and product use. However while this was the dominating emphasis of the research study, the final results may have been constrained by the inherent limitations of the profile of the users who participated in this research study. The inferences drawn primarily reflected preferences of a male user segment in the age group of 18-25 and 25- 45 years. There was insignificant representation from the other three categories of age group. There was negligible representation from female respondents primarily due to the nature of a male dominated environment of the location where the experiments were conducted.

It would have been interesting to note the preference pattern of women respondents. It would have been possible to examine if gender as a parameter contributed to influencing the user preference for the style and looks of a camera. This would have indicated if there was justification for product differentiation based on gender as criteria.

There is conviction that the analysis of the environment of product use would throw up interesting insights to give a holistic perspective to the study. This aspect of the study was limited and not in-depth. The study of the environment of use is included as a part of the appendix (Appendix 4). This however is only an outline.

Time and expenses become important criteria in deciding the sample size of the study. Ideally 500 respondents would have been a better sample size for a mixed method research approach undertaken across specified locations in different parts of the country. Such a study would have resulted in inferences that were pan-Indian in its scope. It would have given cultural preference patterns for the different geographical locations of the country.

Through the means of an on line survey it would have been possible to scale up the sample size. However, as the unlimited version of the software package identified for conducting the on live survey could not be procured in time I was constrained to use the demonstration version of the software package with their restricted features. The online survey was therefore limited to a pan-Indian representation for the residents of the IIT Guwahati campus.

6.6 Conclusions

As seen in the two experiments that were conducted - the focus group study and the on- line survey technique based on MaxDiff method - the former is more rigorous in its qualitative nature while the other is quantitative in nature. Both involve cost, time and efforts to achieve worthwhile results. This thesis has attempted to outline a methodology for such a study and the inferences drawn and conclusions made are more 'indicative' in nature and spirit. For its application in a competitive real world situation, a combination of techniques needs to be considered based on the time line of progress of such a design research study. A dedicated design research team could be associated with the marketing research group during the early stages of the product planning phase. It could be the responsibility of such a design research group to conduct a qualitative on line study in product preference and life style to understand the cultural patterns of product use relevant to its business on an on going basis. Such qualitative studies over a period of time would prove invaluable for business operations at a global level.

Qualitative focus group approaches seem more pertinent and economically viable after the concept ideation phase where the designer is ready with new conceptual product ideas that need cross confirmation and validation. This is a critical phase in the product development cycle where confidentiality is also important.

Based on these considerations the methodology adopted in this research needs to be suitably modified. The numbers of variables need to be appropriately reformulated to suit the context of design objectives to be met.

In the methodology adopted, there were limitations to the approach with conclusions still being strong and inferential through direct observation method that was adopted.

This raises definite questions if a combination of qualitative and quantitative approach to the study should have been complemented by using a more rigorous statistical scale of measurement of the preference pattern. This measurement would be based on tried and tested methods of study adopted from other marketing approaches. This aspect needs to be further investigated.

As a closing statement, this thesis set out to outline a methodology that would help to draw inferences about the users' preference for the visual parameters of the product. Identification of this important design parameter would strengthen the overall objectives to be met in any product planning initiative. It would in the process, fill in a significant shortcoming that is usually not articulated by a market research group which is examining user preference.

Increasingly with products having to be designed for 'mass customizing' there will be greater need in identifying user expectation and meeting them through 'good design' initiatives. It is felt that such a methodology will increasingly be relevant in the near future and it cannot be denied that this research methodology is a timely intervention during the present times.

One hopes that such a comprehensive and objective approach in understanding the user preference for the visual domain of product form will enrich the designers' creative endeavour and guide them in the product planning phase. Local cultural parameters can thus be included in new product design and development initiatives.

Appendix 1

Visual plates for Focus Group user survey

Visual plates of Focus Group survey conducted as part of empirical study 1

About this project

We want to first thank you for agreeing to participate in this research project.

The objective of this study is to know your preference for objects of every day use.

We are going to use some unconventional methods such as this flipbook, which contains images of objects of everyday use that you may have used.

This flipbook will help you to express how you feel about the looks of the products and your opinion and experience of using them.

We hope that you will enjoy participating in this project.

What you will have to do

This flipbook contains three sections and may take, not more than twenty minutes of your time.

We are seeking your response and views regarding

1. Your preference for shapes and looks of some objects of every day use shown in the form of visuals.

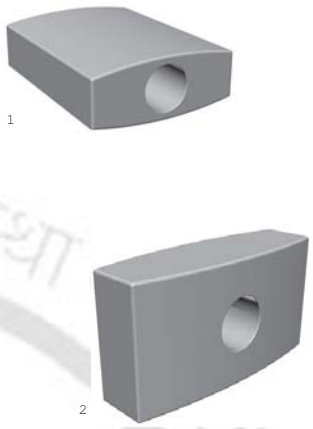
2. Your experience and views regarding some of the products that you may have used or desire to use.

3. Some information regarding yourself.

FE Series

FE 1

FE 2



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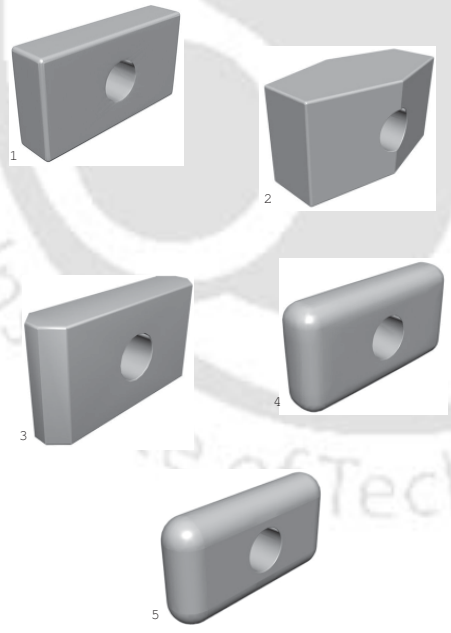

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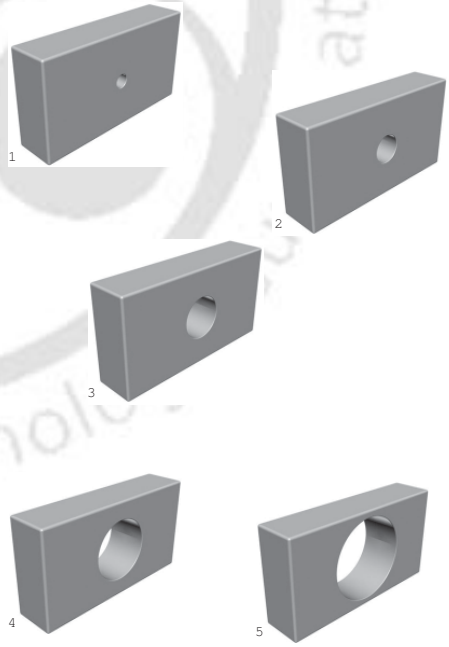

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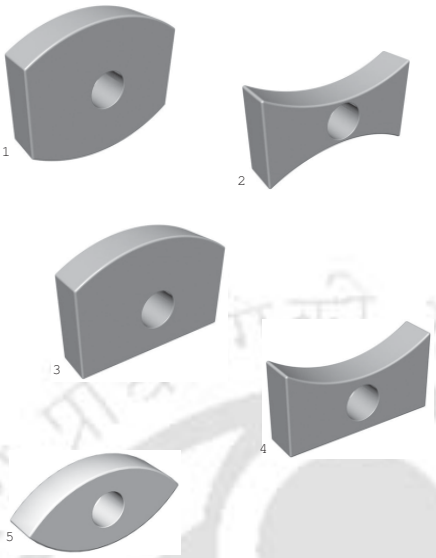
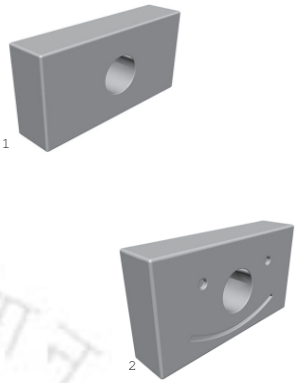


FE 10



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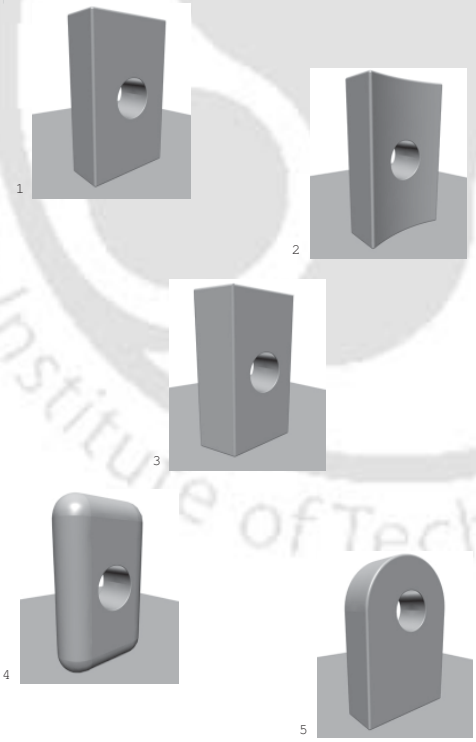
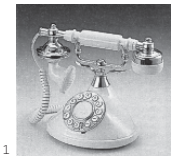


FA Series

FA 1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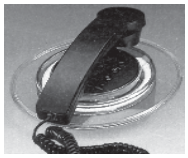
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FA 2


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FA 3


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FA 4


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FA 5


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FA 6


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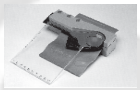
FA 8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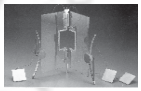
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FA 9

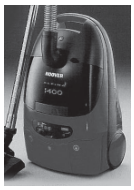
FA 10

FA 11

FA 12

FA 13


1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3


4


5

FA 14


1


2


3


4

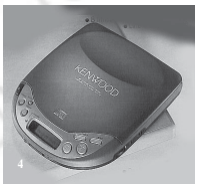

5

FA 15


1


2


3


4


5

Questionnaire

- Taking pictures of family, friends, locations when out for sightseeing or traveling is an interesting activity that we may have undertaken some time in the recent past.

- When we look at pictures we recollect interesting happenings and activities that we have undertaken and it helps to recall and recollect memories of our past.

- • Do you usually use a camera for this purpose
- • Have someone take pictures for you.

Do you use
- conventional film roll camera
- digital camera

- What make of camera did you use?

- _____

- What pictures did you take in the last one year?

- Family
- Marriage
- Picnic
- Tourist place
- Others _____
- _____

- How did you store the pictures?
- What do you like about the pictures you took?
- What memories do you recollect looking at these pictures?
- Which are your selected favorite pictures?
- Which is the most memorable event that you recollect looking at some favourite pictures that you have selected.
- What do you like about your camera?

- Which features do you like about your camera.

How do you carry it –
When in use

- In hand
- Around neck
- In bag
- Around waist
- Around shoulder
- Others

When not in use.

- In brief case
- In camera bag
- In cupboard
- In table drawer
- Others _____

What features do you dislike about your camera.

Imagine if tomorrow you lost your camera –

Would you buy another and replace it

- Immediately
- In the next three months
- In the next one year
- Not at all

Which type will you buy

- Digital camera
- Mobile phone camera
- Conventional film camera

Which brand will you buy

1 _____

2 _____

3 _____

For the purchase of the new camera you are willing to pay:

- Rs.2000 to 3500
- Rs.5000 to 8000
- Rs.12000 to 18000
- More than Rs.24000

Study of User preference for Product styling

Series FE

FE1							
FE2							
FE3							
FE4							
FE5							
FE6							
FE7							
FE8							
FE9							
FE10							
FE11							

Series FC

FC1							
FC2							
FC3							
FC4							
FC5							
FC6							
FC7							

Series FA 1st Preference

FA1							
FA2							
FA3							
FA4							
FA5							
FA6							
FA7							
FA8							
FA9							
FA10							
FA11							
FA12							
FA13							
FA14							
FA15							

Series FA 2nd Preference

FA1							
FA2							
FA3							
FA4							
FA5							
FA6							
FA7							
FA8							
FA9							
FA10							
FA11							
FA12							
FA13							
FA14							
FA15							

Personal Details:

Name: _____ e-mail address: _____

Age: 18 - 24 years ☐
25-45 years ☐
46 - 60 years ☐

Occupation: Student ☐ Service ☐ Business ☐ Self employed ☐ Others ☐

Monthly Income: 5000 - 15000 ☐ 15000 - 25000 ☐ 25000 - 50000 ☐ 50000 & above ☐

Gender: Male ☐ Female ☐

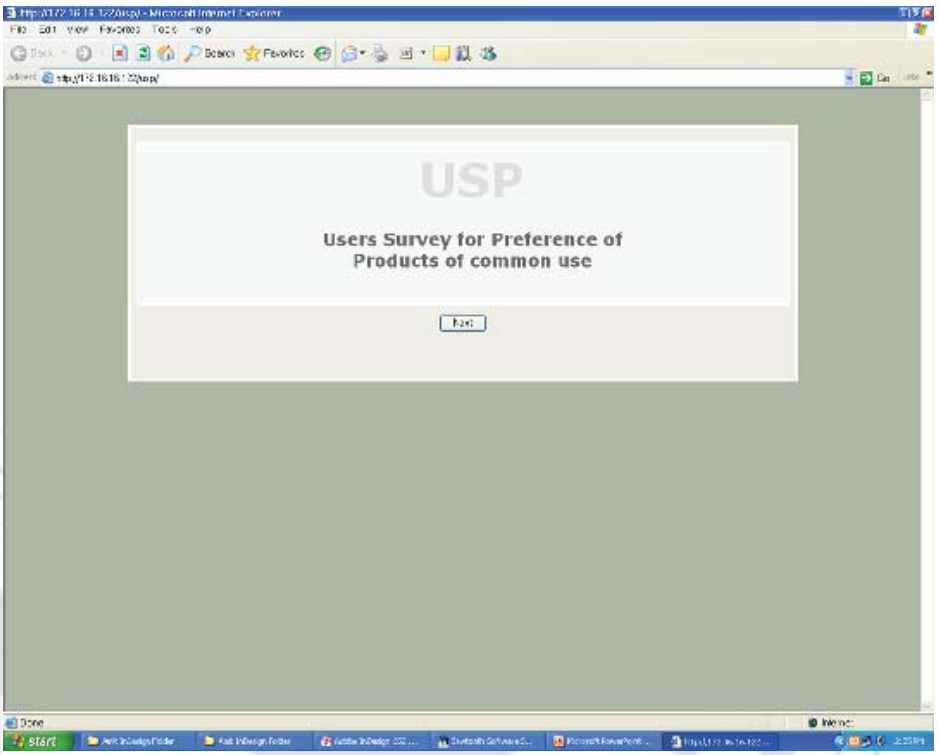
Education: Degree ☐ Post Graduate ☐ Professional ☐ Others ☐

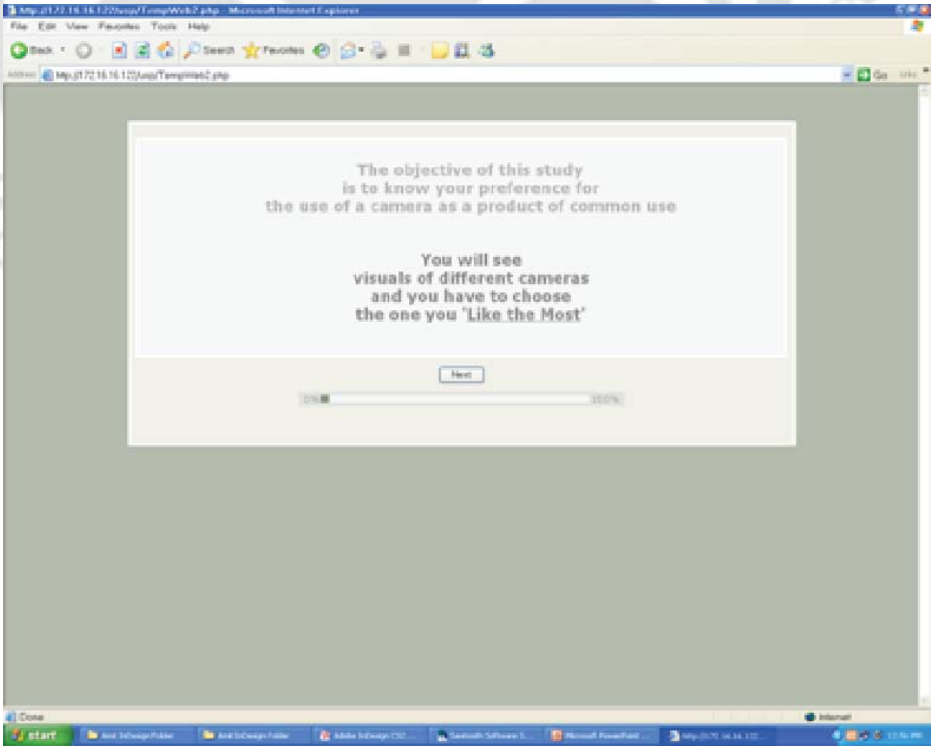
Your Home Town: _____

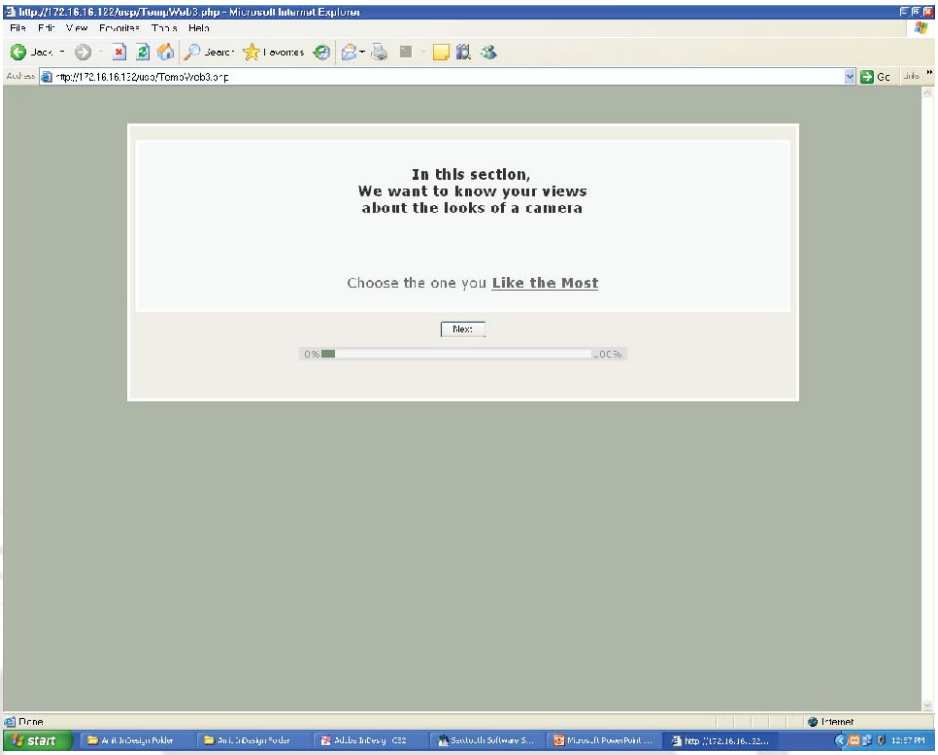
Appendix 2

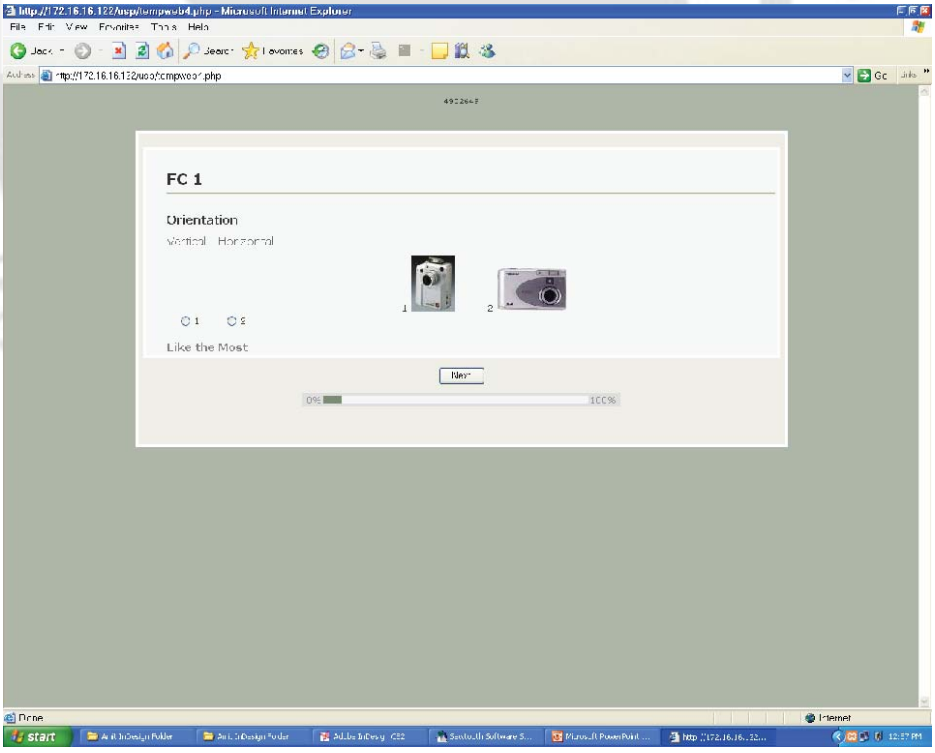
Visual plates for USP online user survey

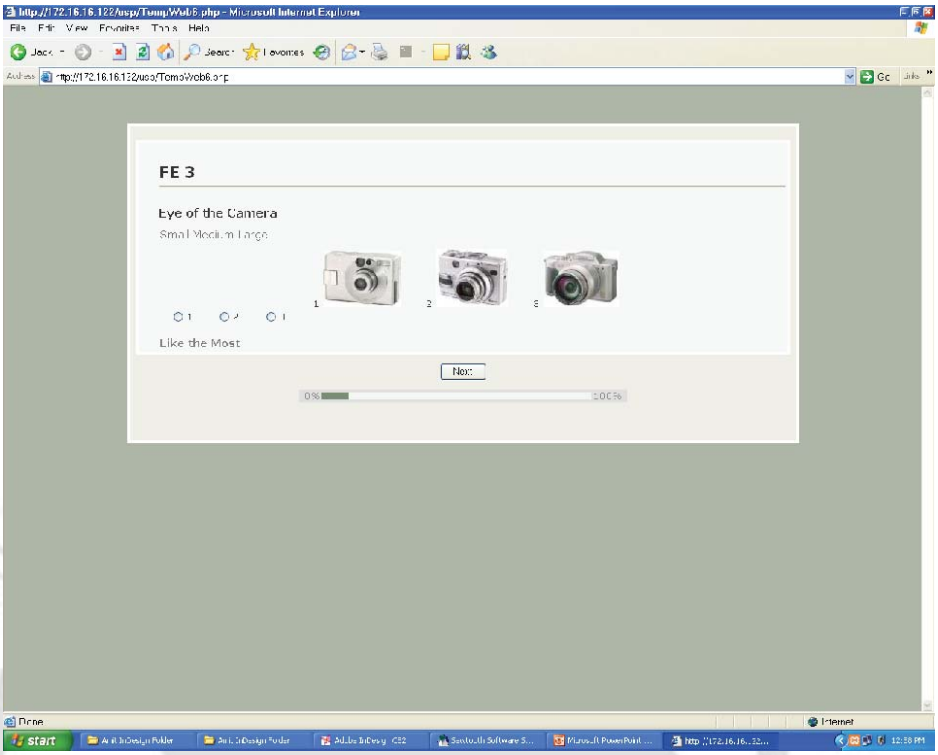
Visual Plates for USP on line survey conducted as part of empirical study 2

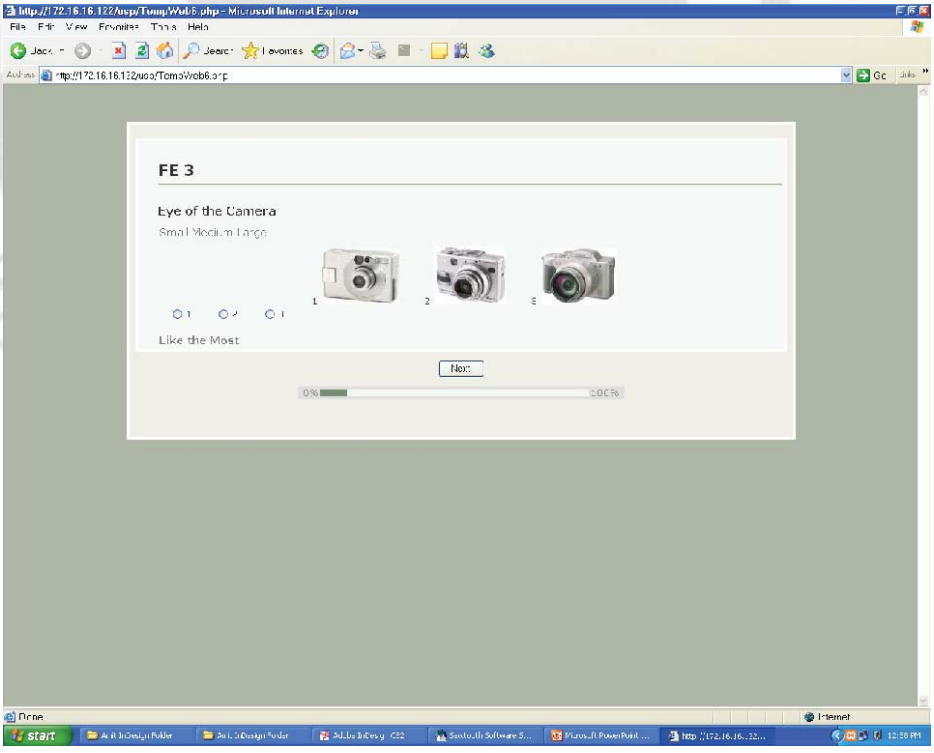


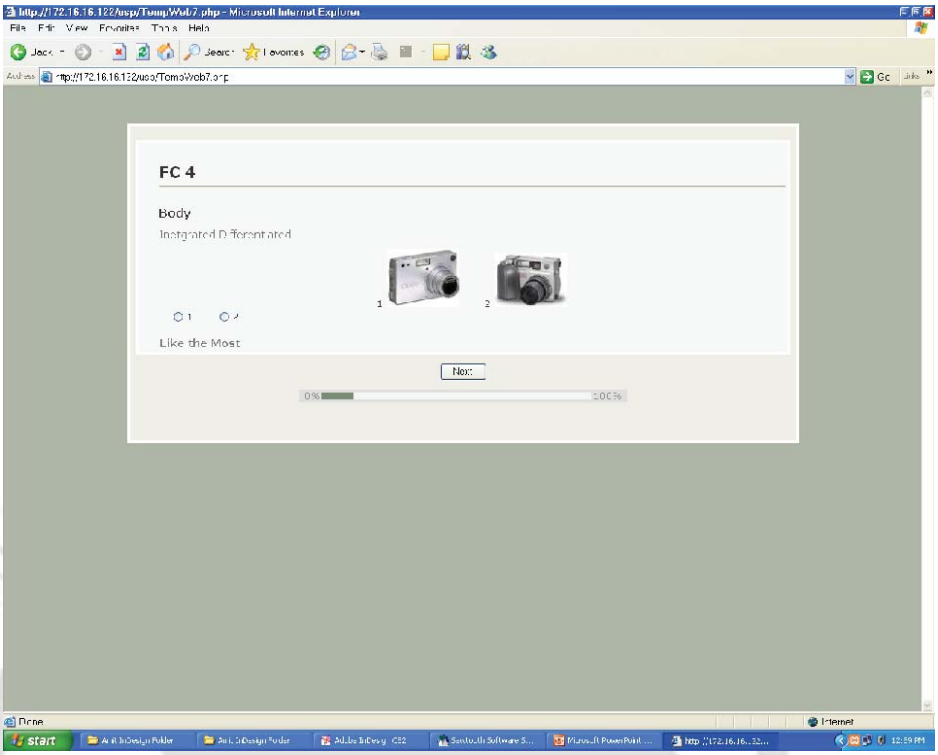


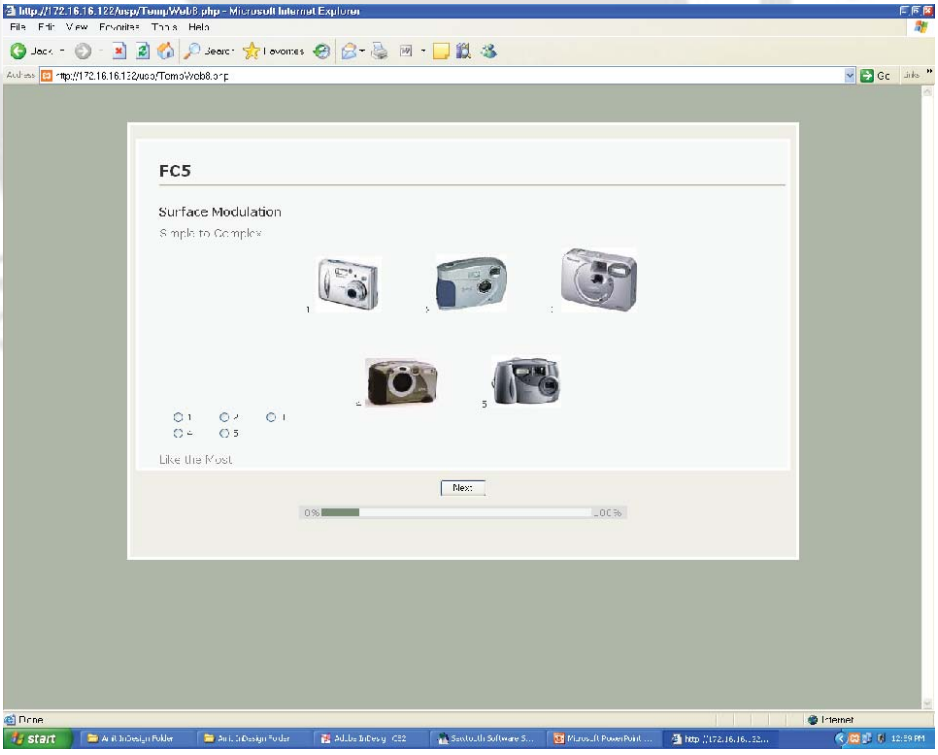


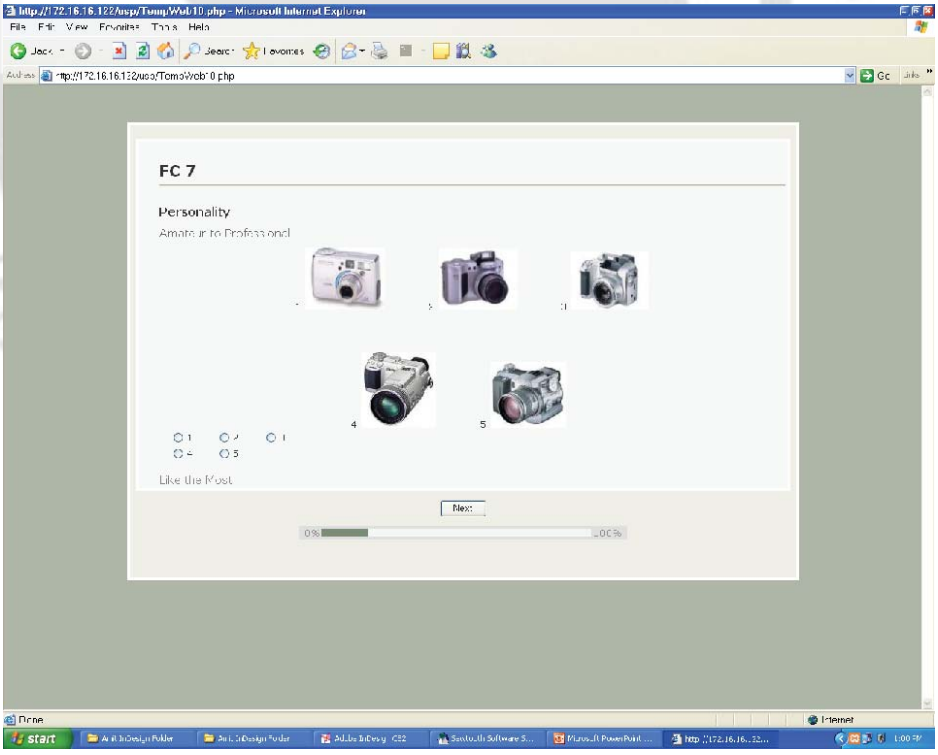


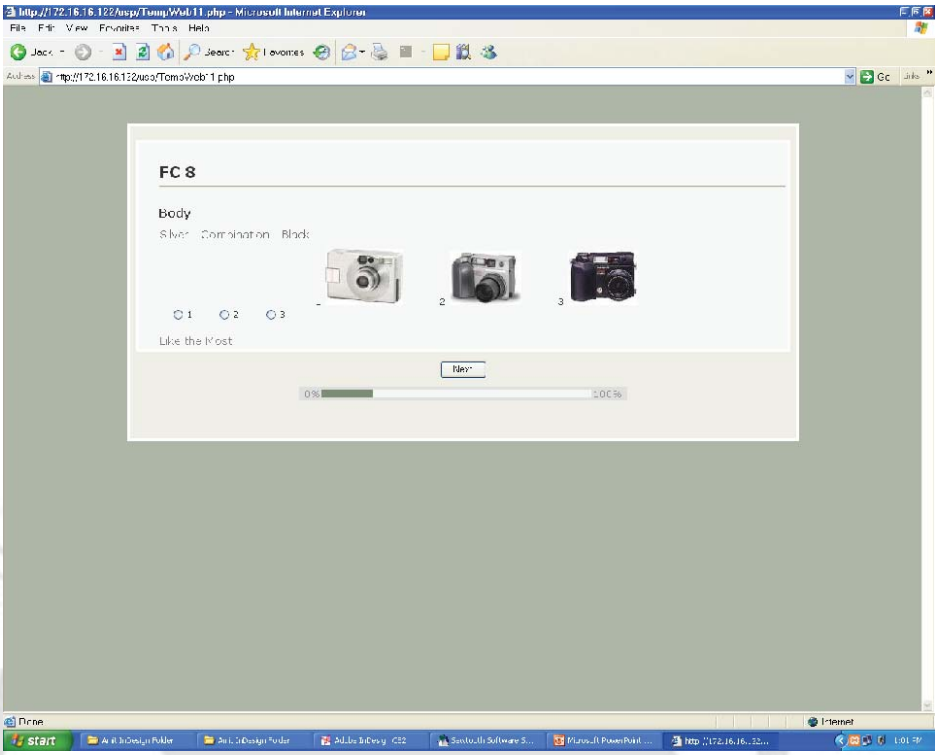


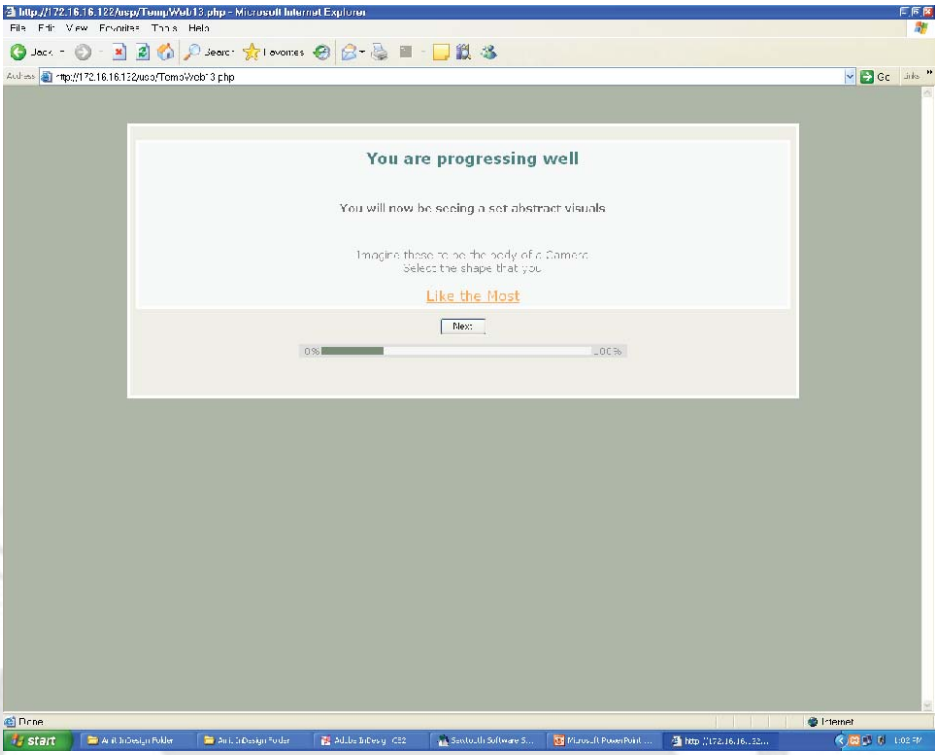


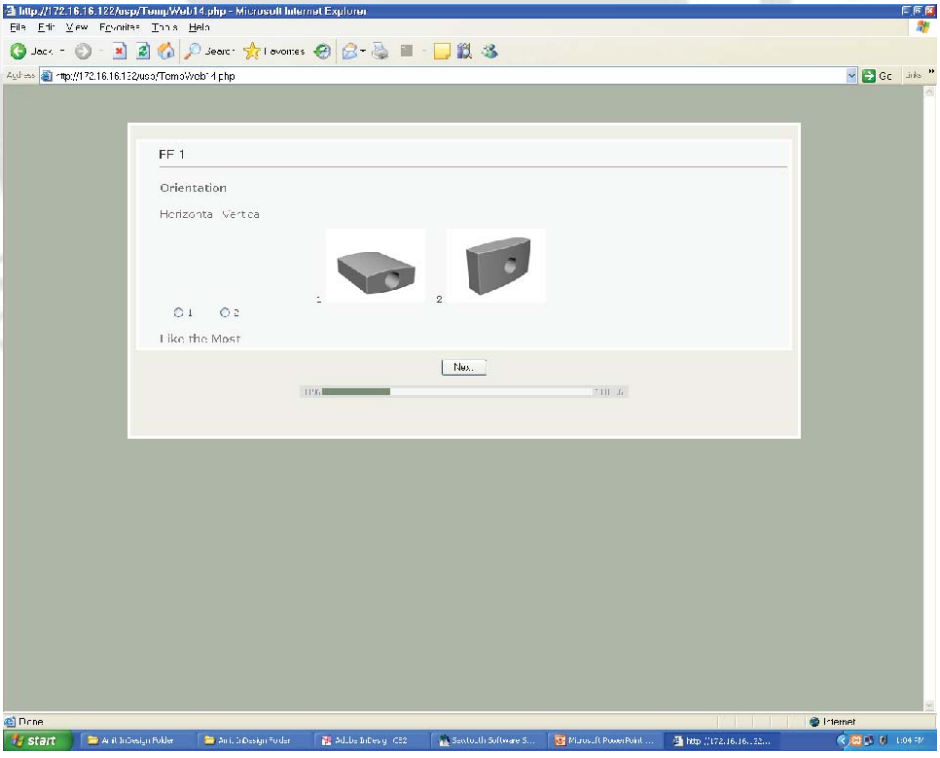


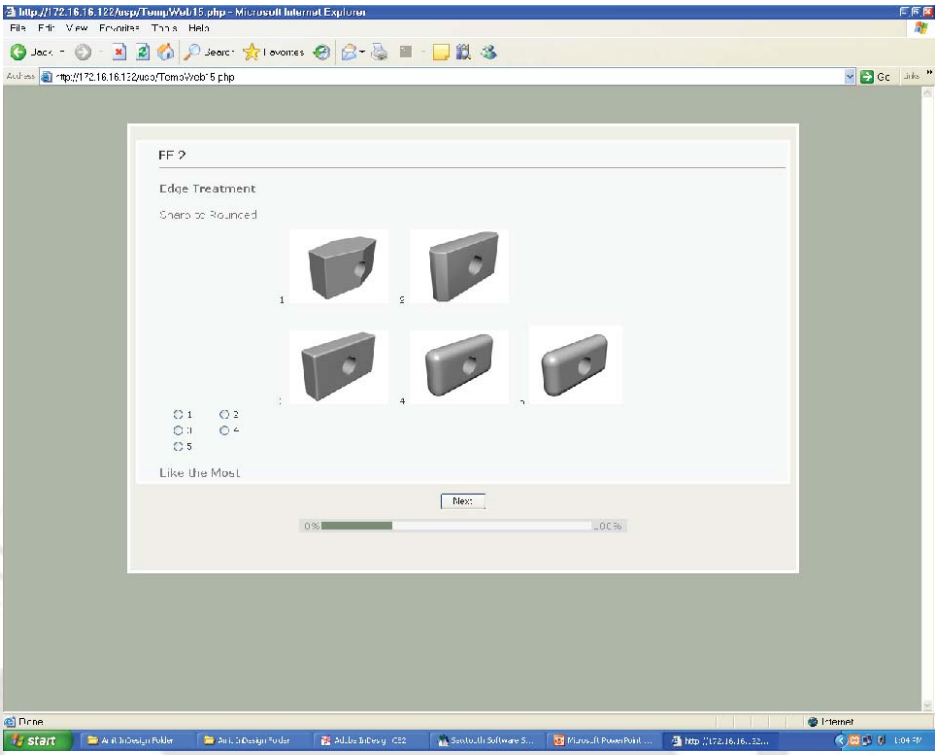


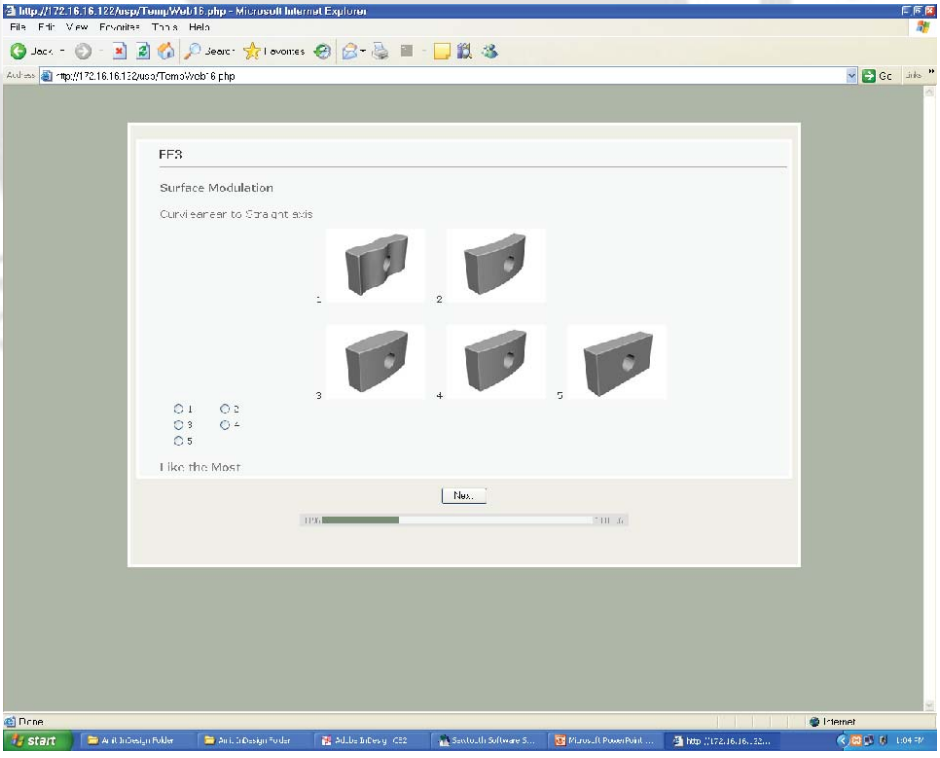


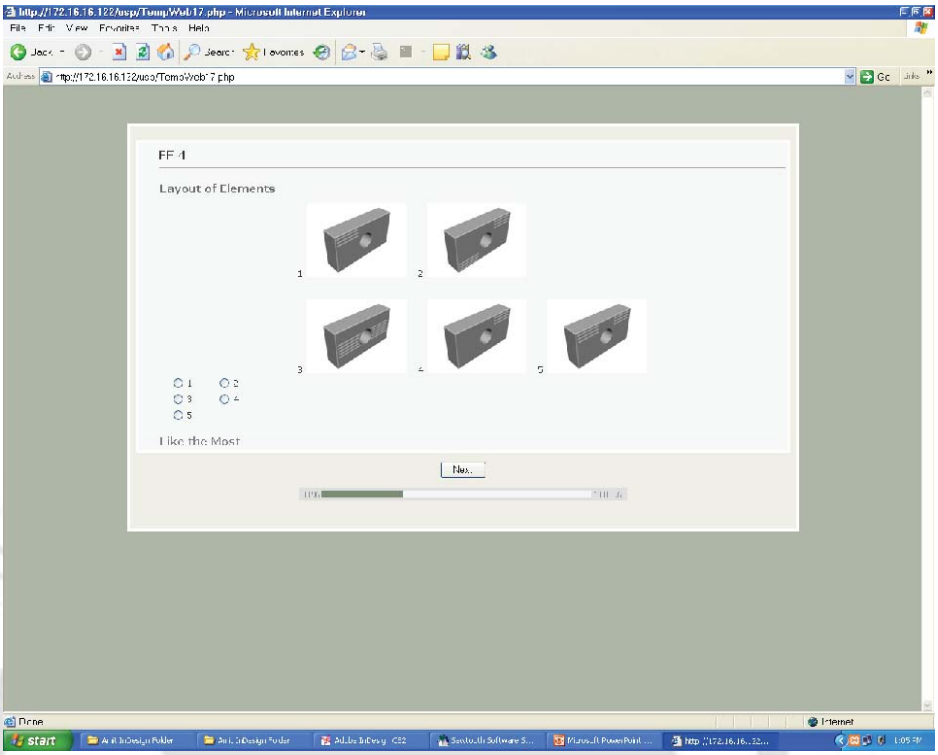


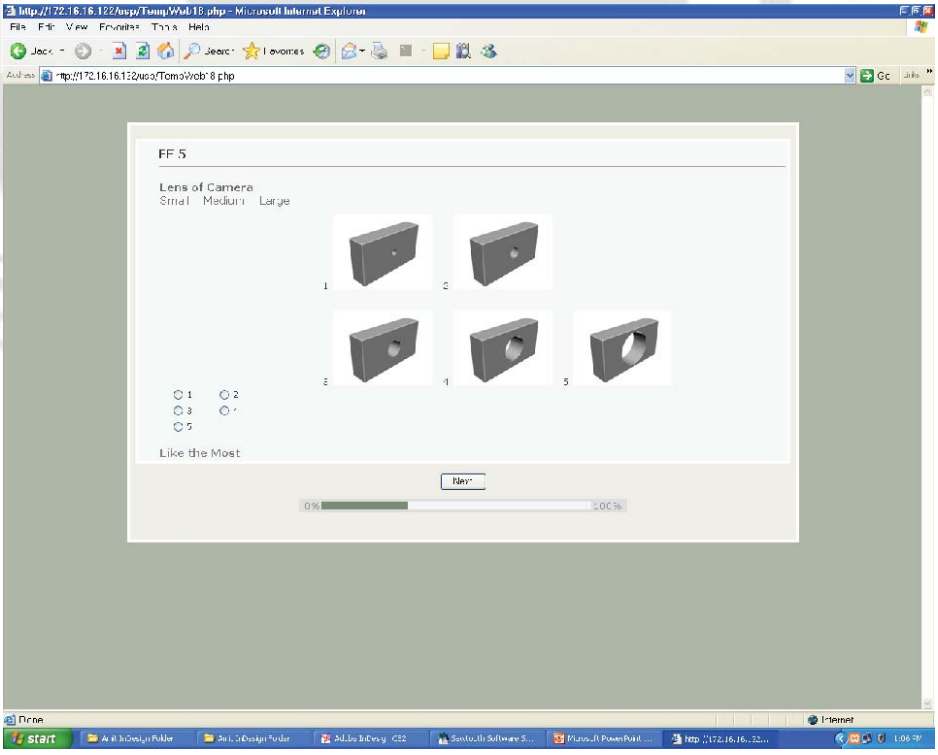


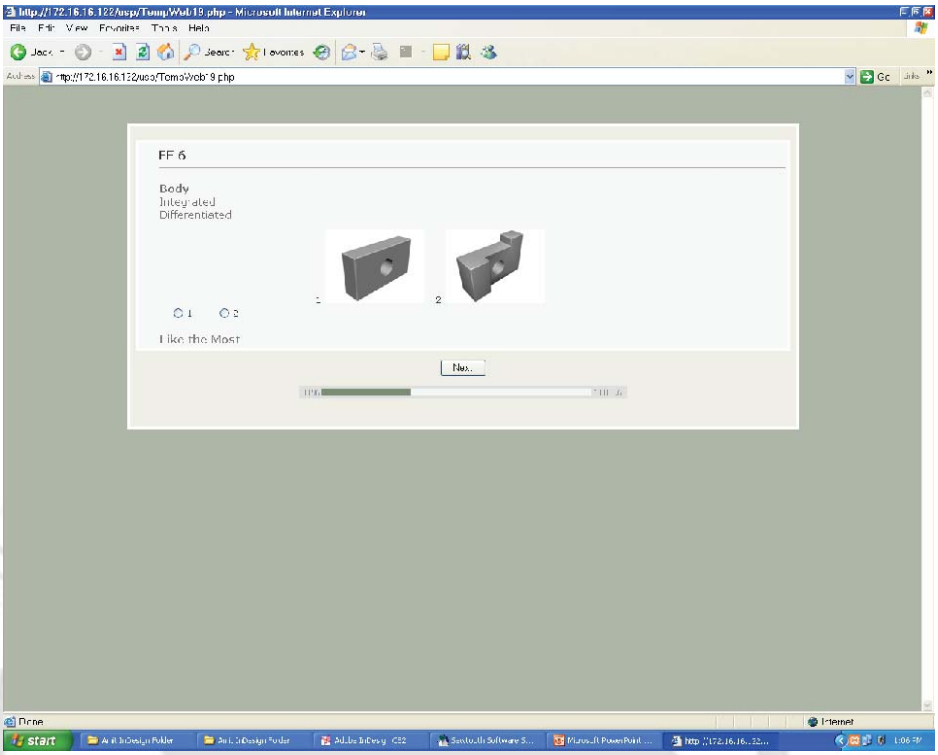


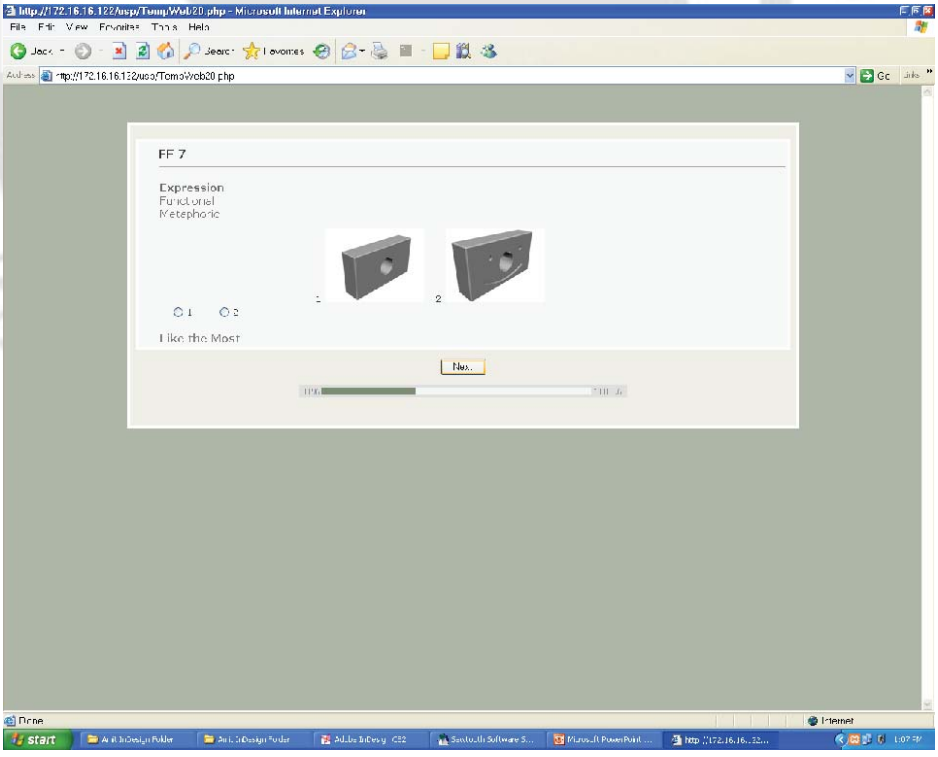


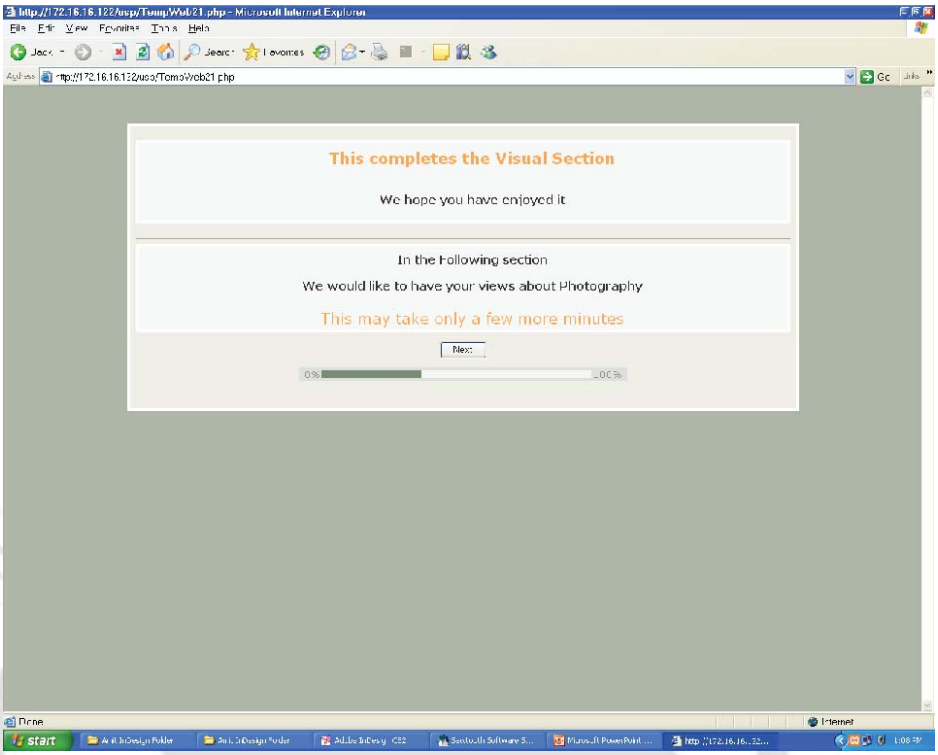


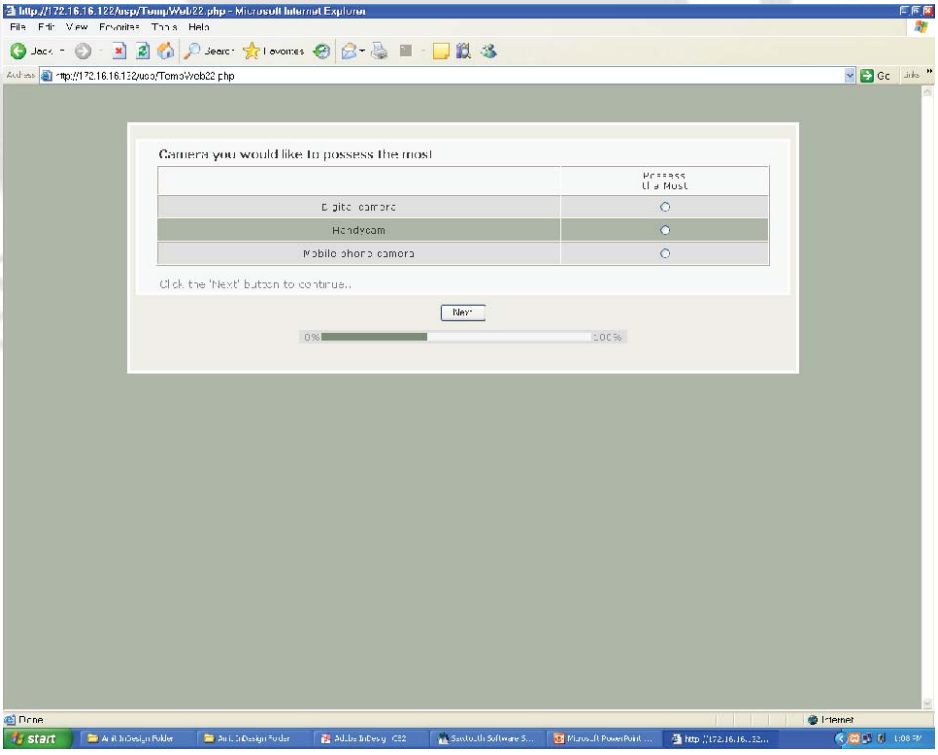


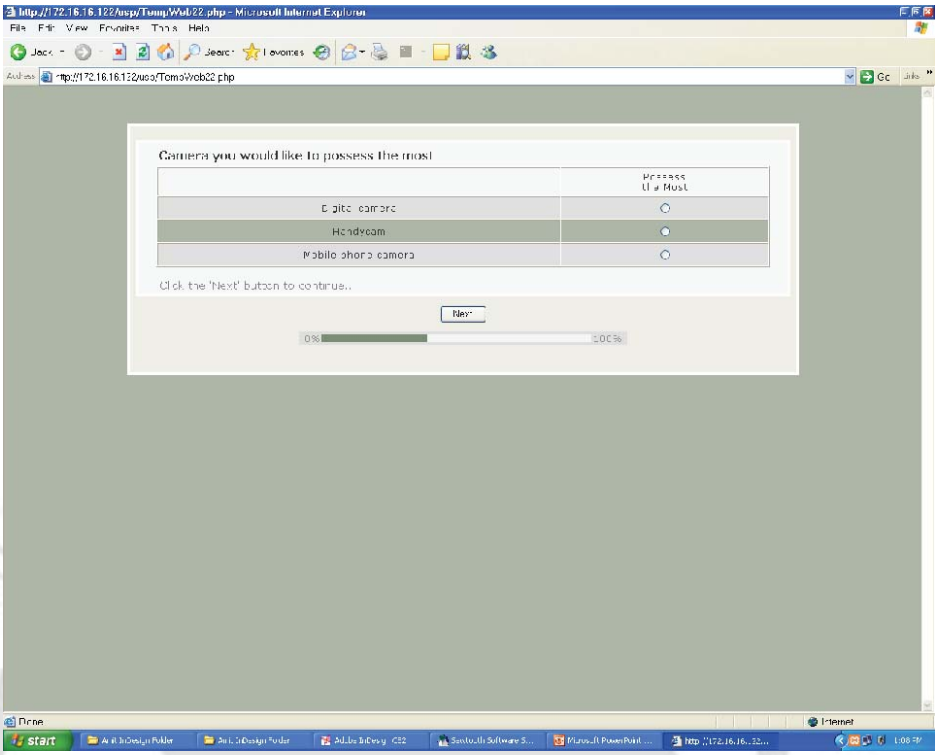


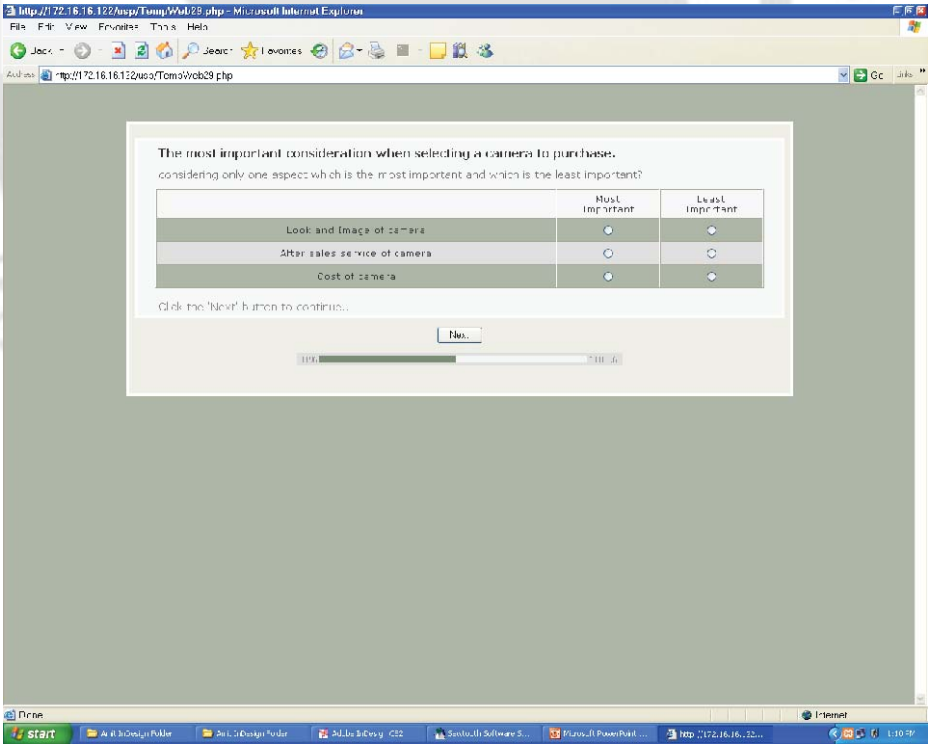


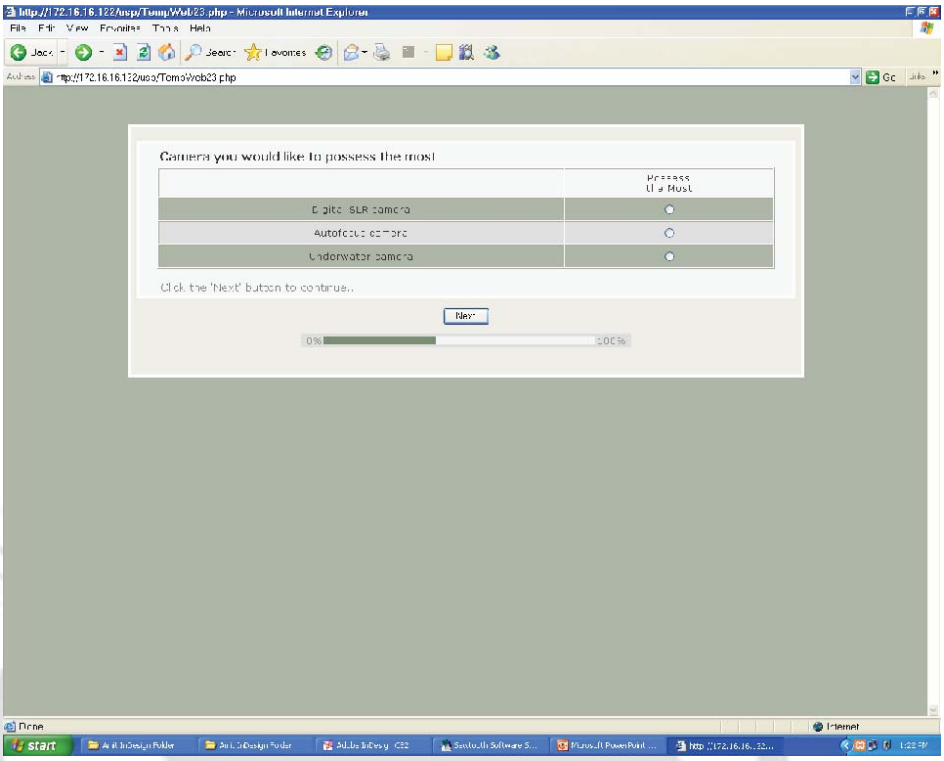


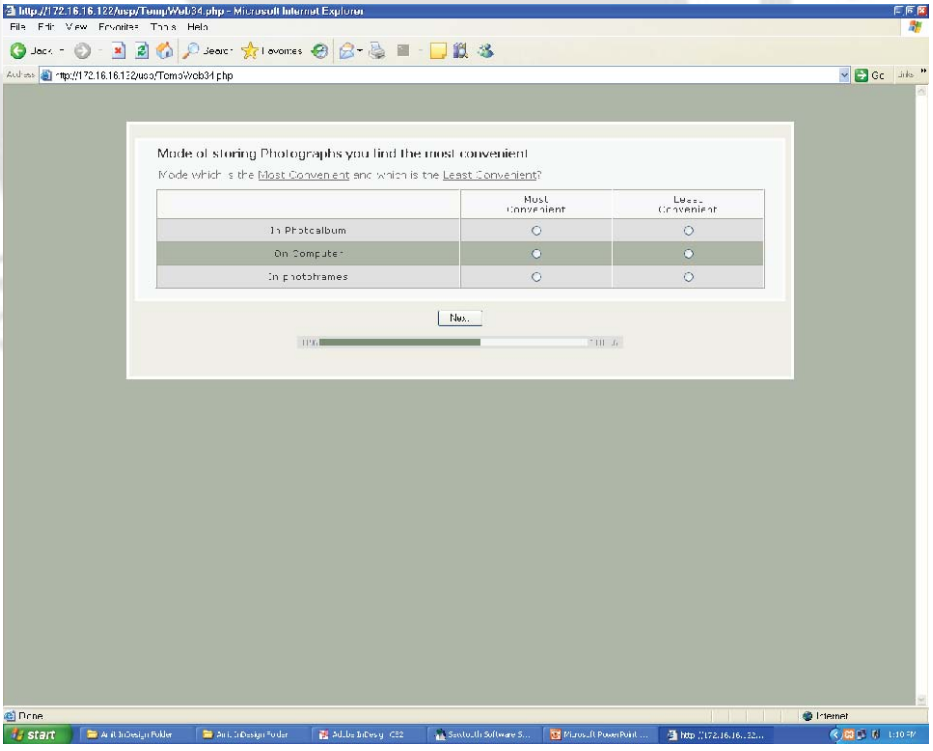


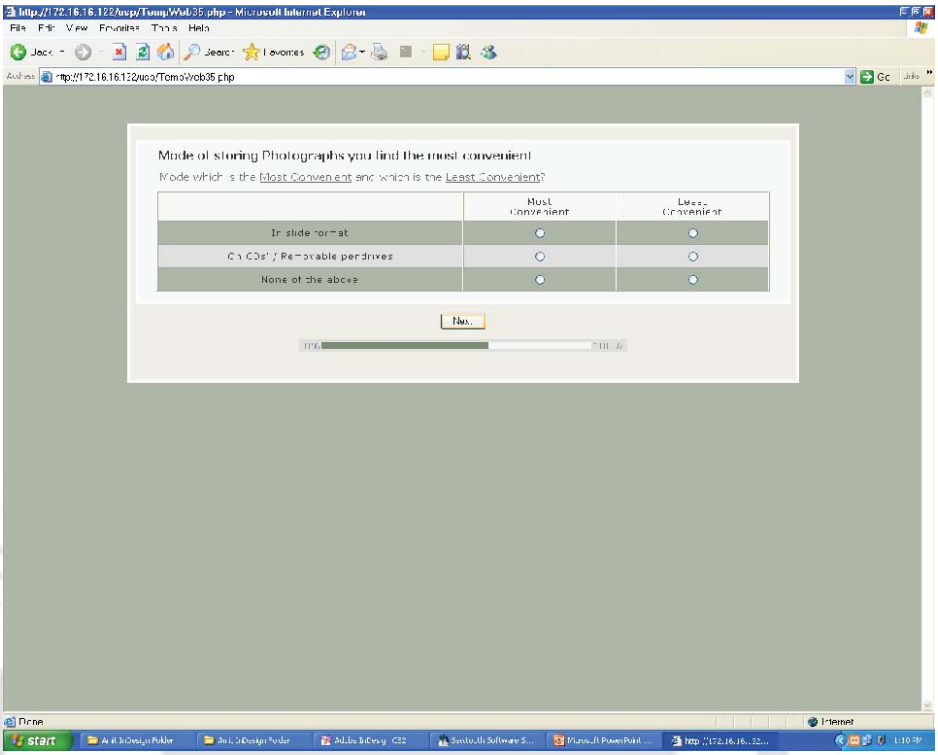


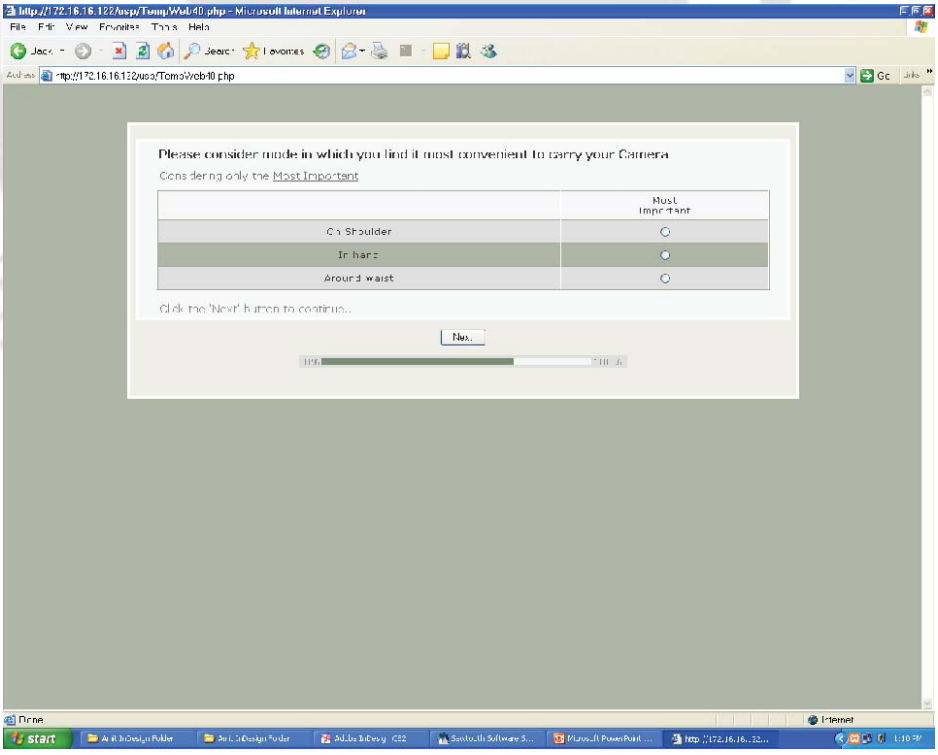


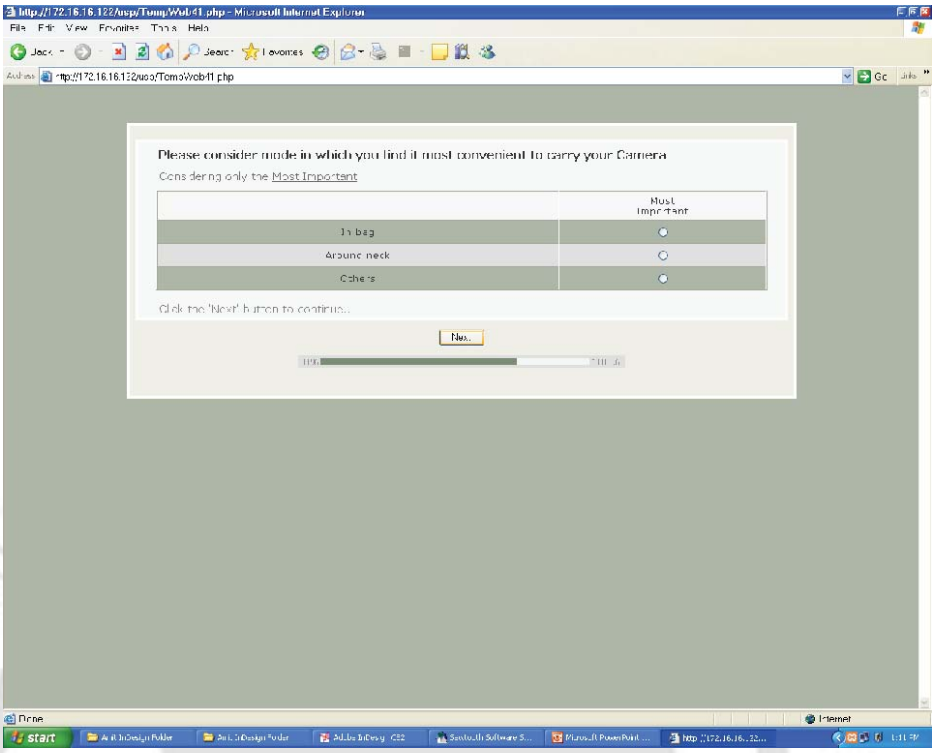


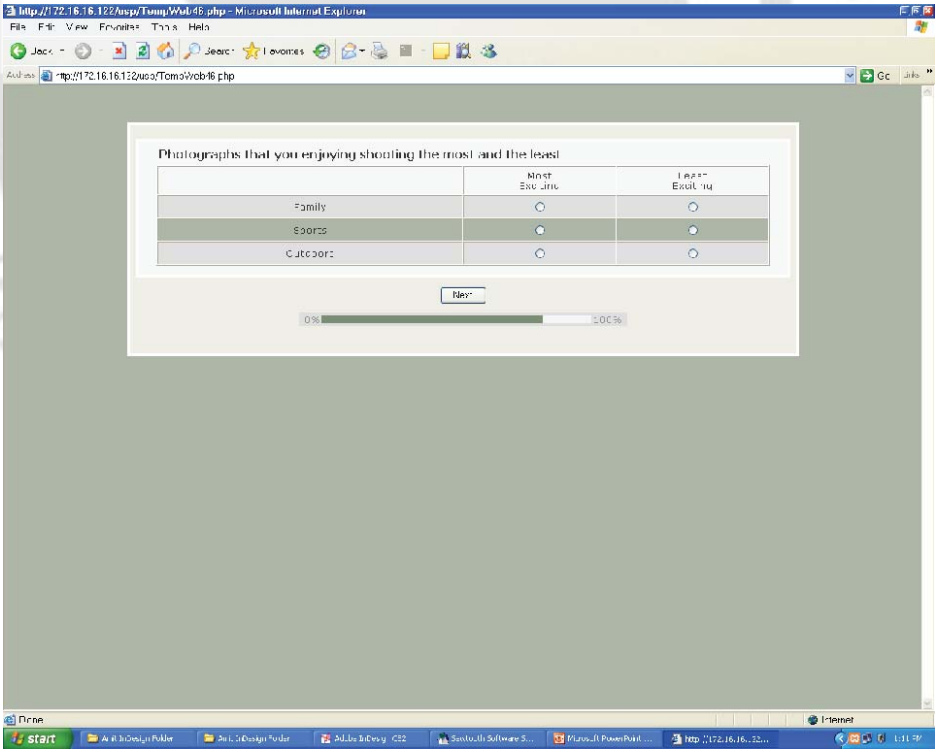


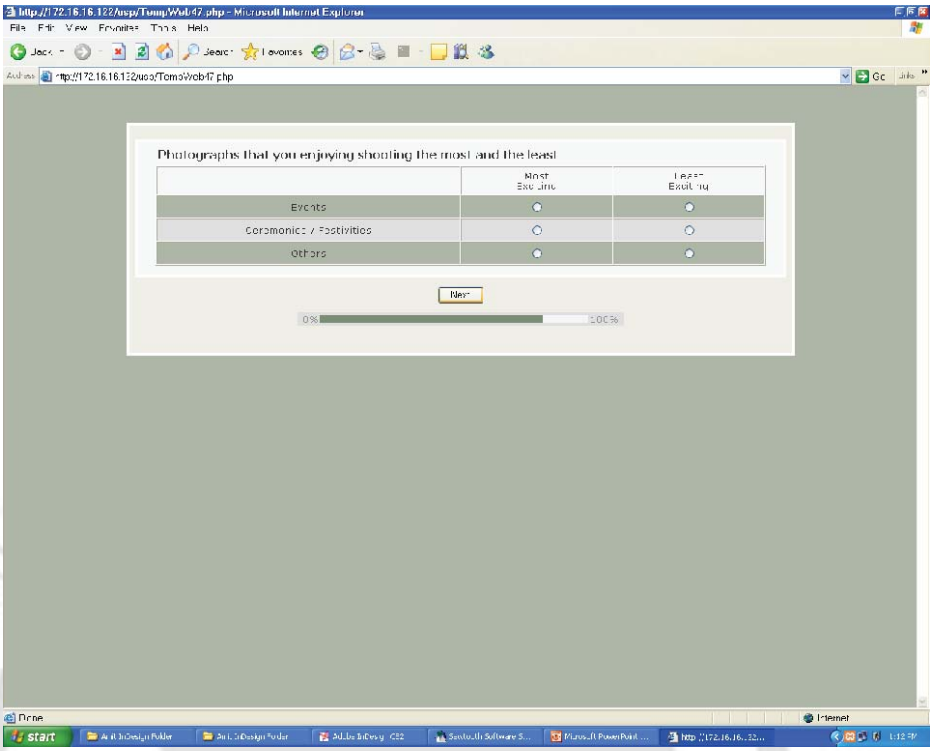


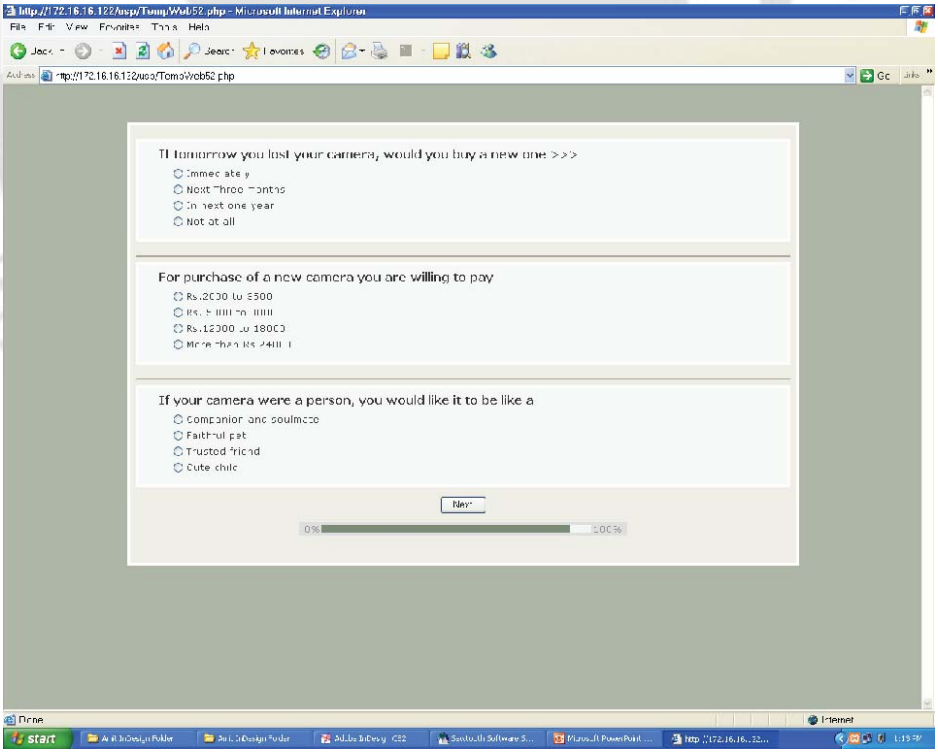


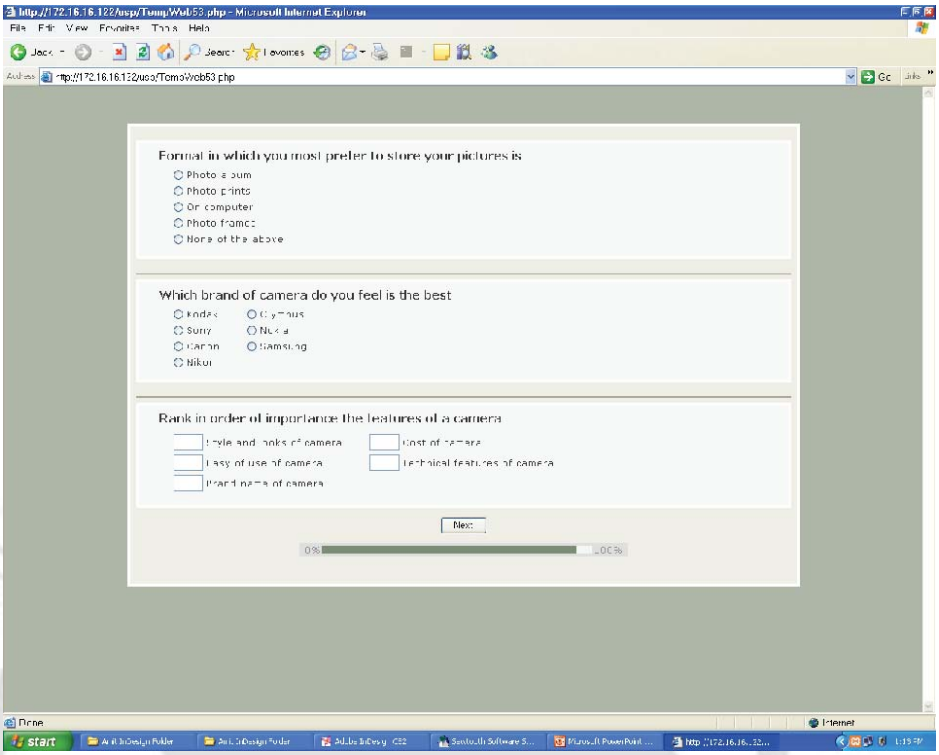


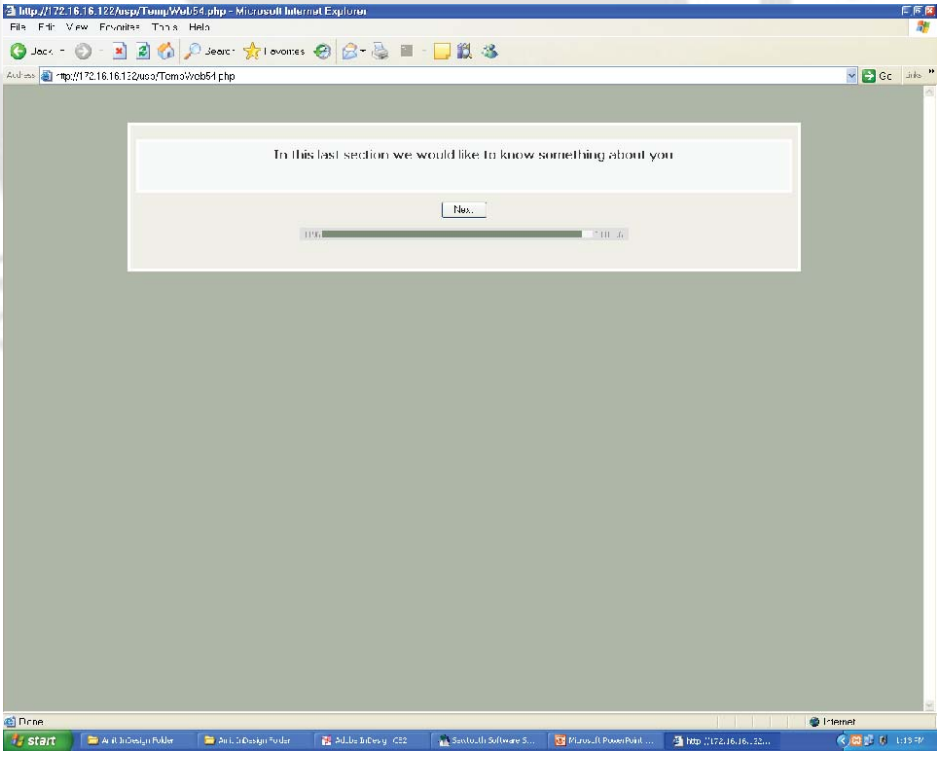


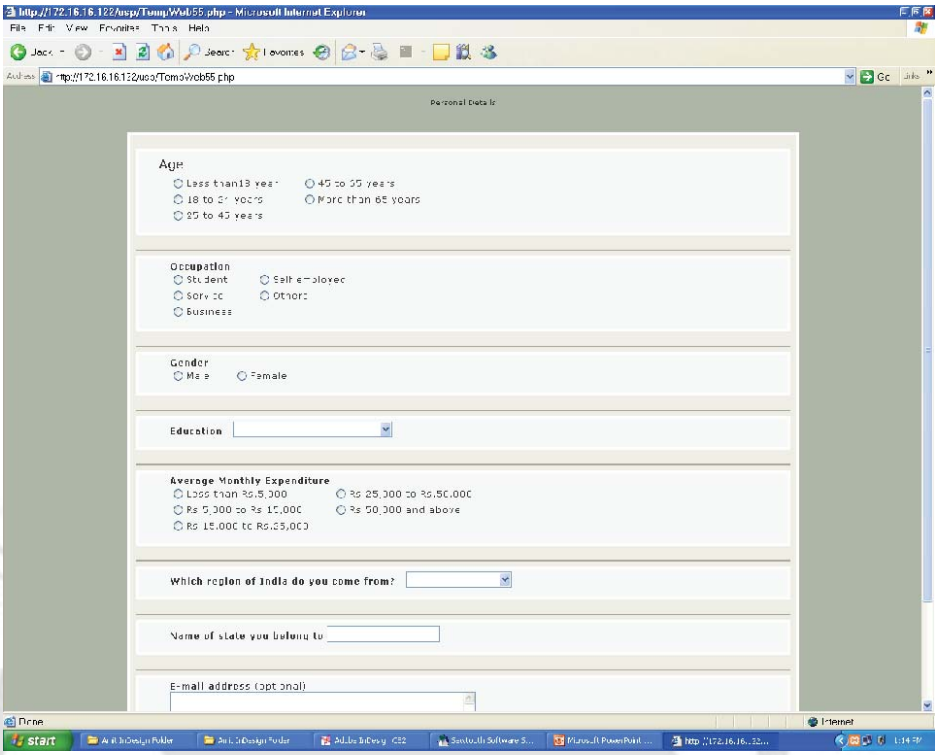


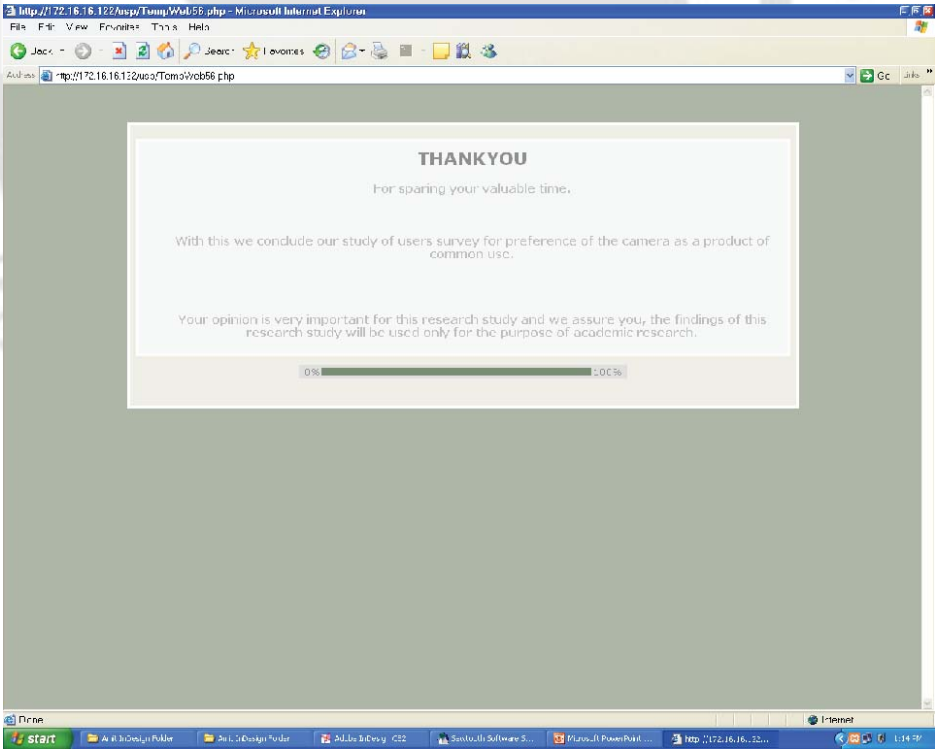












Appendix 3

Data sheet of USP online survey

Serial No	Identity	Age Group	FC Series					
S.No	id	Column1	fc1	fc2	fc3	fc4	fc5	fc6
1	4630432	Gr V	1	2	2	1	5	5
2	8348694	Above 65	2	2	3	1	1	5
3	6523743	Gr IV	2	2	2	1	3	3
4	3417053	45-65 years	2	2	2	1	1	1
5	7696533		2	2	3	2		2
6	2525940		2	2	1	1	3	2
7	9064026		2	2	1	1	4	4
8	7696533		2	2	3	2		2
9	5838928	Gr III	2	2	2	2	1	5
10	6007385	25-45 years	1	1	1	1	1	1
11	5061340		2	2	3	1	3	3
12	1184387		1	1	1	2	2	1
13	3876037		1	1	1	1	4	3
14	5838928		2	2	2	2	1	5
15	5902100		2	2	2	2	3	1
16	1343078		2	2	3	1	1	5
17	3884582		2	2	2	2	4	1
18	2877502		2	2	1	1	1	2
19	2099914		2	1	3	1	1	1
20	1376037		2	2	1	1	5	1
21	7718811		2	2	1	1	1	1
22	2987366		2	2	2	1	1	1
23	9857483		2	2	3	2	2	2
24	9039612		2	2	1	1	3	2
25	5515442		2	2	2	1	1	1
26	3023987		2	1	1	1	3	5
27	2873840		2	2	3	1	1	2
28	7234192		1	2	2	2	1	5
29	1376037		2	2	1	1	5	1
30	9562073		2	2	2	1	3	1
31	4186096		2	2	1	1	5	2
32	7604065		2	1	3	2	4	5
33	7071839		1	1	1	1	1	1
34	8138733		2	2	3	1	1	2
35	7903137		1	2	3	2	5	5
36	4898987		2	2	1	1	1	1
37	4530334		2	2	3	1	1	2
38	8767395		2	2	1	1	1	1
39	5039368		1	2	2	2	4	2
40	6918946		2	2	3	1	1	4
41	5007629		2	2	2	2	5	2
42	4612122		2	2	3	1	3	3
43	3845520		2	1	1	1	1	5
44	8929749		1	1	2	1	4	1
45	2226867		2	2	2	1	3	5
46	3207092		2	2	2	2	1	2
47	1217346		2	1	3	2	5	5

			FE Series						
fc7	fc8	fc9	fe1	fe2	fe3	fe4	fe5	fe6	fe7
2	1	5	1	1	1	3	5	2	2
5	3	2	2	3	4	5	4	1	1
3	2	2	2	3	3	3	3	1	1
5	1	2	2	5	3	1	3	1	1
5	3	3	2	4	4		5	2	1
3	3	3	2	5	4	4	3	1	2
2	2	2	2	4	4	2	2	1	2
5	3	3	2	4	4		5	2	1
3	1	2	2	2	4	3	2	2	2
1	1	5	1	5	3	5	3	1	1
5	1	3	2	4	3	3	5	1	1
3	2	3	1	5	2	3	2	2	2
5	2	3	2	4	4	4	4	2	2
3	1	2	2	2	4	3	2	2	2
1	1	2	2	4	5	4	3	2	1
1	1	3	2	5	4	4	5	1	1
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4	2	3	2	4	4	4	4	2	2
4	1	2	2	4	4	2	4	1	1
3	3	5	2	4	5	5	4	1	1
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2	3	5	2	3	5	4	3	1	1
5	2	3	2	2	1	4	4	2	2
3	3	2	1	2	2	2	2	1	2
1	1	2	2	2	4	4	3	1	1
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1		1	1	1	1	1	1	1	1
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2	2	2	2	2	4	2	4	1	1
4	2	1	2	2	2	2	2	1	2

Max Diff series						
max1_1	max1_2	max2_1	max2_2	max3_1	max3_2	max4_1
3	6	1	4	2	5	2
2	5	2	5	2	5	2
	4	1	6	2	5	2
2	4	2	5	2	5	2
1	4	1	5	2	4	1
1	4	2	6	2	5	2
2	4	3	5	2	5	2
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1	4	3	6	2	5	3
2	5	1	4	2	4	2
1	5	2	4	2	5	2
2	4	2	4	1	5	3
2	4	2	5	2	4	1
1	5	2	4	2	4	2
1	5	2	6	2	5	2
1	4	3	5	1	5	3
3	5	2	4	1	4	3
1	4	2	4	2	5	2
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3	6	2	5	2	4	2
2	5	2	6	2	5	2
1	4	2	6	2	4	3
1	4	2	4	2	5	3
						2

max4_2	max5_1	max5_2	m2_1	m2_2	m3_1	m3_2	m5_1
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6	3	6	1	4	3	6	2
4	1	5					
5	3	5					2
5	3	6		6			2
4	3	5	1	4	3	4	2
5	3	5					2
5	3	6		6			2
4	1	4	3	6	1	5	2
5	3	5	1	4	3	4	2
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4	1	4	3	6	1	5	2
	1	4	1	6	3	6	2
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4	3	6	1	5	3		2
4	2	4	1	5	1	6	1
4	3	4					
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5	3	5	3	6	3	4	2
6	3	4			3	6	2
6	3	4	3		1	5	2
4	1	4	1	5	3	6	2
4	3	5			1		1
4	3	5	3	5	3	4	2
5	3	5	1	6	3	4	2
6	3	6			3	6	2
4	1	4	3	6	3	6	2
5	3	6	1	4	3	6	1
4	3	6	1	4	3	4	2
4	1	4	1				
4	3	5	1	5	1	4	2
4	3	6					
6	3	6					
	3	4					
4	3	5	3	5	3	6	1
4	3	4	3	5	3	4	2
4	1	6					

	Preference series							
m5_2	pre2	pre3	pre4	pre6	pre7	pre8_1	pre8_2	pre8_3
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	2	3	3	2	2	5	3	4
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6	3	1	3	3	3	4	1	5
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4	1	2	3	1	5	4	3	5
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6	3	3	4	3	2	5	4	1
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5	2	1	4	3	3	5	4	3
6	3	2	4	1	1	3	1	5
4	2	2	3	4	2	4	3	1
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	2	3	1	3	4	2	4	3
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6	1	3	4	3	2	5	2	3
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6	2	3	4	3	1	1	4	5
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6	3	2	3	3	4	4	5	1
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4	2	3	3	3	2	1	3	4
	2	2	3	3	3	3	4	2
6	2	4	4	1	3	1		
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5	2	1	3	2	1	4	3	5
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	1	2	3	1	1	4	1	5
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	3	4	3	3	3	5	3	1
	2	2	3	3	3	1	5	2
	4	4	1	3	2			
6	3	3	3	3	2	4	5	3
6	2	3	3	3	4	4	5	2
	3	2	4	3	2	5	1	3

		Age Gr	Occupation	Gender	Education	Avg Monthly Expenses
		Personal Data				
pre8_4	pre8_5	Qns1	Qns2	Qns3	Qns4	Qns5
4	1	5	5	1	1	5
		5	3	1	4	5
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2	3	4	2	1	5	4
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2	1	3	4	2	2	2
2	1	3	2	2	5	2
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2	1	3	2	2	3	2
2	1	3	4	2	2	2
4	2	3	2	2	2	1
5	2	3	2	2	4	2
4	3	3	1	2	3	1
2	3	3	2	1	3	3
5	1	3	1	1	5	2
3	2	3	1	1	4	2
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3	2	3	2	1	3	4
4	2	3	1	1	3	2
4	2	3	2	1	5	2
3	4	3	2	1	5	2
	1	3	2	1	3	2
2	1	3	1	1	5	1
3	1	3	2	1	3	2
1	4	3	2	1	5	4

Region	State	E-mail
Qns6	Qns7	Qns8
7	UNITED STATES	
1	UP	
3	assam	
3	Assam	
4	maharashtra	
3	assam	
3	assam	
4	maharashtra	
3	Assam	
3	Assam	
1	Delhi	
2	Kerala	girijarobi@gmail.com
3	Assam	anjuman@iitg.ernet.in
3	Assam	
3	Assam	
3	Assam	chandrik@iitg.ernet.in
3	assam	
2	Karnataka	mokashi@iitg.ernet.in
2	Orissa	raj_chem44@yahoo.com
2	Andhra Pradesh	
1	ua	
1	UP	
5		
5	Orissa	biswa@iitg.ernet.in
3		
2	Andhra Pradesh	
4	MAHARASHTRA	harshal@iitg.ernet.in
1	Rajasthan	
2	Andhra Pradesh	
3	Assam	
2	Karnataka	vadiraja.iitg@gmail.com
6	bihar	
3	ASSAM	ssanjib.mech@gmail.com
5	WestBengal	manabray@iitg.ernet.in
3		
5		
5	West Bengal	
1	UP	uday@iitg.ernet.in
5	West Bengal	hspaul@gmail.com
3	Assam	
5	West Bengal	s.paul@iitg.ernet.in
2	TN	
2	karnataka	prasanna@iitg.ernet.in
1	Manipur	romio@iitg.ernet.in
5	West Bengal	
3	West Bengal	ssinha2u@gmail.com
3	Assam	

Appendix3: Data sheet of Users Survey for Preferences for Products of everyday use

48	5146790		2	2	2	2	5	5
49	6434631		1	1	1	2	3	3
50	9248352		2	2	3	2	1	5
51	2995910		2	2	2	1	1	1
52	5901184		2	2	2	1	1	1
53	1439514		2	2	3	2	2	2
54	6125794		2	2	3	2	5	5
55	3463440		2	2	1	2	5	2
56	9549866		2	2	1	1	1	2
57	2991028		1	2	1	1	1	5
58	6051331		2	2	1	1	4	2
59	5080872		2	2	3	1	4	2
60	6869202		2	2	2	2	1	2
61	7837220		2	2	3	1	2	3
62	5089417		2	1	2	1	1	2
63	4844055		2	1	3	2	5	5
64	7071839		1	1	1	1	1	1
65	2873840		2	2	3	1	1	2
66	9410706		1	2	2	2	5	2
67	599670		2	2	1	1	1	2
68	4791565		2	2	3	2	5	5
69	6062317		2	2	1	1	2	4
70	4107971		2	2	2	1	4	3
71	1292724		1	1	1	1	1	1
72	4913635		2		3			
73	6241455		2	2	3	1	4	5
74	4497375		2	2	1	1	1	1
75	1468811		2	1	2	1	2	2
76	6167297		2	2	1	1	1	1
77	2215881		2	2	3	2	5	5
78	2062072		2	1	3	2	1	5
79	754699		2	2	3	1	1	4
80	4410706		2	2	3	2	1	5
81	6058655		2	2	1	1	1	1
82	8619690		2	2	2	2	5	2
83	7726136		2	2	2	2	1	4
84	9062806		1	2	1	2	1	1
85	2384338		2	2	2	2	2	2
86	3220520		2	2	2	1	1	1
87	4850159		2	2	2	1	4	3
88	5245667		2	2	3	2	1	5
89	9557190	Gr II	2	2	1	1	3	1
90	5947571	18-25 years	2	2	1	1	1	1
91	7517395		1	1	1	1	5	4
92	6929016		2	2	3	2	2	5
93	9011536		2	1	2	1	4	1
94	8362122		2	2	1	1	1	3
95	8308411		2	1	2	2	5	5
96	6141663		2	2	1	1	2	2
97	1294250		2	2	1	1	3	1
98	6052246		2	2	2	1	1	5
99	6399231		2	2	1	1	4	2
100	7657776		2	2	3	1	1	2
101	234680					2	5	2
102	7165833		2	2	1	1	5	5
103	8590393		2	2	1	2	1	1

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5	2	3	2	2	5	2	5	2	1
1	2	2	2	4	4	2	3	1	1
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3	2	2	2	2	3	2	2	2	2
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5	1	1	2	2	4	4	2	1	1
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Appendix3: Data sheet of Users Survey for Preferences for Products of everyday use

1	4	2	5	2	5	3
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Appendix3: Data sheet of Users Survey for Preferences for Products of everyday use

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6	3	5					
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3	Assam	deee111333@yahoo.com
5	Orissa	
5	West Bengal	tapas.k@iitg.ernet.in
1	Bihar	nknishchal@iitg.ernet.in
5	Odisha	
5	west bengal	
3	Assam	
1	Manipur	muan@iitg.ernet.in
5	West Bengal	
2	Kerala	
2	Tamilnadu	
3	Assam	djgoswami@iitg.ernet.in
3	Assam	prakash.haz@gmail.com
3	Assam	
2	andhrapradesh	r.pamula@iitg.ernet.in
1	Assam	dhb@iitg.ernet.in
3	ASSAM	ssanjib.mech@gmail.com
4	MAHARASHTRA	harshal@iitg.ernet.in
3	Assam	
3	assam	rkashyap@iitg.ernet.in
3	Asom	
3	Assam	
3	Assam	
3	Assam	
3	Assam	kumud@iitg.ernet.in
4	Maharashtra	
3	Assam	pallav_ghy@yahoo.com
2	Tamilnadu	n.krishnan@iitg.ernet.in
3	tripura	pal.here@rediffmail.com
2	Tamilnadu	
3	Assam	
3	assam	bolin@iitg.ernet.in
3	assam	bishnu@iitg.ernet.in
5	Orissa	
2	Kerala	msshaji@hotmail.com
3	West Bengal	
5	Uttar Pradesh	narsingh@iitg.ernet.in
5	assam	amitabh@iitg.ernet.in
1		
3	Assam	indrajit_talukdar@yahoo.co.in
3	Assam	utpal@iitg.ernet.in
1	Delhi	
2	Andhra Pradesh	
4	rajasthan	
2	andhra pradesh	neo_jhawar@yahoo.co.in
1	uttar pradesh	u.ashutosh@iitg.ernet.in
4	rajasthan	
2	Andhra Pradesh	
2	andhra pradesh	
2	Andhra pradesh	
2	Andra Pradesh	
5	JHARKHAND	
2	Andhra Pradesh	
4	Gujrat	
1	assam	

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114	7202454	2	1	3	2	4	5
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124	6669007	2	1	2	1	2	2
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126	2706604	2	2	2	1	4	2
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129	9258118	2	2	2	1	1	2
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152	6970520	2	2	1	1	5	1
153	9309388	2	2		1	3	5
154	962219	2	2	2	1	1	1
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157	6991272	1	1	3	1	4	1
158	8408509	1	2	2	1	3	5
159	515441	2	2	1	1	5	2

Appendix3: Data sheet of Users Survey for Preferences for Products of everyday use

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Appendix3: Data sheet of Users Survey for Preferences for Products of everyday use

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2	Tamil Nadu	
4	Madhya Pradesh	k.singh@iitg.ernet.in
2	AP	
1	haryana	akshay.k@iitg.ernet.in
4	rajasthan	
1	Delhi	
4	RAJASTHAN	manuj@iitg.ernet.in
1	Bihar	
2	Andhra Pradesh	tejesheati@gmail.com
2	Andhra pradesh	
1	Haryana	
6	madhya pradesh	
1	delhi	
4	Maharashtra	drshobhan@hotmail.com
2	Andhra Pradesh	
1	Uttar Pradesh	
1	delhi	antriksh@iitg.ernet.in
1	Punjab	
1	Rajasthan	
5	jharkhand	chandan2110@yahoo.co.in
5	Bihar	
2	Andhra Pradesh	
2	Andhra Pradesh	revanth.ongole@gmail.com
2	tamilnadu	mayilairajesh@gmail.com
2	andhra pradesh	
1	Bihar	
1	U.P.	
5	bihar	k.mayank@iitg.ernet.in
2	Andhra pradesh	k.chauhan@iitg.ernet.in
1	Delhi	vikram@iitg.ernet.in
3	assam	atinbean1@gmail.com
1	Raj	
2	AP	
1	uttar pradesh	
2	Andhra Pradesh	vvk@iitg.ernet.in
1	Delhi	aashishgoel87@gmail.com
2	Andhra Pradesh	
6	Chattisgarh	iitg.subh@gmail.com
2	Andhra Pradesh	ursoftpraveen@gmail.com
5	bihar	manish_charli@yahoo.co.in
1	uttar pradesh	
1	Delhi	aniruddh@iitg.ernet.in
7	U.P.	
3	west bengal	bibekananda@iitg.ernet.in
5	bihar	viss2luvv@yahoo.co.in
2	Andhra Pradesh	
5	jharkhand	
4	Maharashtra	
1	Delhi	
2	Andhra pradesh	
5	bihar	
6	M.P.	kuppannagari@iitg.ernet.in
5		
7	U.P.	
2	AP	
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177	3557434	2	1	1	1	5	5
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189	1763000	1	1	3	1	1	5
190	8662415	2	2	3	2	4	5
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203	8408509	1	2	2	1	3	5
204	376281	2	1	1	1	1	1
205	6599426	2	1	1	2	4	5
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Appendix3: Data sheet of Users Survey for Preferences for Products of everyday use

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1	Delhi	
2	PRAVEEN	praveen_2nk@yahoo.co.in
2		
2	Andhra Pradesh	
1	Delhi	
2	Andhra Pradesh	anil.k@iitg.ernet.in
5	west bengal	mandal.priyatosh@gmail.com
2	Andhra Pradesh	t.naveen@iitg.ernet.in
2	AP	
5	Jharkhand	
1	Delhi	ihatespam@internet.com
3	Assam	mayur@iitg.ernet.in
2	Karnataka	chinmay@iitg.ernet.in
1	Punjab	
2	Andhra Pradesh	r.bhamidipati@iitg.ernet.in
4	maharashtra	
1	punjab	
2	AP	
4	maharashtra	aniket.pugaonkar@gmail.com
2	andhra pradesh	
2	AP	
1		
6	Maharashtra	komawar@iitg.ernet.in
2	Andhra Pradesh	
2	Andhra Pradesh	
1		
3	Asom	
1	patna	
2	andhra pradesh	
2	tamilnadu	
4	MAHARASHTRA	ramtekkar@iitg.ernet.in
2	Andhra Pradesh	
1	UP	
5	orissa	
1	UP	
2	Andhra Pradesh	y.kumar@iitg.ernet.in
1	delhi	
5	Orissa	julupani@yahoo.com
2	Andhra Pradesh	creamychocolates@gmail.com
2	Karnataka	
4	Maharashtra	piyush_pradeep_jain@yahoo.co.in
5	West Bengal	agayali@hotmail.com
2	AP	
1	delhi	
1	haryana	
5	delhi	
2	TAMIL NADU	t.theophilus@iitg.ernet.in
2	Tamil Nadu	
6	bihar	
5	BIHAR	rohto2005@yahoo.co.in
3	assam	a.bhengra@iitg.ernet.in
2	Andhra Pradesh	
1	U.P.	superbhimanshu@gmail.com
1	Delhi	
4	Rajasthan	

Appendix3: Data sheet of Users Survey for Preferences for Products of everyday use

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219	6772766		2	2	1	1	3	2
220	4382629		2	2	2	2	5	5
221	829162		2	1	3	2	1	5
222	3246155		2	2	1	1	3	4
223	6870423		2	2	2	1	5	5
224	9350892		2	1	2	1	2	1
225	8746643		2	1	1	1	1	1
226	1958313		2	2	1	1	1	1
227	8183899		1	1	3	2	5	4
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229	292053		1	2	3	1	1	2
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231	6770325		2	1	2	1	1	2
232	3200989		2	2	1	1	4	2
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234	5151672		2	1	3	2	5	5
235	5641174		2	1	2	1	4	5
236	1242981		2	2	2	2	5	5
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238	7578430		2	1	2	1	1	3
239	1592102		2	2	2	2	3	2
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Appendix3: Data sheet of Users Survey for Preferences for Products of everyday use

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Appendix3: Data sheet of Users Survey for Preferences for Products of everyday use

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1	Punjab	
5	West Bengal	
2		
2	Andhra Pradesh	avikramsingh@gmail.com
1	uttarpradesh	
1	delhi	alok.vrm@iitg.ernet.in
2	Andhra pradesh	raviteja1414@yahoo.com
4	Gujarat	
1	up	
4	gujarat	bajaj@iitg.ernet.in
2	KARNATAKA	mvenkataprasadg@gmail.com
6	chhattisgarh	amey@iitg.ernet.in
4	rajasthan	v.ranga@iitg.ernet.in
1	delhi	
2	ANDHRA PRADESH	
3	assam	
1		
3	Manipur	
4	maharashtra	
2	Tamil Nadu	siddharth.muthukrishnan@gmail.com
2	kerala	
1	rajasthan	
2	andhra pradesh	s.kolluri@iitg.ernet.in
2	Andhra Pradesh	manchem@iitg.ernet.in
4	Rajasthan	
2		
2	karnataka	apaji_malapur@yahoo.com
3	Tripura	debayan@iitg.ernet.in
3	Tripura	thainswe@gmail.com
3	ASSAM	bsraj@iitg.ernet.in
1	Rajasthan	
2	Andhra Pradesh	c.jaya@iitg.ernet.in
3	assam	
3	assam	
6	mp	
3	assam	stud@iitg.ernet.in
1	delhi	

Appendix 4

Study of Lifestyle and Environment of Use

STUDY OF LIFE STYLE AND ENVIRONMENT OF USE OF THE PRODUCT

A major objective of the methodology adopted was to understand users' preferences for the given product. Inferences could be drawn in order to work towards evolving a product brief for the visual characteristics of the product form. But it seemed equally important to extend the scope of the study to research into a much broader cultural framework and understand the region-specific and contextual characteristics of this framework.

While the respondent-based study would aid the evolution of preference patterns, a separate study would be essential to understand the cultural contexts.

It was therefore felt appropriate to study the product in the broader context of its environment of use.

The main objective of an environment of use study generally addresses the following issues:

- Mapping of the region in terms of socio-cultural and socio-economic fabric.
- Understanding of the cultural aspects and patterns of product usage.
- Understanding of the local nuances and variations in communication of information at various societal levels.
- Internalization of the local 'flavors' and idioms.
- Identification of region-specific socio-cultural perceptions of products in general.
- Identification of region-specific culture of purchase and ownership of products.
- Understanding region-specific visual ambiences as manifestations of cultural idioms and values.
- Identifying typical behavioral patterns and correlating them to their region and culture-specific causes.

However the present study, keeping in mind constraints of time and feasibility covered only photo documentation, interviews and an examination of visual material. Among the visual material that were considered the following were found to offer very strong region-specific visual characteristics.

Magazines	Newspapers	Journals	Periodicals
Handouts	Leaflets Posters	Pamphlets	Calendars
Almanacs	Religious	Literature	
Signboards	Hoardings	Banners	Certificates
Telephone	Directories	Time Tables	Bills
Cash Memos	Vouchers	Receipts	Greeting Cards
Invitation Cards	Costumes	Film Tickets	Bus Tickets
Licences	Identity Cards	Business Cards	
Shopping Catalogues		Carry Bags	Packages
Containers	Cassette Labels	Playing Cards	Reservation Forms
Courier Forms	Regional Advertisements	Vehicle License Plates	
House Number Plates Name Plates		Photo Frames	
Photographs displayed in Homes / Offices / Institutions / Drawing Rooms			
Shamianas/ Pandals Awnings		Symbols and Logograms	
Regional Styles in Bilingual Displays		Vehicle Decorations	
Visual Personalisation of Objects,		Products and Spaces	
Religious Imagery and Icon Styles		*Rangolis* / House Decorations	
Work space Decorations		Messages on Vehicles	
Local Styles of Architecture		Graffiti	

The visual material collated is put together in the form of a photo-document for future reference and offers scope for further research.

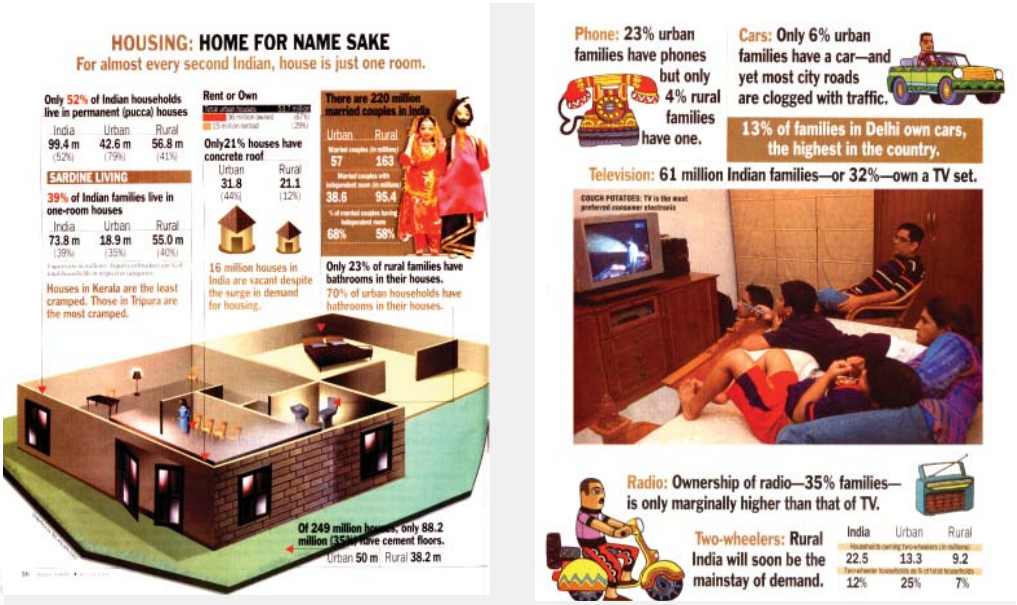
Some of the information related to these aspects of the study have been collated by keeping a tab over survey reports related to life styles of people in India that have been reported from time to time in periodicals and journals. A few of these have been included in this section.

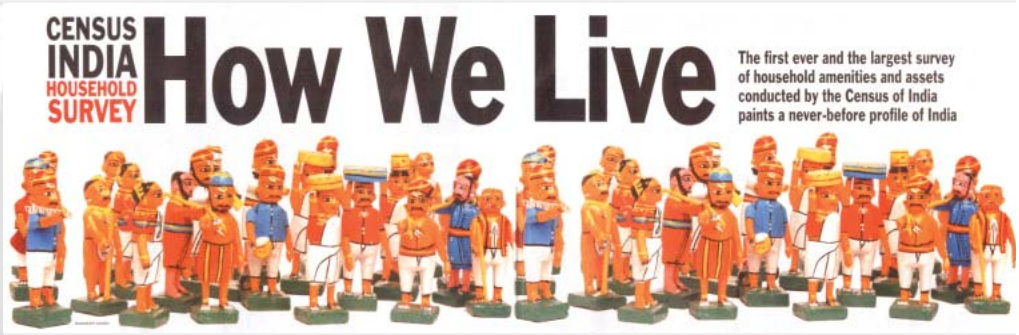
Concurrently, material was collected and documented over the duration of the research study and give a visual reference to the living environments of the user, the market environment and the different engagements and manifestations of the lifestyles of people and their activities. The images are drawn from locations in Ahmedabad, Bangalore and Guwahati city.

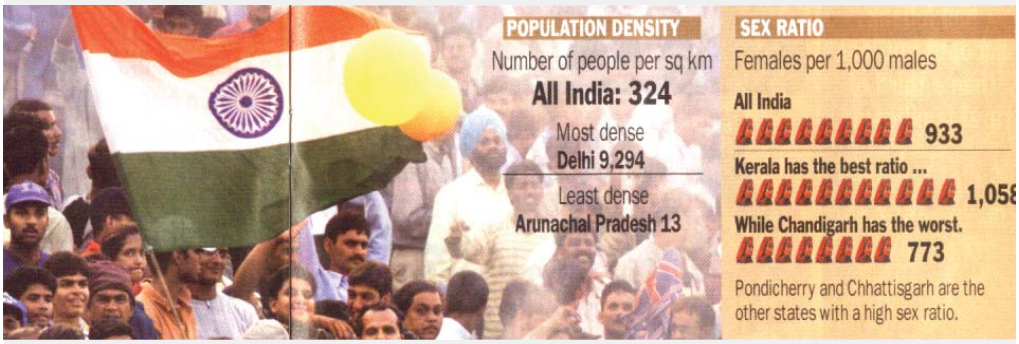
The images presents different pattern and potential for product use that can be examined to provide a region specific profile of use and services in that city. What is immediately noticeable is that the one-hour Photoshop and other photographic equipment shops with a recognizable standardized image of glass fronts and a show casing of activities within, belong to new shopping complexes and areas in the city. These today offer services of the digital format of instant photography and printing. All these Photoshop's operate as retail sales outlets for photographic equipment and accessories and as service centre for developing and printing.

In contrast, the up-market and newly expanding markets with its very modern facades, restaurants, shopping complexes presents an environment that has adopted a transnational profile. These markets cater not only to customers in the city but for the entire geographical region. For example, the Fancy Bazar markets in Guwahati caters to the entire north eastern region where people from the entire region visit the city as one of the main commercial and business centres.

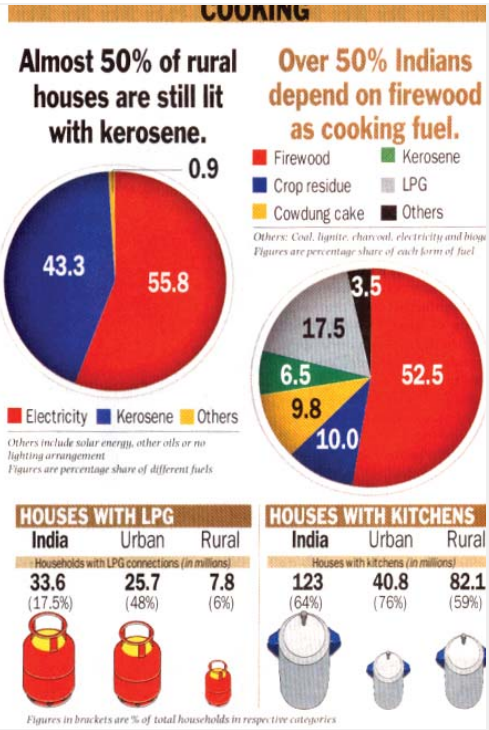
Further, photo documentation comprising of home interiors of respondents reflect their living environments, the products they use and possible possibly reflects their tastes and their life styles. These are shown below supported with captions.

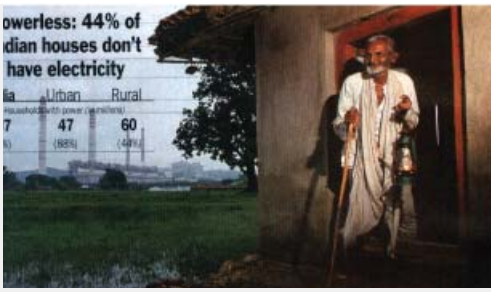


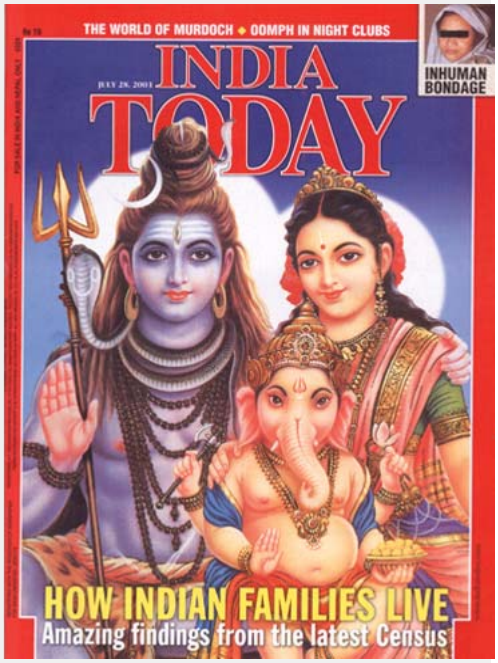


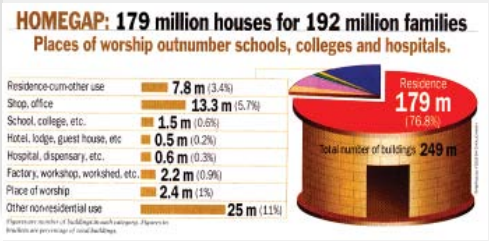


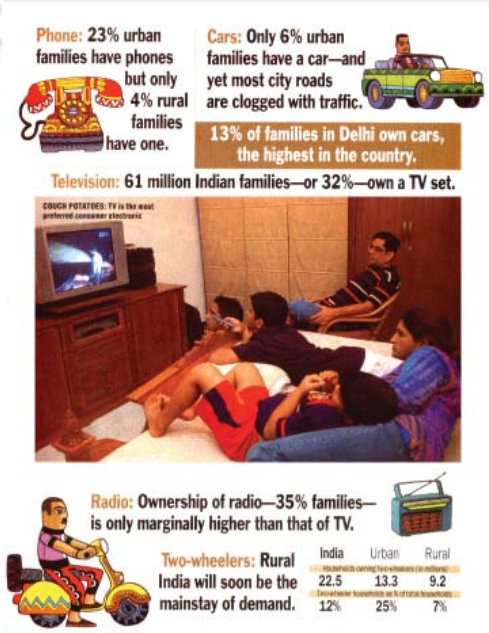
Findings of study on how Indians live - Survey undertaken by a leading indian journal 'India Today'

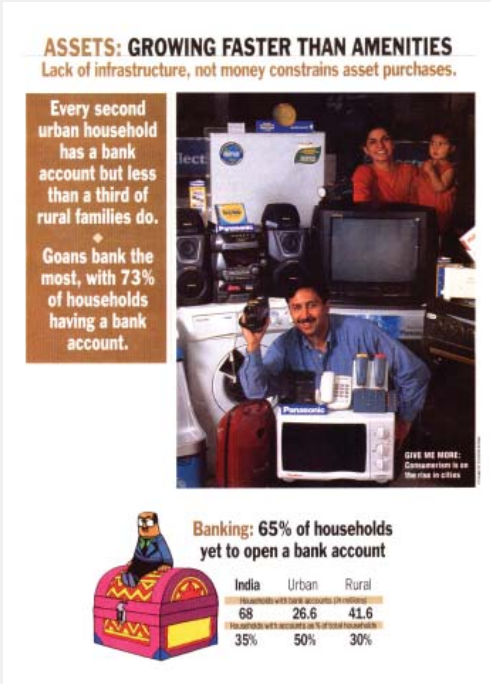












How Indians live - study reported in weekly '*India Today*'







Typical home interiors amongst residents of IIT Guwahati campus

- Drawing room
- Dining room furniture
- Drawing room furniture
- Prayer *Mantap*

Interiors of homes amongst residents of IIT campus

Audio vissual media on streets in Bangalore city

Visual display in a shop

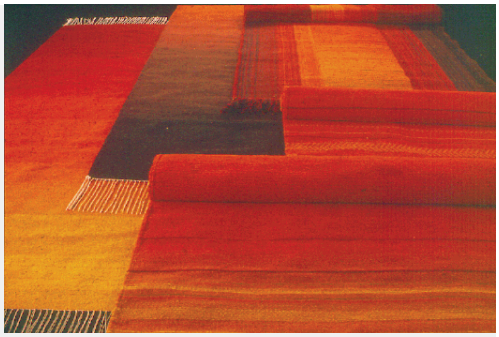
Street scape in suburb of Bangalore city

Street graphics

Generation next

Imaging and consumption in a city

Life style amongst youth and upper income group of residents in Bangalore city


Contemporary fashion and lifestyle products


Contemporary Fashion and life style accessories designed at a design school

Innovative adaptations - the chakda

School children in an auto rickshaw

Colourful congregation of people in Delhi

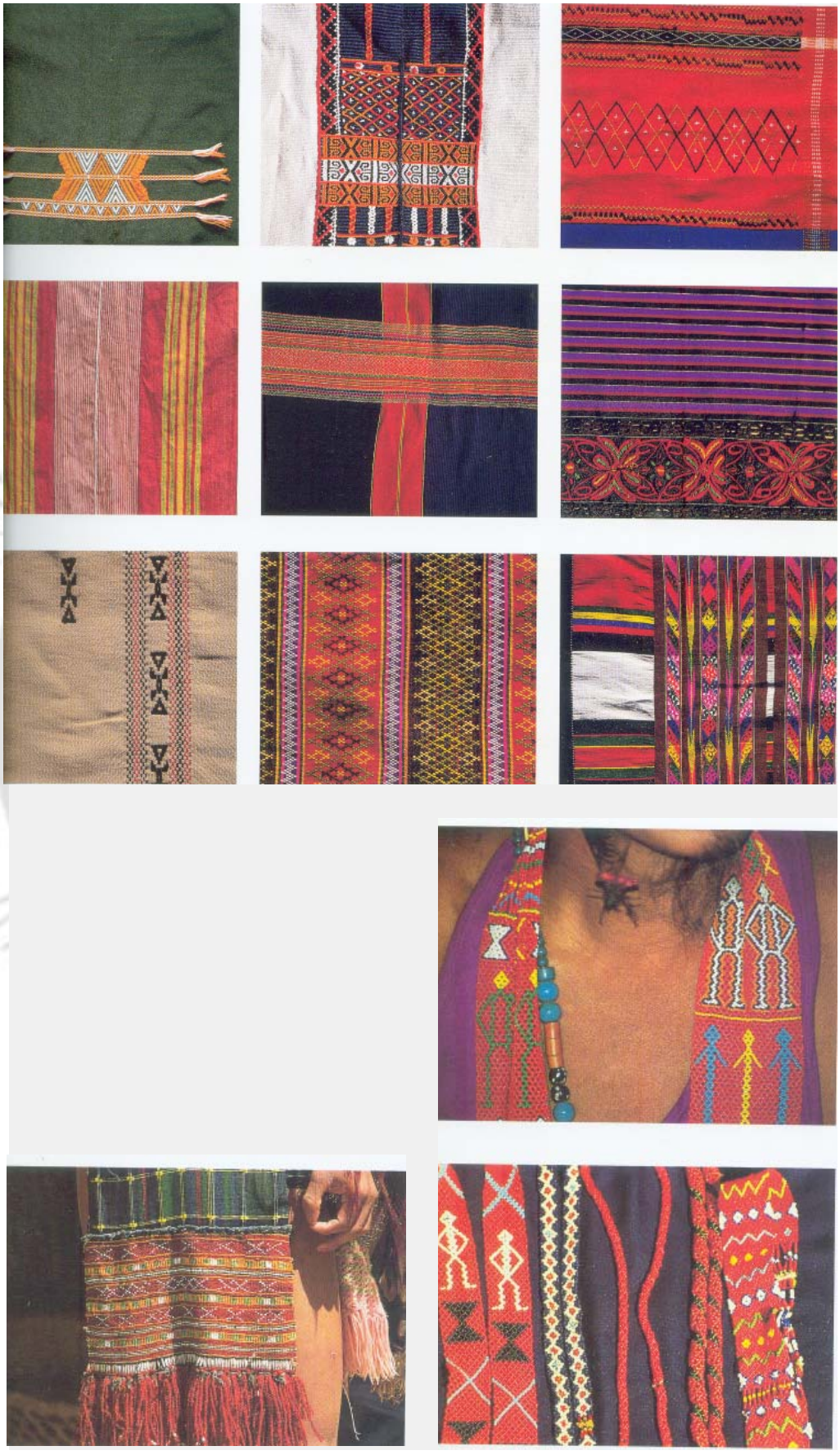
Congested streets in old city in Ahmedabad





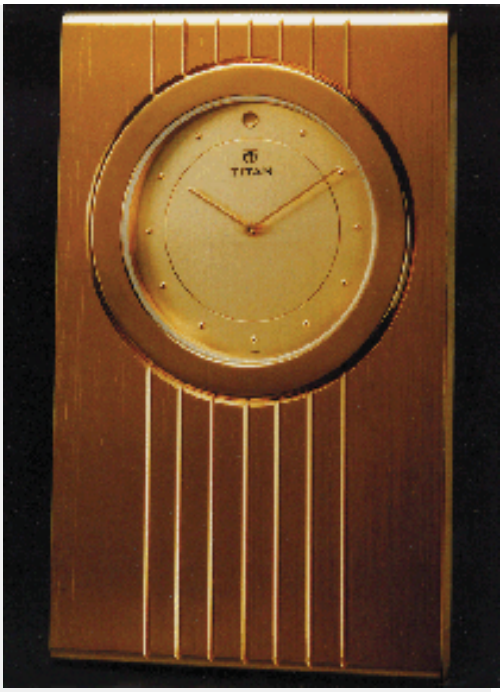


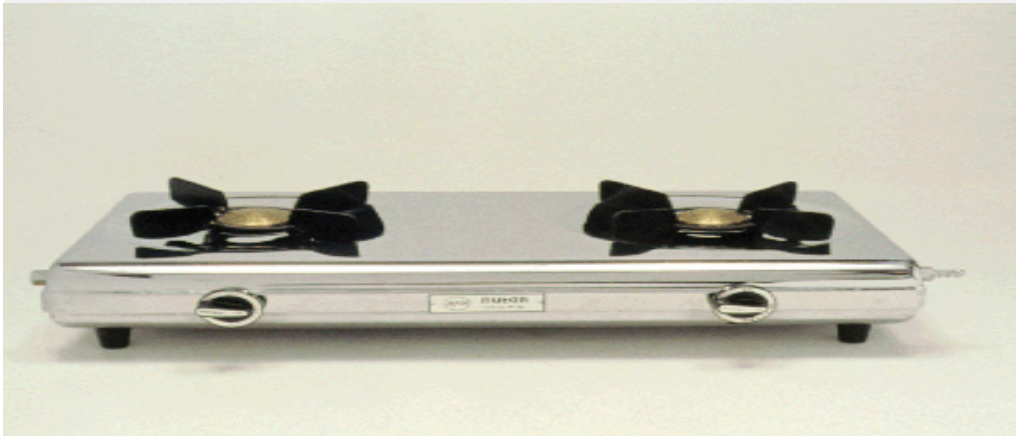

Treasures of traditional communities of north east India - Costumes and Jewellery



Treasures of traditional communities of north east India - Texxtiles and bead work

Examples of professional industrial design work undertaken by Indian designers





Examples of professional industrial design work undertaken by Indian designers

Appendix 5

List of Papers presented and published

List of Papers Presented in Conferences

Papers Presented

International

1. Mokashi-Punekar, R., Gromala, D. and Khandelwal, M. (2005), 'Design Visions: Centres of Synergetic and Dynamic Interface between Education Centres and Society', paper presented at International Conference on Design Education: Tradition and Modernity, National Institute of Design, Ahmedabad, March 2-4, 2005.

2. Mehta, S. and Mokashi-Punekar, R. (2007), 'Indigenous Innovations', paper presented at CONNECTED: International Conference on Design Education Sydney, University of New South Wales, Sydney,September 9-12, 2007.

3. Gupta, D., Bosnjak, A., Mokashi-Punekar, R. and Ahmed, S. (2005), 'Modulating Play Environment to Induce Social Play for Children with Autism', paper presented at HWWE 2005 International Conference on Humanizing Work and Work Environment, IIT Guwahati, December 10 -12, 2005.

4. Mokashi-Punekar, R. (2005), 'Sustainable Development: Education Craft and Technology', poster presentation at the International Conference 'Education for Sustainable Future' organized by the Centre for Environmental Education, Ahmedabad, January 18-20th, 2005.

*5. Mokashi-Punekar, R. and Ramachandran, K. (2008), 'User Preference for the Visual domain of product form - An emperical participative study through the net'. Abstract submitted to the Third International Conference on Design Computing and Cognition (DCC'08 or DCC08), Georgia Institute of Technology, Atlanta, USA . (Confirmation awaited)

National

1. Mokashi-Punekar R. (2004), 'Searching for Meaning in Everyday objects', paper presented at National Folklore Congress, Guwahati University,. Guwahati, January, 2004.

2. Mokashi-Punekar R. (2005), 'Design Concerns – A North Eastern Perspective' Illustrated presentation, CII – NID DESIGN CONCLAVE, Shillong. November,2005.

Papers Published

International

1. Mokashi-Punekar, R., Gromala, D. and Khandelwal, M. (2005), 'Design Visions: Centres of Synergetic and Dynamic Interface between Education Centres and Society', in Shashank Mehta and Vijai Singh Katiyar (ed) *Design Education: Tradition and Modernity*, National Institute of Design, Ahmedabad, 537-540.

2. Mehta, S. and Mokashi-Punekar, R. (2007) 'Indigenous Innovations', in *CONNECTED: Proceedings of the International Conference on Design Education Sydney*, University of New South Wales, Sydney.

3. Gupta, D., Bosnjak, A., Mokashi-Punekar, R. and Ahmed, S. (2005), 'Modulating Play Environment to Induce Social Play for Children with Autism', in Debkumar Chakrabarti and Abhijit Das (ed) HWWE 2005 *Proceedings of the International Conference on Humanizing Work and Work Environment, IIT Guwahati*, Allied Publishers, Mumbai, 275-282.

Publication

Monograph

1. Mokashi-Punekar R. (2005), *'Taming of Bambusa the giant grass - Monograph on Shilpaguru Shri. Mantu Chandra Das', published by Crafts Council of India, New Delhi.*

Design Workshops Attended

Mokashi Punekar R. (2004), Attended the workshop 'Design Catalyst' on Industrial Design organized by Shristi School of Art Design and Technology, Bangalore, 15-17th, December, 2004.

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