PDS PRODUCT DESIGN SCOTLAND

A NETWORK OF technology SCOTLAND

# PRODUCT DESIGN SCOTLAND TOOLKIT


## IN PARTNERSHIP WITH

filament · product design · THE GLASGOW SCHOOL OF ART · wideblue making technology happen · SCINTILLA · systolic product development

4c · peacock technology ltd · ENIGMA PEOPLE SOLUTIONS · MAGE CONTROL SYSTEMS · NMIS National Manufacturing Institute Scotland · DMEM Delivering Total Engineering · University of Strathclyde Glasgow · ktn


# ABOUT US

With a long tradition of innovation, entrepreneurship and commercialisation, the product design sector is one of Scotland's key industries. Through advances in technology, designers are providing innovative products across a number of global markets, including healthcare, energy, communications and mobility. Integration of these technologies into viable, efficient and commercially attractive products is key, and the partnership between technology and product design is becoming ever more important.

Product Design Scotland, managed by Technology Scotland, the representative body for Scotland's Enabling Technologies Sector, has been established to support the product and industrial design sector in Scotland. The network aims to be the focal point for the community, raising awareness of the critical importance of design to future growth and competitiveness and creating a thriving, collaborative network to drive innovation.

By working with companies and organisations across Scotland, we support the sector through:

- Promoting the value of strategic design to government and industry
- Raising the profile of Scotland's product/ industrial design sector
- Increasing visibility of those operating within relevant supply chains
- Improving competitiveness through collaboration and knowledge exchange
- Creating new networks to shape the future of design in Scotland.

# TOPIC INTRODUCTION

## WHAT IS HUMAN CENTRED DESIGN?

From a Stone Age axe to the laptop used to type this article, designed objects exist to meet a human need or desire. These needs might be physical, environmental, social, intellectual or even emotional. We design things for many different reasons, but they are, more often than not, human reasons. We design things for people. And so people should be at the centre of the design process.

Human Centred Design is an approach that re-centres each design decision around the different people it will affect. It encourages us to relentlessly ask 'how will this impact the people who interact with my product? Will this decision positively affect them?'

Human Centred Design is often used interchangeably with User Centred Design. While the end users are extremely important, they aren't the only people in the process. We also have to consider the people who manufacture, assemble, ship, retail and recycle our products. One object touches many people across its life, and Human Centred Design aims to put those people at the forefront, considering their holistic needs throughout the design process.

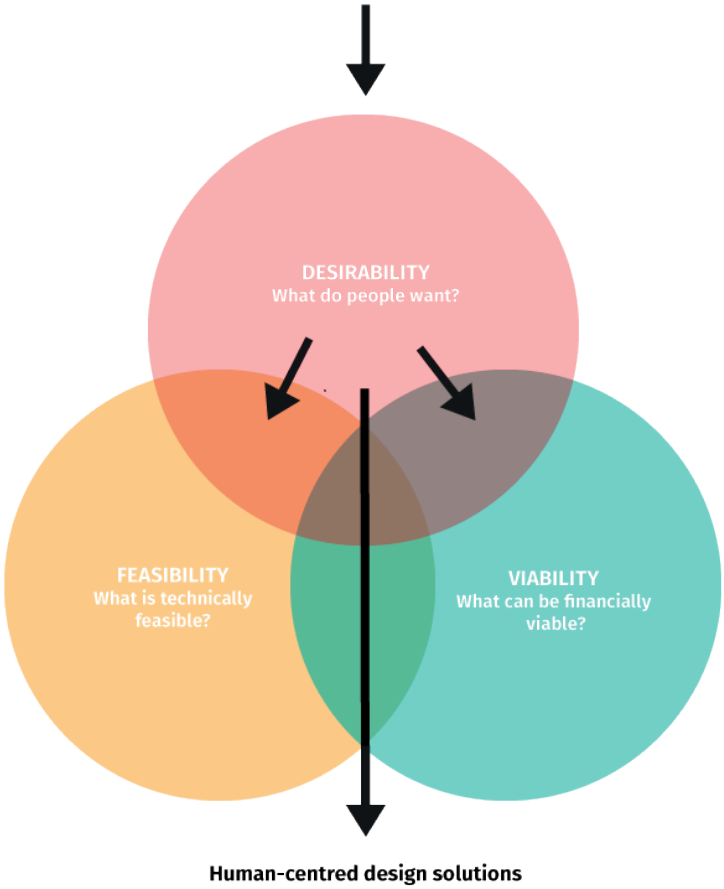
By engaging with people early and often and seeking to honestly appreciate their needs, we can begin to design products that don't just function, but really work.

## WHY IT MATTERS

*"People ignore design that ignores people"* Frank Chimero

Involving an often complex network of stakeholders in the design process takes time, cost and effort. So why bother with all the hassle, if you're pretty sure you're onto a winning idea anyway?

Organisations that utilise human centred design approaches tend to be more accurate in creating products and services that deeply understand their customers and therefore satisfy their true needs and wants. Consequently, they tend to be more successful as they are more aware and can discover new opportunities, challenge biases, and think differently.




Human Centred Design teaches us to look at projects through three lenses - people (desirability), business (viability) and technology (feasibility).

Solely focusing on technical feasibility or financial viability rarely results in a truly great product. If we spend all of our time honing the technology, we might well emerge with a technically clever solution, but risk that it doesn't actually solve a problem any real person has. We could also be so focused on reducing the production cost, so our product is financially viable, that we make compromises that negatively impact the people we're designing for.

Great products balance desirability with feasibility and viability to create a coherent, holistic, human-centred whole. Desirability emphasises the importance of meeting a real need in a person's life. Good products allow someone to accomplish a task but great ones enable this in a way that is intuitive and satisfying. They elevate a functional interaction to a great experience.

By balancing rational and emotional requirements, we can begin to solve problems in a more human way and ultimately create better, more appropriate products.

# THE PRINCIPLES OF HUMAN CENTRED DESIGN

1. **People-centered:** Focus on people and their context in order to create things that are appropriate for them.

2. **Understand and solve the right problems, the root problems:** Understand and solve the right problem, the root causes, the underlying fundamental issues. Otherwise, the symptoms will just keep returning.

3. **Everything is a system:** Think of everything as a system of interconnected parts.

4. **Small and simple interventions:** Do iterative work and don't rush to a solution. Try small, simple interventions and learn from them one by one, and slowly your results will get bigger and better. Continually prototype, test and refine your proposals to make sure that your small solutions truly meet the needs of the people you focus on.

# HUMAN CENTRED DESIGN APPROACH

As we've discussed, Human Centred Design emphasises discovering the right problem to solve by engaging people then holistically iterating and refining ideas until an appropriate solution is uncovered. This approach shouldn't be thought of as a linear process but rather a mindset that can be applied throughout the product development journey.


Let's explore some ways we can put this into practice:

## EMPATHISE

Empathy is perhaps the most important concept in Human Centred Design. After all, how can you expect to design a product that truly matches people's needs, without first walking in their shoes? By removing your assumptions, and observing, listening and asking questions to those you are designing for, we can better identify opportunities, gather insight and begin to understand what the need we are going to fulfil.

**Methods you might try:**

- **Observing** what your user does in the existing scenario. What do they struggle with? what works well? What else are they interacting around them?

- **Interviewing** people and asking open questions. Don't be restricted by your own knowledge or assumptions.

- **Roleplaying** scenarios can get you closer to your user's experience - consider carrying out tasks or using current products with them in mind - pay careful attention to the experience, how you feel, what frustrates you. Just be wary of the insights you pull from your own experiences, its easy to get fixated on something you think is a problem that might not be the full experience of an everyday User.

## DEFINE

Before we start coming up with solutions, it's important to distil the research from stakeholder engagements to uncover insights and better frame the problem we're trying to solve.

**Methods you might try:**

- Business Model Canvas - Framework for Laying out requirements on a single page according to key areas across Feasibility, Viability and Desirability.
- Value Proposition Canvas - Allows you to map specific user needs and wants to your product benefits.
- **Personas** - Building specific user profiles from stakeholder engagements allows the team to validate design decisions throughout the development process.

## IDEATE

Now for the fun bit - you can start to get ideas down on paper. Remember and leave your assumptions at the door, and bring what you learned with you.

**Methods you might try:**

- **Crazy 8's** - Each person in the session is given a piece of A4 paper that is creased to create 8 boxes. The aim is to fill the 8 boxes with thumbnail sketches in a set amount of time. This helps rapidly explore many ideas and not be too 'married' to your first solution. Remember to keep your user's identified needs and the defined problem at the centre of this discussion and you can always do further rounds to filter down areas of interest.
- **Storyboarding** - Creating visual, comic book style strips enables you and your team to visualise user experience journeys to uncover insights and opportunities. When looking at each step in the process, think about how you want your users to feel about or interact with that step, then determine what solutions or ideas will enable that. Storyboarding each step of your process can also be helpful because you may realise you missed an essential step.

## PROTOTYPE

Prototyping is critically important because how can you test something you can't put in front of users? If you can't test your idea, how can you have any confidence in moving through a process (and spending any more time and money)? And crucially how can you ensure you are meeting the needs of all three lenses if you don't test from the User's point of view?

This is where prototyping comes in. And we'd recommend doing this often and fast. It may seem obvious the more you are understanding this process, but waiting to spend your money on one beautiful, high fidelity prototype of your first fully formed idea, without getting feedback along the way, is a high risk strategy.

## TEST

And finally, close the loop by going back to those insights and defined problems and check if this idea is going to solve this. Talk to your users and ask if it fulfils their needs.

Testing single features or exploring multiple options for interactions, materials or finishes and getting feedback from your users as you go, is ultimately going to make your product better. It allows you to answer questions and solve problems quickly - saving you time and money, whilst always making sure you are staying true to user requirements.


# CASE STUDY

## OVERVIEW

Indoor air quality (IAQ) in our homes is a growing health concern in the 21st century, with chronic lung diseases such as asthma and COPD rising by 40% in the last 30 years. We also spend 90% of our time indoors where air can be up to 5 times more polluted than outdoors. Although awareness of IAQ has risen as a result of the COVID pandemic, most people still don't fully understand the source of pollutants or their health impacts. Indoor pollutants caused by cooking, cleaning and outdoor sources are all invisible so easy to ignore until the health effects are felt first hand. Most existing IAQ monitors are beige boxes that require technical background knowledge of IAQ and have data heavy interfaces that people often find confusing.

## INDENTIFYING THE OPPORTUNITY

Nooku's mission is to improve global lung health by educating everyone about the dangers of poor air quality, through motivational technology. To do this meant redefining how people viewed air quality monitors. The challenge was to transform a confusing and mundane piece of technology into a product that was simple yet engaging. The solution had to encourage people to care enough about their home's air quality to promote long term behaviour change.

## HUMAN CENTRED APPROACH

It was immediately clear that a deep understanding of people's views towards air quality would be needed to achieve the project aim. During early engagements, it became apparent that families with young children were particularly concerned about their indoor air quality. Through surveys and in person observations, the team were able to gain valuable insights both from a user expectation and potential intervention point of view. For example, one of the insights the design team noted from a general IAQ survey was that while almost all participants were concerned about the chemicals in cleaning products, none could identify how this might affect their air quality and health.

Another insight was that most parents felt intimidated by data heavy interfaces as they found them overwhelming to understand. The process highlighted that there was a huge gap in people's understanding of indoor air pollutants and the effects they have on health. In order to visualise the results, the team constructed day-in-the-life profiles to understand how any design would need to integrate into a family's existing routine and also provide easy to understand language to keep everyone engaged.

Key tools used to ensure that the design team kept people's needs front of mind were user personas and a value proposition canvas, linking any features the final design may have with the user insights gathered. Using the framework created, the design team decided to focus efforts on creating an air quality monitor with personality that would not only detect pollutants but educate and engage both adults and children to become air quality champions in their own homes.

As the project entered the ideation phase, dozens of sketch concepts were generated to explore possible design directions. A major outcome of these initial sessions was the idea of characterisation, drawing upon virtual pet and gamified challenges to keep younger family members engaged and help define the product as more than just a piece of technology in the home. Getting in front of user groups was a priority for the design team, recruiting and running workshops with local schools to encourage co-creation and test assumptions made throughout the process.

By the end of the define and ideation phases, the team had created a well defined brief and could move on with both physical and digital prototyping. Implementing an iterative design, build and test cycle allowed the team to quickly move through a variety of concepts - testing form, usability and function. At the prototyping stage it was important to use the correct tools to allow for fast feedback loops with the user base. Basic wireframes of the app UX were created alongside rapid 3D prints of the device to explore the potential physical / digital interactions and interventions to assess potential impact. As the design reached the final stages, working beta prototypes were placed in peoples homes, allowing the team to gather physical and emotional feedback from users though occupant diary and exit interviews.

Committing to a Human Centred Design approach resulted in the team developing a useful product that answers a genuine market need while delivering a bit of delight. Nooku was soft launched at IFA, Europe's largest consumer electronics exhibition in Berlin, where the product was positively received by both the public, distributors and retail. Nooku will be available to buy as part of a pre-order campaign in early 2023.

## KEY RESOURCES

1. **OXO Good Grips:** One of the best products summarising the human-centred design method is the OXO Grip, designed by Sam Farber, when he observed his wife struggling with a common vegetable peeler. Their "Good Grips" line revolutionised the way the product categorization and consumers thought and interacted with kitchenware designs. Their ergonomics contributed massively to the sector's development and innovation, and as such their products enabled equity use by all users, regardless of their ability.

https://www.youtube.com/watch?v=EKvak0MrVhg

2. **Adobe:** They adopted the "user-centred design" as well as the "human rights centred design" approaches, gaining a deeper understanding of its users and as such is being considered one of the most successful companies globally. In their **user-centred design approach**, satisfying users' needs and wants becomes the priority, and every decision made in the design process is evaluated by whether it delivers value to its users, therefore it is a way of adding an emotional effect into its products/services.

https://kickbox.org/

3. **Design Council** states that "Human-centred design takes into account every single human being that your design decisions impact on." They have produced a set of pillars to guide you through the process:

https://www.designcouncil.org.uk/fileadmin/uploads/dc/Tools_and_Frameworks/DC_DE_Design_Value_Framework.pdf

4. **Stanford d.:** The Stanford Design School also recognises the importance of Human centred design on tackling the social sector's issues and attributes its success in its ability to put real people back in the line of sight, gather meaningful insights and making the best use of the prototype/feedback loop:

https://dschool.stanford.edu/news-events/unlocking-the-power-of-design-for-the-social-sector-a-human-centered-systems-minded-and-strategy-aligned-design-approach-for-social-sector-leaders

5. **IDEO:** IDEO has developed the "Method Cards" tool to guide and inspire designers and businesses to keep people at the centre of their design process. The tool has been created with the aim to enable creative people to adopt and try new methods for making useful, usable and delightful products and services for people. The tool is beneficial for anyone trying to solve a specific problem and needs guidance on moving forward with design thinking:

https://www.ideo.com/post/method-cards

filament

# FILAMENT PROFILE

At Filament we believe that successful product development strikes the fine balance between customer desire, technical feasibility and business viability.

Our multidisciplinary team of strategists, designers and engineers specialise in the development of connected hardware, we work at the intersection of physical and digital product and service innovation. We live in an increasingly complex world where everything is more interconnected than ever before. Products must now encompass the entire customer experience, not just the physical object.

Our goal is to positively impact people's lives and the wider world while adding measurable value to our client's businesses. Over the past decade we've helped more than 100 ambitious Start-Up's, SME's and Global Organisations successfully launch new products and innovations.

Projects range from short-term assistance with strategic decisions to long-term collaboration through the whole product development cycle - from concept to manufacture, including product verification testing and regulatory compliance support.

If you don't yet have a full development and manufacturing team in place, we can also help to shortlist and select right-sized design, technology and manufacturing partners.

We have extensive experience across diverse markets with key sectors including:

- Digital Health and MedTech
- Renewable energy, Circular economy and Cleantech
- FinTech and Security
- Connected transport and Smart Buildings
- Retail and Customer Experience
- Laboratory automation and Industry 4.0

Our mantra of Product Design Connected not only describes the types of projects we work on, it also encompasses our highly collaborative approach. We help clients navigate the complexities of new product development from initial strategy through to production and market launch connecting them with the right partners along the journey.

**WANT TO KNOW MORE?**

**PRODUCT DESIGN SCOTLAND'S FULL TOOLKIT SERIES IS AVAILABLE HERE.**

CORPORATE SPONSORS

ENIGMA SCINTILLA
PEOPLE SOLUTIONS