# Human Centered Design : Introduction

## Why HCI?

### Good design brings people joy

> It helps us do things we care about and helps us connect to people that we care about.

Good user interfaces can have a tremendous impact on both individuals' ability to accomplish things and society's as a whole. Graphical user interfaces have put computing on hundreds of millions of desks, enabling us to do things like create documents and share photos, interact with family and find information. Conversely, **bad design costs time, money and lives**. Medical devices, airplane accidents and nuclear disasters are just a few domains where bad user interfaces have caused serious injury even debts.

> The key thing is: **many of these interface problems could've been easily avoided**.

Fixing these problems requires following to some basic principles like **consistency** and **feedback**.

### Case Study: The Death of John Denver

In 1998 the singer passed away tragically while flying his airplane. As is common in situations like this, there were a number of factors in play. Usually, deaths mean that multiple different bad things happened simultaneously. Ones you can usually recover from if occured in isolation. In John Denver's case, it was a combination of **low fuel,** a **hard to reach handle to switch the gas tanks** due to some custom modifications to his plane. So this meant that a **bad user interface that mismatched the cockpit's ergonomics** actually contributed to his death.

### The Cost of Bad UX

We interact with hundreds of websites, apps, ticket kiosks, all sorts of physical, digital, and combined information and user experiences. Assuming that **friction caused by bad design** causes Americans **10 minutes** of delay **each day**, for over **300 million Americans** alone, that would be **3 billion person minutes a day** or **18 billion person hours per year**.

> ***Designing pretty good user interfaces is actually pretty easy*** if you know some basic methods, techniques and principles.

## The Power of Prototyping

### Prototyping grounds Communication

- When we talk about prototyping, what we mean is **rapidly creating an approximation of a design.**
- Prototyping is the pivotal activity that structures **innovation**, **collaboration**, and **creativity** in design.
- Prototypes **embody design hypothesis**, and enables designers to test them.
- Successful design results from a series of conversations with materials. **It's not the artifact, it's feedback iteration.**
- Prototypes **serve four distinct audiences or stakeholder groups:** your **colleagues**, the **clients**, the **users** and **yourself**.

### Case Study I : Palm Pilot in a Block of Wood

These days, a lot of us carry a computing device in our pockets, but 20 years ago that wasn't really the case. There were a couple of early attempts that were innovative and exciting, but hadn't quite caught on yet. In the **mid 90s**, **Palm** managed to be able to crack this wide open.

By **2000**, they sold **8 million units a year**, and had a **76% share of the personal digital assistant market**. How did they figure out how to do something which had been so elusive for many years?

> Turns out the journey to 8 million users starts with a **block of wood**.

**Jeff Hawkins**, **Palm's designer**, carried with him a block of wood that was the size and shape that he thought the Palm Pilot would eventually be and he would use it in all the ways that he thought the Palm might get used by actual people. This helped him figure out answers to some questions like:

- What are the tasks that you would **actually use this for**?
- What are the things that you need to be **one button push away**?

> It's easy to tell a story in the board room,  it's different to live life on the ground.

### The Right Way to Prototype

> Different Prototypes help you figure out different things. **It's important to have a goal.**

There are different types of prototypes such as:

- **Physical** Prototypes for **Product / Ergonomics** Design
- **Interactive** Prototypes for **UI / UX** Design

A classic novice mistake with prototyping is that you'll start out and with one idea and refine, refine, refine, refine, then be done.

> If you're using prototyping well, you'll **explore multiple alternatives**.

At each stage in your prototyping process you've got a question. And then from there you'll have new prototypes with new questions. What you want to be able to do is to **focus on the goal and evolve the prototype to fit it**, rather than arguing for one particular design.

### Rights of a prototype

- A prototype **shouldn't be complete,** it takes too long.
- Should be **easy to change**
- Gets to **retire**

> If you are making prototypes that **don't give you new knowledge,**  you're really **wasting your design process.**

## On the Methods of Evaluation

- **Evaluation falls between science and art.**
- **Use Patterns** can be **context-dependent** and evolve over time.

- **Different methods answer different questions** and are best used at **different points in a design cycle.**

| Method | Advantages | Disadvantages | Reliability (Repeatability) | Generalizability | Real World Applicability (Realism) | Work Involved (Efficiency) | Alternative Viewpoints (Comparisons) |
|---|---|---|---|---|---|---|---|
| **InPerson Usability Study** | Learn a lot, avoid developer blinders | Environment / motivations may not be representative. Experimenter Bias. Lack of Comparison. Logistics. | Varies | Varies | Varies | ✅ | ❌ |
| **Surveys** | Quick, Cheap, Large Sample Size, easy to analyse | Reporting vs. Reality | ✅ | ✅ | ❌ | ✅ | ✅ |
| **Focus Groups** | Interaction brings out issues | Groupthink, difficult to discuss sensitive issues | Varies due to Inconsistent Group Dynamics | Varies | ❌ | ❌ | ❌ |
| **Expert / Peer Feedback (Heuristics)** | Quick Valuable Insights, deep insight through dogfooding due to awareness of pain points | Developer blinders, Inbreeding, Lack of representativeness. | Varies due to its dependency on experts | ❌ | ❌ | ✅ | ❌ |
| **A/B Comparative Testing** | Identify key attributes. See Actual Actionable Behaviour. | Expensive. Must build prototype for both alternatives for testing | ✅ | Varies as it depends on sample size, distribution and significance. | ✅ | ❌ | ✅ |
| **Participant Observation** | See realistic longitudinal behaviours | Expensive, needs Mature Prototype | Varies as it depends on the scope | ✅ | ✅ | ❌ | ❌ |
| **Simulation and Modelling** | Don't need detailed design. Good for Input Techniques (atomic tasks). Results can be widely applicable. | Need formal mathematical theory to be proved. | Varies as effectiveness depends upon the problem domain it is applied to | ✅ | Varies. Applicable in the finance and network analysis industries. | Varies. Depends on the degree of data to be modelled. | ✅ |

> The best way to predict the future is **to invent it.**
>
> *-- Alan Kay*