12 CREATIVE METHODS FOR OPPORTUNITY MAPPING IN THE INITIAL PHASE OF DESIGN

Gayatri Menon

Faculty of Industrial Design, National Institute of Design, NID, Paldi, Ahmedabad- 380007, India,
Tel: 091-79-26623692. E-mail: gayatri@nid.edu, menon.gayatri@gmail.com

As the nature of design problems becomes more complex and multifaceted, it becomes important to understand the problem space/ context to arrive at opportunities for redefining design briefs and conceptual frameworks. This paper examines the creative methods involved in coming up with design opportunities for problem spaces. The research worldview taken was pragmatism and an exploratory study was carried out using qualitative methods like case studies and unstructured interviews. A literature review was carried out and a framework for study was prepared. The case studies carried out as per this framework were examined for learning. This learning was further consolidated as findings of the exploratory study.
It is envisaged that the research will bring in some understanding on the initial stage of the project and how certain methods could lead to a creative way of arriving at design opportunities in the initial phase of design.

Keywords: Creative methods, opportunity mapping, design research

1. INTRODUCTION

The objective of the research was to identify the creative methods involved in designing innovative products for identified problem/opportunity spaces. The scope of the creativity process in design and its role especially in the initial stages of design was looked into. A literature review of concepts concerning design methods, creative processes, systems approach, holistic thinking and visual modeling was done which helped in the preparation of the research framework. The study examined the creative methods involved in coming up with innovative design opportunities. A case study approach was taken in order to study the creative methods involved in coming up with design ideas for three real life projects and analysis was done for the same. The role of creativity especially in the initial stages of design could be important in critical decision making stages in deciding 'what to design'

The study concluded that creative methods like questioning and widening the problem space domain, deep insights into specific domains and designer's philosophy/ ethics can play an important role in opportunity mapping in the initial phase of design.

2. CREATIVITY IN DESIGN

The root of the word 'Creativity' in English comes from the Latin 'creatus', literally "to have grown." Historically, cultures have gradually accepted the difference between the words 'to create' and 'to make'. (In Western philosophy during the Christian period 'Creato' meant God's act of creation from nothing while Eastern philosophies looked at creativity as 'discovery' or 'mimicry' rather than 'creation from nothing'). In the 20th century 'creativity' started to be applied not only to arts but also to sciences. Creativity has been extensively studied from psychological, philosophical and sociological perspectives.

A useful distinction has been made by Rhodes between the creative person, the creative product, the creative process, and the creative 'press' or environment. I will be looking at creativity as part of the

design process/method with emphasis on studying the processes which lead to a conceptual framework of the design.

Creativity in design has been looked at from the perspective of being 'innovative' and appropriate. Creativity is generally understood to be a key factor in design. Divergent and associative thinking, techniques like brainstorming, synectics, lateral thinking etc. are closely associated with the idea generation phase of design. David Canaan in his paper on 'Research to fuel the creative process' proposes methods to enhance creative traits as part of the contextual study phase which includes: the ability to make new associations from unrelated elements: this includes collecting of visual and verbal data from subconscious mind, past experiences, new inputs and conscious goals in a structured way so as to help find new associations.

There are some salient features of design pedagogy which makes learning interesting and meaningful. The emphasis in design pedagogy is on synergetic understanding and purposeful creativity. Design by its very nature seeks to 'transform' and change things for the better. It responds sensitively to changes happening in real life — in terms of socio-cultural issues, technological changes, market forces, living patterns etc. Design requires to get inputs from diverse fields of knowledge and bring about a wholistic understanding and perspective. The challenge is to translate this understanding into a tangible reality-a new design. This involves lateral thinking, creative processes and execution. Together they constitute the core of design — purposeful creativity, wholistic understanding and approach, lateral thinking, and most importantly 'learning by thinking, learning by doing'.

Bruce Archer puts forth the idea of technology as 'knowing how' vs. design as a process of 'envisaging what'. He further elaborates that design involves the ability of human being to perceive order, pattern, connectivity and causation in complex things or systems. These systems are captured as a cognitive model, analysed and externalized through drawings, models, notations or language so as to bring it to realization. Thus design involves envisaging a non present reality, analysing it and modelling it externally.

The role of creativity in the initial phases of design does not seem to have been extensively studied and is still seen to be 'fuzzy'. The fuzzy front end is represented by Darrel Rhea in his article on 'Bringing clarity to the fuzzy front end' as a cloud with vague mixture of ideas, trends, requirements etc. which gets into the funnel and through insight gets churned out as product brief. Innovation requires divergent thinking before convergent thinking. The first phase of the inverted cone involves discovery and observations, forecasting and identifying opportunities.

The study of this aspect could lead to a better understanding and developing framework for incorporating creative thinking in the initial phase of design. W. Jones talks about a creative way of defining the design problem and analyzing of problem space leading to problem design. He elaborates that ideally (e.g. in mathematics), a solution makes a problem disappear. A look at the dynamics of the market, with its new 'solutions' for old 'problems', with its invention of 'problems' for new 'solutions', raises doubts in regard to this understanding. It aims at a terminology that goes beyond the static linearity of the schema of problem → solution to a dynamic cyclic self sustaining process. He also talks about Operative epistemology or radical constructivism that propagates a way of thinking and theory of knowledge construction based on cybernetics (Weiner) and general systems theory (Bertalanffy). Problems can lead to solutions but a solution or problem/opportunity space can also lead to problem statement i.e. a design brief. This leads us to the idea of problem/opportunity' space leading to the design brief.

3. RESEARCH WORLDVIEW

The stances and philosophical assumptions made by the researcher is very important. The stance determines the method of research : data collection and analysis. The primary method used in this research is pragmatism and is qualitative and inductive.

A reductionist approach to studying the creative methods in design may not give an understanding in its 'totality'. An approach which is open to studying the inter-connectedness of various parameters in the initial phase of design would be more appropriate. Secondly, design being an applied profession, it

would be appropriate to situate the research in a real life context and look at research methods which would lead to findings that can be applied easily in the profession.

3.1. The Concept of Holism

No part of the reality of the world can be understood unless it is seen in the context of the universe as a whole is an idea which is also reflected in philosophy. Hegelian holism alongwith scientific positivism has influenced systems thought greatly. Eastern philosophy has always emphasized on the inter connectedness of all living things and the strong cause and effect relationship.

Both system science and system philosophy offer a unifying and integrating role for the sciences and philosophy. One of the challenges of design today is to obtain a broadest possible understanding of the scenario and come up with design opportunities for the same. As A. N. Whitehead says: 'The transitions to new fruitfulness of understanding are achieved by recurrence to the utmost depths of intuition for the refreshment of imagination, In the end — though there is no end — what is being achieved, is width of view, issuing in greater opportunities.

3.2. Pragmatism

Pragmatism is concerned with the consequences of the research, on the primary importance of the questions asked rather than the methods and multiple methods of data collection inform the problems under study. Thus it is pluralistic and oriented towards 'what works' and practice.

In pragmatism:

- The ontology i.e. the nature of reality is singular or multiple. Researchers test hypotheses and provide multiple perspectives
- The epistemology i.e. the relationship between the researcher and that being researched is practical. The researcher collects data by 'what works' to address the research question.
- The axiology i.e. the role of values is multiple. i.e. it could be both biased and unbiased perspective
- The methodology is combining i.e. researchers collect both qualitative and quantitative data and mix them.
- The rhetoric i.e. the language of research can be both formal or informal.

4. ACTION BASED RRESEARCH

The advantage of action based research is that it is conducted in a real life situation. System design project is the final classroom project carried out by post graduate industrial design students at the National Institute of Design during which students are encouraged to work on live projects. Workshops are also conducted for professionals from industries as part of Outreach program at NID. The author was involved as a course guide and anchor faculty respectively for both the system design course and industry workshop and therefore got the opportunity to conduct the study within the framework.

The project parameters allowed the participants to travel and meet stakeholders, conduct studies, use workshop facilities of the client and be in contact with the client for feedback and discussions. The case study represents the work and learning of process followed by individual participants.

In design profession, designers are expected to work not only for industries but also for organizations and public sector projects. Therefore one case study was selected from each of these areas:
Three case studies were selected:

1. Designing of Bamboo toys for INBAR (an organization)
2. Designing of stainless steel accessories for 'Oblique' (an industry)
3. Designing for Law garden road side vendors (a public sector project)

All the participants were oriented towards this area through some lectures, presentations and discussions. These included:

Lecture cum Presentation 1: System thinking and Innovation in design

Gives a broad overview of systems thinking, Ludwig van Bertanfly (1940s), Christopher Jones, Buckminister Fuller, Ulm school of design and the beginning of systems approach in design, innovation practices, user-technology-market related innovation etc. and discussions on approaches in design including 'Product group oriented systems approach', 'products within systems' and 'from the system to the product' approach.

Lecture cum presentation 2: Understanding the subject-object relationship in systems. An understanding of ideological stands and participatory processes

Case study of a systems study done from different perspectives was shared. Participatory action research methods and processes were also discussed. Crash assignment on coming up with case studies related to design in complex system scenarios.

Lecture cum presentation 4: Building systems model — visual modeling

Visual representation: the externalizing- reflection -internalizing cycle. Understanding the various components which constitute the external system and their inter-relationships; Using participatory processes to define the various system components; Using of venn diagrams, metaphors, dynamic models, etc. with the purpose of synthesizing. The use of metaphors for visual modeling to help in synthesis and communication, Specific design brief based on design opportunity

Lecture cum presentation 3 Creativity

Creativity in design: appropriateness, uniqueness, innovation. Techniques: brainstorming: Osborne, Synectics: Gordon, Creativity techniques: Edward de Bono. Associative thinking; Use of empathy and multiple perspectives; Creative insights design opportunities and design directions; design briefs, use of metaphors, personification etc; creative processes, creative products.

Lecture cum presentation 5: Idea generation and detailing

The use of creative processes; Tacit understanding, images, form, visual, colours constituting the experiential memory inside the mind and external imagery; Using collage, visual montage, etc. to create experiential associations to develop the ideas Technical feasibility and detailing.

4.1. Data Collection and Analysis

Data collection was collected from the case study mainly through:

1. Documentation of the process
2. Images of charts/diagrams collected
3. One is to one interview : points noted
4. Part of focus group discussions recorded
5. Recording of presentations

A triangulation method was used to validate the data. The data was collected through 3 to 5 different means as mentioned above

The analysis method used for qualitative research included organising documents and visual data, transcribing the text and preparing the data. The next step was to read through the data and analyse them in them in terms of process followed and the resultant learning. These learning was then consolidated to arrive at results. The representation of the data analysis would include a discussion on the findings in terms of theory.

The process followed during the design was documented by the students. This included writeups and also visual charts and mind maps. One to one interview and focused group discussions also helped in detailed writing of the process. The critical processes which led to idea generation were independently observed by the author and another design faculty. All the critical processes derived by either of the two observers were put forth since this is an exploratory research phase. The processes thus derived

would be critically analysed in the next phase. The learning from the process is of a generic nature and was derived by the author based on the process followed.

4.2. Case Studies

4.2.1. Case Study 1: Designing Bamboo toys for INBAR

The project purpose was to design a range of Bamboo toys for providing work and generating income for craftspeople, to train people with easy methods of making bamboo products and for profit. A range of bamboo toys for the age group of 2-5 year was designed as part of the project

- Process: To find many design possibilities and directions, opportunity mapping from the perspective of market related opportunity, user-related opportunity and technology related opportunity was carried out which helped in generating many ideas.
- Learning: Opportunity mapping from different perspectives helps in generating multiple design directions and ideas
- Process: Collaboration with an occupational therapist, an external expert led to the development of ideas based on social-emotional development of child which was not thought of before
- Learning: Collaboration with external expert leads to a different idea.
- Process: Since INBAR is a networking organization, a visual representation of the functional parameters related to user, manufacturing and marketing helped in understanding the product cycle
- Learning: Visual representation helps in developing a model to understand linkages which would effect the design
- Process: Study of changing patterns in toy market for young children led to the finding that there is a growing market of eco-friendly toys. This resulted into incorporating eco-friendly features in the design
- Learning: Study of changing market patterns led to incorporating the finding as features in the design
- Process: In-depth study of children's behavior led to the observation of children stacking spoons, clothes etc. one on top of another which led to the development of a stacking toy
- Learning : In-depth observation of user behavior and identifying the gap leads to a product idea
- Process: In-depth exploration of the material led to use of elastic property of bamboo as a play feature for toy
- Learning: In-depth exploration leads to unknown possibilities and helps to come up with innovative idea
- Process: Designer's perspective/approach that rural semi-skilled people should benefit from making the toys led to the incorporation of design features which would be possible with minimum infrastructural resources
- Learning: Designer's approach plays an important role in deciding the features of the design

4.2.2. Case study 2: Designing a Range of Stainless Steel Accessories for Oblique

To design a range of products/accessories made of stainless steel in order to establish Oblique as a brand in the market and for profit. A range of stainless steel accessories to avoid clutter at office and home for urban young was designed

- Process: Opportunity mapping in terms of different scenarios like travelling, at home, in office etc. for same user led to different ideas for stainless steel accessories
- Learning : Opportunity mapping in terms of different scenarios leads to many ideas
- Process: Visual representation in terms of metaphor modeling helped in understanding the industry aspirations and vision which influenced the design parameters
- Learning: Visual representation can help in communicating idea
- Process: Going indepth into properties of steel and studying various properties helped in identifying spring steel properties which could be used in the accessories so that they could wind up and hang from places

- Learning: Indepth exploration of material properties and associating the same with user need could help in coming up with unique design
- Process: In order to identify the product to be designed, user space observation and functional requirement analysis was carried out. This helped to identify the need of product and the gap in terms of user need
- Learning: In depth observation of user space and identifying the user need/product gap helped in defining the design brief

4.2.3. Case Study 3:Designing for the Law Garden Vendor Community

The project purpose was to study urban based craft communities and designing to bring about a positive change for the community. Law garden community in Ahmedabad was studied and the project approach was to benefit the law garden crafts community. This led to the concept of an urban haat scenario with a mix of product-systems-services approach

- Process: In order to define the project brief, an iterative process of using mind maps from analytical to synthesis oriented mind map was carried out. This helped in getting clarity at different stages of the project
- Learning: Visual representation involving mind maps help in reflecting, communicating and getting clarity in complex projects
- Process:The concept of urban haat was built by linking and inter-relating various elements like garden, public spaces, craft council, marketing middle men etc in form of a likely scenario
- Learning: Analysing the gap in craft product selling in urban places resulted in the concept
- Process: In order to develop and communicate the concept of urban haat and various functionaries associated with it, visual representation involving scenario mapping was used
- Learning: Visual representation in terms of a scenario model is helpful when the concept is a mixture of product, system and services
- Process: Identifying and collaborating with existing stakeholders consisting of craftspeople, middle men, municipality, eating joints was very important in terms of getting different perspectives. This helped in defining concept parameters
- Learning: Identifying and collaborating with stakeholders helps in defining concept parameters
- Process: For defining the project purpose, the designer's perspective that the design should primarily help the craft vendors played a very important role in defining the project
- Learning: The designer's perspective sometimes determines the project purpose and hence is critical
- Process: Study of craft vendor community included a historical study of patterns of change in terms of changing urban landscapes and resulting problems of craft vendors
- Learning: Studying historical pattern of change helped in arriving at a problem statement
- Process: During conceptualisation phase, potential stakeholders like craft council of India and DC(H)who could become a part of the solution were also thought of.
- Learning: Incorporating potential stakeholder broadens the scope of the project and helps in arriving at appropriate concepts.

5. RESULTS AND DISCUSSIONS

Based on the learning derived from the processes which helped in creative idea generation, a pattern/thread of thought was identified. This helped in the generation of some findings. Designers need to be encouraged to constantly question and widen the problem space domain. Sensitivity, empathy, goal oriented approach and reflective practices are critical to the process.

5.1. Collaborating with Internal and External Experts

The internal experts could be people directly related to the design brief from within the industry/product development system while external experts are people who are brought into the project for

their specific expertise. This helps the designer in getting new understanding/ insights and in getting new direction and design opportunities.

5.2. Studying Changing Trends

Patterns of change in terms of market trends, cultural trends, technological trend, psychosocial trends etc. are studied and mapped out. The analysis of it helps to get insights into gaps, needs which can become design opportunities. A new technology or pattern of user behavior can also inspire the creation of new design opportunity.

5.3. Identifying Existing and Potential Stakeholders

Identifying existing stakeholders helps in getting different perceptions of problem space and constructing it in a more 'holistic' manner. Bringing in potential stakeholders into the system would help in creating a paradigm shift and result in new opportunities which were not thought of before.

5.4. Studying Historical Pattern of Changes

The problem space is dynamic and it is important to understand it in relation with time also. Studying the historical pattern will help in envisaging a future scenario. Building a future scenario on this basis could result into new opportunities.

5.5. Widening the Scope of Design from Specific to Generic

The design of specific product results in a strong notion of existing reality and makes it difficult to break away from it. Converting it into a generic word helps in breaking away from the tangible form of the design and look for opportunities in terms of its attributes and features.

5.6. Going Deep into a Specific Domain

Indepth observation, exploration and experimentation into specific domains for understanding user, nature of material properties etc. helps in coming up with new knowledge and resultant opportunities.

5.7. Designer's Stance/Philosophy

Designer's approach plays an important role throughout the design and is specially critical in self initiated design projects wherein it can determine the project purpose. The designer's stance, philosophy and ethics can help in identifying new opportunities which were not perceived earlier.

6. CONCLUSION

The study emphasizes the fact that creativity in the initial phase of design can have a strong impact on how the problem space is perceived and the concept scenario envisaged. The designer's stance has a strong impact on the shared vision/intent of the project. Questioning and widening the zones of problem space and indepth study of the same can help in the creation of new opportunities. Collaborations with experts, identifying existing and potential stakeholders, studying patterns of change etc. help in contextualizing the design and coming up with a conceptual framework for the same. The methods would be specially useful in gaining a new understanding of design problems and coming up with creative design approaches and directions based on the opportunity mapping. It also brings forth the idea of strong associations between the processes and layering of knowledge leading to the development of an understanding which is critical in design. The findings on creative methods for opportunity mapping elaborated in this paper are a result of an exploratory study. These findings can be treated as propositions for conducting further experimental studies and validation.

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