

Footwear for All : Embracing Inclusive Design Principles - Design Thinking Aspects

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ABSTRACT

In a world that is becoming more varied and interconnected, the concept of inclusive design has gained traction in a variety of industries, including fashion and footwear. "Footwear for All: Embracing Inclusive Design Principles" looks at the convergence of footwear design and inclusive principles, with a particular emphasis on the use of design thinking approaches.

This research paper investigates the various components of inclusive design thinking in the context of footwear, highlighting its critical role in creating shoes that cater to a wide range of consumers, regardless of age, ability, or personal taste. It analyzes how design thinking supports empathy, ideation, and innovation in the footwear design process, resulting in products that are not only aesthetically beautiful but also functional, comfortable, and accessible, using real-world examples and case studies.

Keywords : Design for All, Empathy-Driven Design, Iterative Prototyping, Problem solving, Sustainability & Ethics.

I. INTRODUCTION

Design thinking is a methodology for solving complex problems in a creative and user-centric manner. Understanding users, challenging assumptions, redefining problems, and creating innovative solutions to prototype and test are all core features of the design thinking methodology.

The Hasso-Plattner Institute of Design at Stanford pioneered the six-stage design thinking model

(d.school). Empathize; Define, Ideate, Prototype, Test, and Implement are the stages of design thinking.

Empathize: Understand the user's problem for which you are designing.

Define: Develop a problem statement.

Brainstorm/ Ideate: Come up with creative solutions to this problem.

Prototype: Create a physical representation of this solution.

Validate/Test: This solution with your intended audience.

Implement : Put the vision into action.

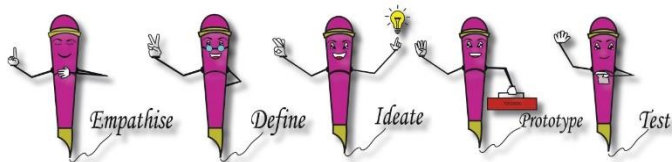


Figure 1. Elements of design thinking.

Individual fitness became increasingly important in the post-covid era. People are also prepared to dress in sports attire. Footwear design is a specialised discipline that requires designers to create emotionally appealing designs. In practise, this necessitates the use of both hermeneutic and reflective design thinking skills by designers. However, due to the increasing demand for new footwear models, it is not always possible to continue developing new footwear designs without some form of assistance.

Design in Brief Information (Design IB) is the very first stage in the design process that ought to have a reasonable comprehension of who you are designing. Prior to beginning work, it is vital to see precisely what is needed for the customer or for a design project. The designer works one year in advance from the sale of the product. Design briefs including complete information about the footwear/ product to be designed, and samples of leather to be used in the production process. If no leather/ non-leather samples are attached, the designers are needed to obtain appropriate materials themselves.

Footwear designing has complexity to create the design, and focuses on functionality as well as aesthetics. There are various steps involved to create new product, the steps also vary slightly depending on the individual designer. The paper is intended to be used as an example to understand the influence of design in brief information on the new product development.

Generally, Footwear is an integral part of human living, which protects the feet from extremes of temperature,

moisture and mechanical trauma. Footwear is outer covering portion of feet.[1]

Design brief information of athletics and sports specific footwear is also slightly differ from the fashion attire. A design brief is a document crafted by a designer to guide their entire design journey, ensuring harmony with crucial collaborators like product marketing and development teams. It outlines essential details about the purpose behind designing a particular product, serving as the inception of the creative process. The information within a typical brief covers the following elements:

- Collection title
- Collection statement
- Client/ consumer profile
- Story telling
- Brief Building - Define the problem
- Brief Building- Theme
- Brief Building – Inspiration
- Brief Building- Solution

Stages Involved in the Design Thinking:

The stages involved in the design thinking can vary designer to designer. The design process stage will help the designer to discover the realism and reduce the failure percentage of the design collection.

Stage 1- Empathize:

Stage 1.1-Collection Title/ Header:

- Project header or a caption that should excite your target audience.
- Title of a design can be anything for instance
- Anything that represents the design or the whole collection
- Short and easy to spell
- A descriptive or distinctive name that is chosen.
- Your theme can also be your title.
- It should be able to convey the story of the product or collection.
- It can also be related to a celebrity, an era, movie, geographical phenomena, species etc.

Stage 1.2-Collection Statement:

Project/collection statement is a single line sentence that describes the outline of your product or collection. It expresses exactly what you want to achieve with this project. Specifies the goal of the project. For an example of "Design a contemporary trail lifestyle runner for an explorer/hiker", "Appealing Avant Garde construction and closures while increasing functionality of core skaters", "Design a runner shoe for an individuals with minor plantar fasciitis".

Stage 1.3-Client/ consumer profile

After the collection statement, once the designer decides upon the target market, a client / consumer profile can be created. A client profile is a description or representation of your client's or ideal customer's characteristics that you are willing to target. This allows you to gain a better understanding of the audience who will be using your design and to personalize the final design accordingly. The client profile contains information about the client such as age, location, income, purchasing habits, psychographic behaviours, interests, and so on.

Stage 1.4-Story Telling:

Story telling will highlight the day in life of the target customer, which would include the all the activities, visuals, daily routine/schedule thought out day and performance level. These are essentially the consumer's story. Highlights the consumer's daily activities, things that they see performance level. This would help analysis whether the consumer has an active lifestyle or not that would help in designing the shoe for the client. Images could be added to represent the mood of the consumer. The story is mainly divided into three parts: beginning, middle & end. For an example if our client is an athlete then the story would be pre-game, in-game and post-game. This step mainly focuses on the schedule of the consumer.

Stage 2.1-Brief Building- Define the problem:

When you design while keeping the problem in mind you should look at the daily routine of the customer or any specified activity. The previously mentioned

design story should be looked at to discover the problem and its cause. There could be factors like climatic conditions, daily commute, terrain covered etc. this could also be dealt by keeping yourself in the customer's place and then think about the possible problems that could occur and the solutions for the same. We should also consider the current footwear that they are using and how their foot moves in it. Also consider the various other problems that could arise in the other parts of the feet. Some problem examples are:

Disability, Ankle problem, Toe deformity, Knee, Joints, Arches, Instep, Backpain, Ankle pain, Comfort, Performance, Breathability, Weight, Traction, Environment, Protection, Materials and so on.

Stage 3-Ideate:**3.1 Brief Building- Theme:**

This is a very crucial step as this sets the emotion and visual of the design. This step takes a little longer as this has the emotion that connects the design visual and the consumer. This comprises of images and keywords that give the feel of the design. The theme helps connect with the consumers and would help in building hype and excitement for the design. The theme can also be told as a particular idea or subject on which the idea is being based.

Some examples of theme keywords are: textured, minimal, energetic, string, light, fast, enthusiastic, layered, avantgarde, haute couture, bold etc.

3.2 Brief Building – Inspiration

When you are designing a footwear product then you have to find the inspiration that would be the potential solution. These are visual inspirations that could strike the ideas or the solution. The idea best identifies with the problem that the consumer has. The inspiration could be taken from the interests, activities, performance, environment, passion, hobby of the consumer. The visual inspiration drives the solution. These would guide the solution and help elaborate the theme. These inspirations can guide the design with the help of construction, forms, shapes, proportions,

patterns etc. the conceptual ideas, emotions, visuals are taken into the consideration which are either taken from the internet, hand drawn or are inspired by the daily activities etc.

Some of the possible areas of inspiration are:

1. Location
2. Food
3. Animals
4. Cars
5. Schools
6. Colours
7. Architecture
8. Patterns
9. Shapes
10. Materials
11. Music
12. Movies
13. Memories
14. Sports
15. Monuments
16. Attraction etc.

3.3 Brief Building- Solution

When you find the solution for the footwear problem then the current footwear of the consumer is looked to identify any lingering foot problems. A specific area of which a solution is found out and on the basis of which the solutions are explored in the design ideation phase. This step seeks to solve the problems with the help of innovative ideas, solutions, designs, constructions and technical innovations etc. Imagery helps visualise the area of problem better. Some of the possible solutions:

Problem Building	Possible Solution
⊗ Disability	✔ Accessable
⊗ Ankle Problem	✔ Cushioning
⊗ Toe Area/ Deformity	✔ Toe Guard
⊗ Knee related	✔ Reverse Energy
⊗ Arch Deformity	✔ Arch Support
⊗ Entry Way	✔ Easy Entry
⊗ Lacing	✔ Velcro, Auto-Lace
⊗ Performance	✔ Suitable Sole/ Grip
⊗ Breathability	✔ Ventilation
⊗ Durability	✔ Longevity
⊗ Weight	✔ Light
⊗ Back pain	✔ Multi function
⊗ Traction	✔ Traction Grip
⊗ Materials	✔ Suitable Materials
⊗ Environment	✔ More Comfort
⊗ Protection	✔ Innovation

Figure 2. Problem building & possible solution

Method -Application to Flat Feet and Footwear Design:

The paper emphasizes the role of design thinking in addressing disability, particularly flat feet (pes planus), a condition impacting the biomechanics of the foot arch. The study recognizes that customized footwear for individuals with foot deformities, considering factors like deformity type and body mass index, is crucial for enhancing overall foot function and addressing individual well-being. The off-loading strategy, transferring plantar load to the rearfoot through a rocker mechanism, is discussed as a common approach, requiring a delicate balance between functionality and potential risks. [9].

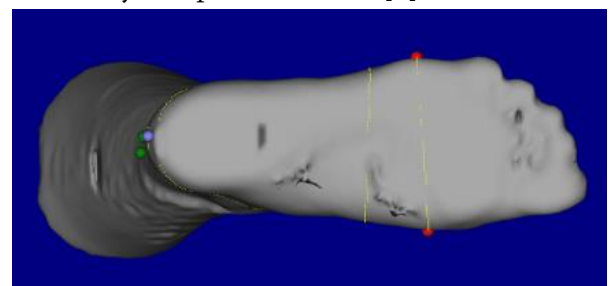


Figure 2. Three dimensional (3D) scanning data of People with pesplanus.

In Figure 2, represents the intricacies of pes planus emerges through the lens of 3D scanning data. This visual representation encapsulates the unique anatomical details of individuals affected by pes planus, offering a nuanced perspective on the foot's structure and contours for a comprehensive understanding of the biomechanical aspects associated with this condition.

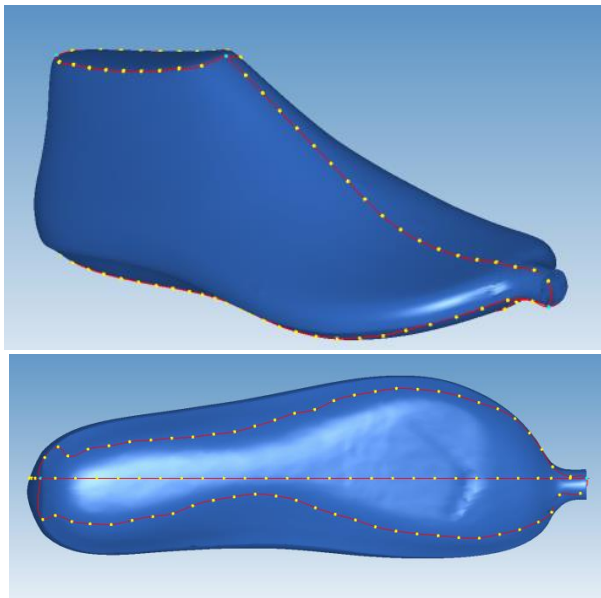


Figure 3 Shoe-last development for People with pesplanus.

Further, In this research endeavor, we have pioneered the development of specialized shoe lasts (*Figure-3*) created from three-dimensional (3D) scanning data derived from individuals afflicted with pes planus. This innovative approach allows cutting-edge technology with footwear design, yielding bespoke solutions tailored to the unique anatomical intricacies presented by pes planus for the realm of personalized footwear solutions for individuals grappling with pes planus.



HATHI PAD



Figure 4 Footwear with Orthosis pads for People with pesplanus.

Figure 4 illustrates the utilization of footwear with orthosis pads for individuals with flat feet based on individual foot conditions. This signifies a tailored approach in addressing the specific needs of this population, showcasing the application of design thinking principles in developing footwear solutions.

To prevent the occurrence of pesplanus, efforts have been made to improve methods for screening. However, definitive prospective trials assessing the efficacy of existing assays are lacking. This study was conducted at FDDI Hyderabad, India, and included people with pesplanus. The study documented the viewpoints of patients who used footwear on a regular basis, including those who were hesitant to accept certain designs or were unsatisfied with the footwear

model for various reasons. Their feedback, as well as suggestions for enhancing footwear acceptability, was methodically categorized into specified groups to help inform the development of more acceptable footwear designs.

Primary data, foot impressions, pressure distribution, and foot ulceration by the foot impression data sheet, guided the development of insoles and footwear. Participants dissatisfied with conventional footwear were closely observed and periodically consulted for suggestions to enhance the acceptability of the provided footwear.

II. RESULTS AND DISCUSSION

The research underscores the pivotal role of design thinking in addressing disability, specifically focusing on flat feet (pes planus), and the condition impacting the biomechanics of the foot arch. It acknowledges the importance of tailored solutions, particularly customized footwear, for individuals with foot deformities, taking into consideration factors such as deformity type and body mass index. This customization is deemed crucial not only for enhancing overall foot function but also for addressing individual well-being

This bespoke approach highlights the commitment to addressing the specific needs of this population, demonstrating the practical application of design thinking principles in the field of footwear design.

However, the research reveals a gap in the literature, with a lack of definitive prospective trials assessing the efficacy of existing screening assays. The study, conducted at FDDI Hyderabad, India, involved individuals with pesplanus who were affiliated with the lepra society and others. The perspectives of patients regularly using footwear were systematically documented, encompassing those who hesitated to accept certain designs or expressed dissatisfaction with the footwear model for various reasons. Their feedback and suggestions for enhancing footwear acceptability were meticulously categorized into specified groups,

providing valuable insights to inform the development of more acceptable footwear designs.

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