Principles, Strategies, Tools for Design Thinking

May 2021

Table of Contents

Prologue

Industrial design was the leverage of Steve Jobs' strategy to turn Apple around in 1997. After launch of iMac, it rose from <$5 in 1997 to $12+ in 1998 to $35+ in 2000, a ~600+% jump in ~3 years. Design-driven companies have outperformed the S&P Index by 228% over 10 year - DMI (Design Management Institute). Companies that foster creativity enjoy 1.5 times greater market share. 50% of design-led companies report more loyal customers. – Adobe.

Through this eBook, you will learn a pragmatic approach to understanding the fundamental principles, strategies and tools for design thinking. Learn how you can articulate the business value of investing in building a great UX and measure its effectiveness. This eBook enables you to integrate your education with your work so you can apply, iterate, and innovate on the job and boost your immediate and long-term outcomes. My mission is to provide high-quality content at affordable price. This eBook provides a high level overview on the following topics -

- What do you stand to lose in the absence of good design
- How design enabled Apple's turnaround story in 1997
- How do you design something really well
- How do you solve the most pressing problems for your customers
- How does user centered design work
- How to improve usability by leveraging design best practices
- How rapid prototyping helps save time, cost, effort
- How to measure the quality of UX and goals of the product
- What are the must read books on UX
- What are the more interesting TED talks on UX
- Most successful startups pivot
- What are some of the good tools for UX design

Rapid prototyping is a low-tech trial to solve problem for your first few customers as fast as possible, using a rough or low fidelity item. The Pinocchio Technique – creating a 'wooden' mockup of your idea. Invest in the optimal rapid prototyping option and tool to build a minimal viable product (MVP) for running low fidelity experiments in front of your customers. This eBook covers nine rapid prototyping options, including -

- Sketches
- Paper Prototype
- Storyboard / Wireframes
- User Interface (UI) Mockups
- Partial Code Prototype
- Quick Code Prototype
- Video Demo
- Quality Code Prototype

This eBook also provides a high level overview of different tools available for rapid prototyping of UI+UX. This eBook covers WHAT options and tools are available for rapid prototyping of UI+UX. Currently, this eBook does NOT cover HOW to use these tools.

It's becoming easier and easier to create Web sites and mobile apps. But harder and harder to measure the effectiveness of these applications. This eBook covers how to measure the effectiveness of UX using Google's HEART framework and Goals-Signals-Metrics (GSM) process.

Better products or a superior customer service are no longer enough to stand out. Technology has lowered barriers for entry and, with that, provoked a new era of competition. According to John Maeda, design partner at Kleiner Perkins Caufield & Byers, the solution is to become a design-led company. Design-led companies invest heavily in powerful customer experiences – a key element to tackle if you want to get your customers' attention and motivate them to keep coming back.

Who should read this eBook

- Business Heads
- Consultants, Marketing Managers
- Entrepreneurs, Educators, Evangelists
- Program Managers, Product Managers, Analysts
- UI/UX Designers

There's a lot of good knowledge packed inside this eBook, so hesitate no more! Learn more about fundamental principles, strategies, tools for design thinking today! I'll see you inside the eBook. Thank you.

Chapter One: What do you stand to lose in the absence of good design

When designed badly, the products are unusable, leading to great frustration and irritation. When designed well, the results are brilliant, pleasurable products. Good design can deliver massive return on investment (ROI). Industrial design was the leverage of Steve Jobs' strategy to turn Apple around in 1997. After the launch of iMac, Apple's share price rose from <$5 in 1997 to $12+ in 1998 to $35+ in 2000, a 600+% jump in ~3 years.

Image Credit: Turnkey Interiors

Bad design is more expensive. Design is concerned with how things work, how they are controlled, and the nature of the interaction between people and technology. When done well, the results are brilliant, pleasurable products. When done badly, the products are unusable, leading to great frustration and irritation. Or they might be useable but force us to behave the way the product wishes rather than as we wish. **- Don Norman**

Every company looks for ways to increase profit and reduce expense. Many companies try to cut cost by finding 'cheap' way to present information. What's the outcome ? Bad design baffles, confuses, distracts, dissuades, frustrates. Your prospect moves on to your competitor. First impression is the last impression. Today, a potential customer's first experience with your business is often your site or app. If that first impression isn't favorable in the first 5 seconds, that prospect is gone, probably never to return thus impacting any sales that would have come your way.

Companies focusing their time, energy and dollars on good design reap major rewards. Over a decade ago, the Design Management Institute (DMI) and Motiv Strategies analyzed the performance of US companies incorporating design as an integral part of their business strategy. The resulting Design Value Index tracked the value of 16 publicly held companies that met specific design management criteria and **monitored the impact of investment in good design** on their stock value, relative to the overall S&P Index. The result? Design-led companies maintained significant stock market advantage, **outperforming the S&P by over 228%** for three straight years.

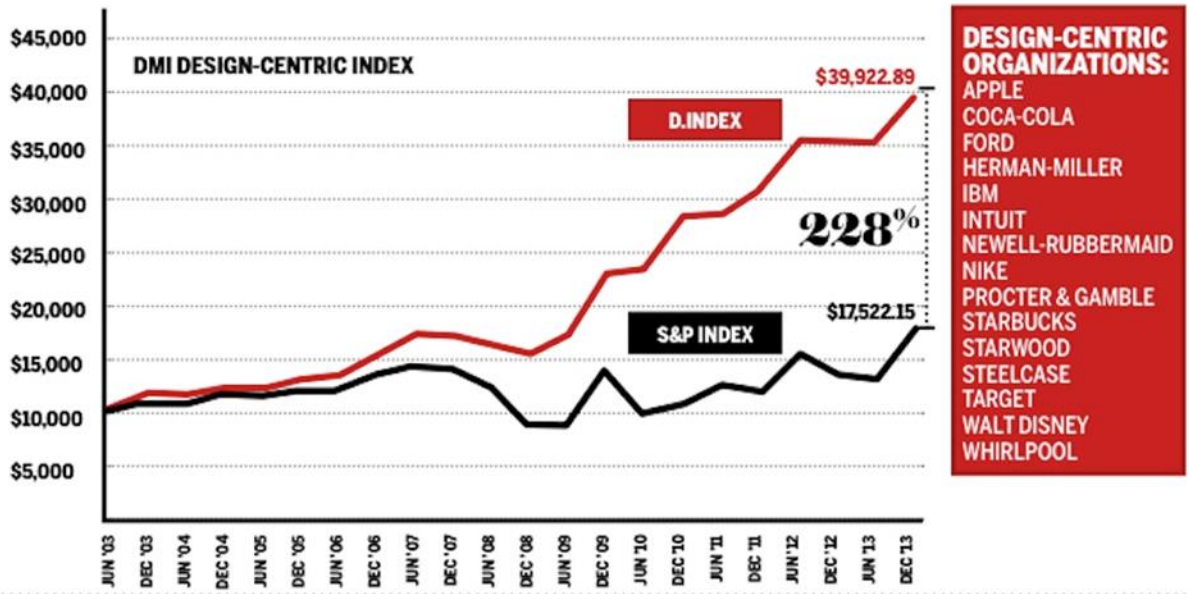


Image Credit: Design Management Institute (dmi.org)

Examples

1 – This is a local train station in a city in India. It's so difficult for children, ladies, and elderly to get on and off from the train. Reduce the gap between platform and train. The level of platform and train should be the same.

Woman from Dombivli falls from train, dies

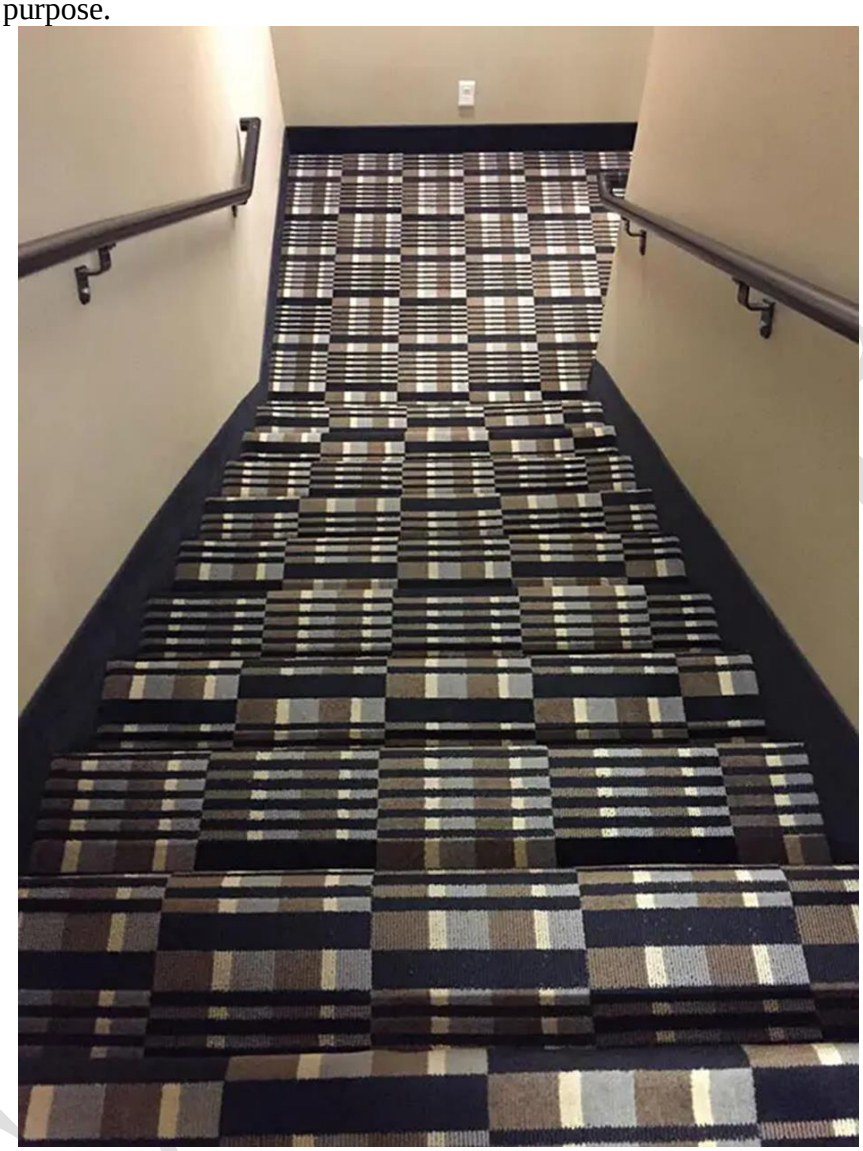
on July 23, 2019 *in* Mumbai

A 30-year-old Dombivli woman fell from an overcrowded local train between Kopar and Diva railway stations and died on Monday morning.Savita Naik used to reside with her parents and brother, while one sister is married.

Image Credit: Times of India, Nov 2019

2 – Sometimes, human beings make such obvious errors that casual observers cannot believe they didn't notice the design flaws from the get-go.

3 - These dizzying steps may trip someone up at some point. Probably not a good design for insurance purpose.



4 – What's wrong with this compass?

Good design is invisible. Good design is actually a lot harder to notice than poor design, in part because good design fits our needs so well that the design is invisible.

Examples

1 – This calorie counter tool is just brilliant. After I enter my weight and fitness goals, the app automatically calculates how much calories I need per day to reach that goal. Then, every time I enter a meal, the app calculates the calories and deducts them from my total number to keep me focused and on track. Also, when I enter a certain exercise that I did, it balances back the calories count by removing burnt calories based on the exercise type and duration.

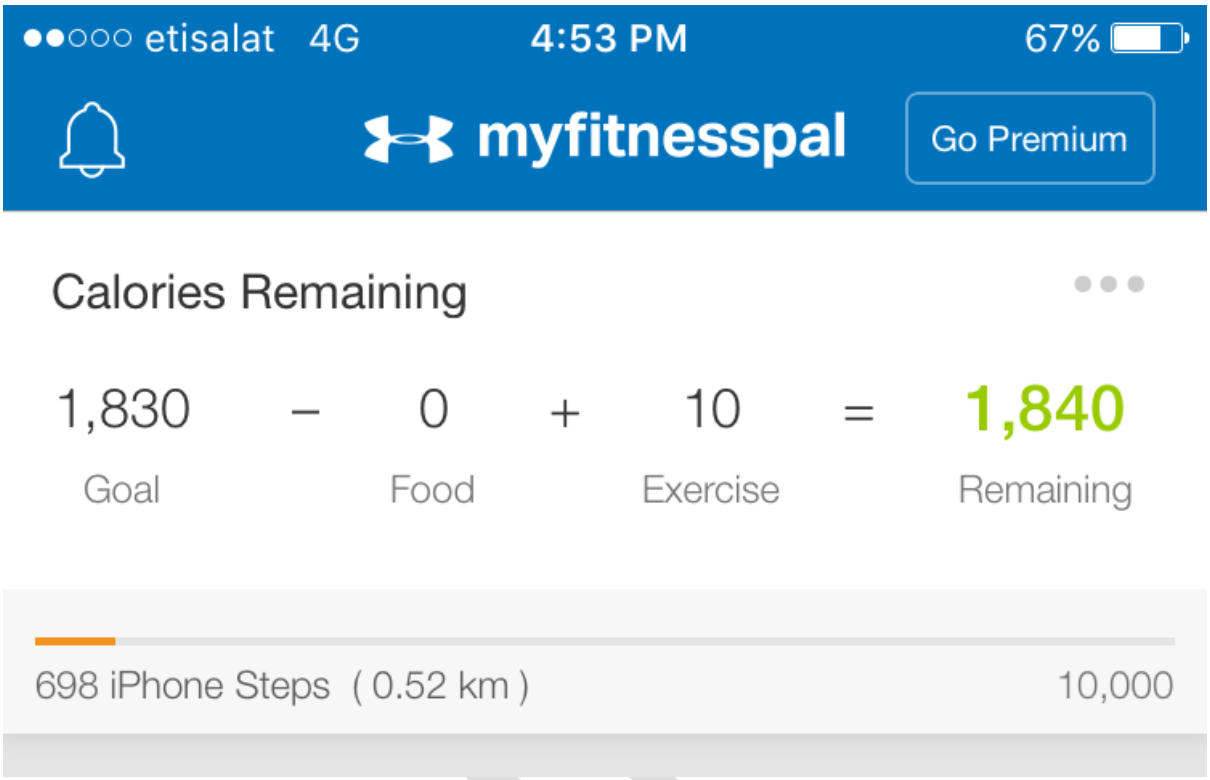
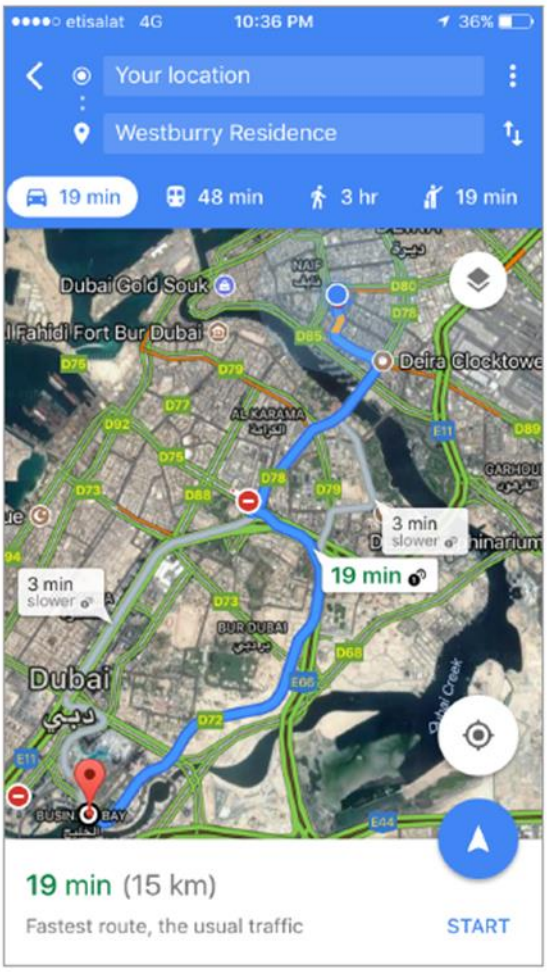
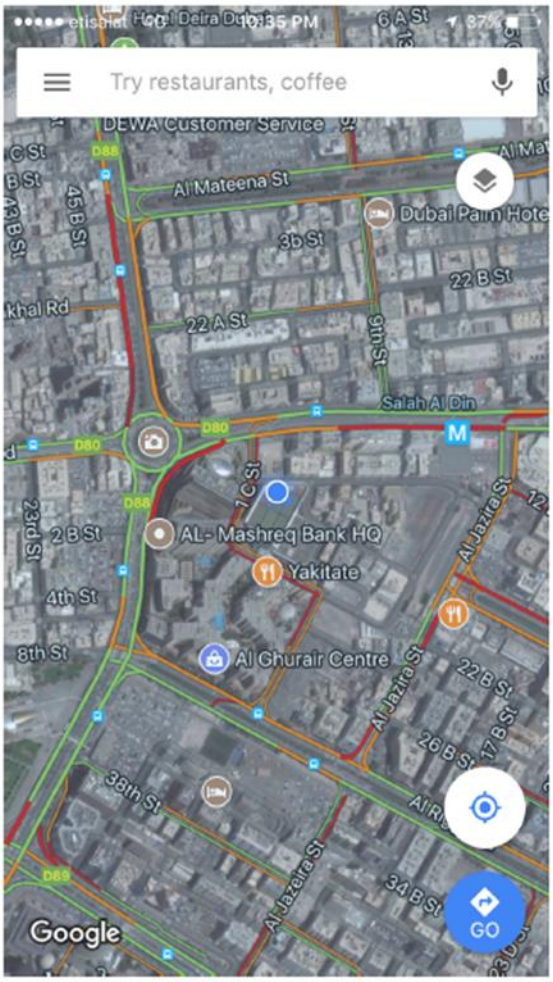


Image Credit: myfitnesspal app

2 - Visibility of route status and traffic. An important aspect when going to a place, is to know the time remaining to reach that destination. The app calculates the time remaining and based on the mode of transport selected and traffic situation, it predicts the estimated time of arrival (ETA). **Make it simple. Make it inviting to look at.**



Trip Timing



Traffic Status

3 – Infographic. Too much of text gets really boring. The graphical presentation of infographics is one of the most sought after designs today. **Make it simple. Make it fun to read.**

How design enabled Apple's turnaround in 1997 – 600+% jump in share price in 3 years. Industrial design was the leverage of Steve Jobs' strategy to turn Apple around in 1997. After the launch of iMac, its share price rose from <$5 in 1997 to $12+ in 1998 to $35+ in 2000, a 600+% jump in ~3 years. From design and business perspective, iMac was the first of many products that turned industrial design into reality and made almost the same impact as the original Macintosh did in 1984. Read more about this story here.

What has most value ? If you see hell break lose – customer resentment and complaints on site, app, social media, inactive or poor engagement, these hard to miss alarming metrics are creating noise and quantifying bad design.

Good design drives **long-term** user engagement often resulting in sales and revenue. Good design is actually a lot harder to notice than poor design, in part because good design fits our needs so well that the design is invisible.

The question shifts from 'What can design do for me?' to 'What do I stand to lose in the absence of good design?' **Play the long game.**

How do you drive innovation at your organization ? How do you evaluate bad versus good design ?

Chapter Two : How design enabled Apple's turnaround in 1997 – 600%+ jump in share price in 3 years

How Apple applied the principles of good design iteratively to iMac and other products delivering massive return on investment ? Aesthetics is leverage. The aesthetic-usability effect refers to users' tendency to perceive attractive products as more usable. People tend to believe that things that look better will work better. Apple's massive success in 1997 – a 600+% jump in share price in ~3 years - is an excellent example of the competitive advantage of paying attention to aesthetics. The design that led to success was in styling and bordering the iMac. All changes were to the external appearance on the front side of the glass than internal look, feel or behavior. Apple did not redefine computing, it simply redefined how the computer looked like.

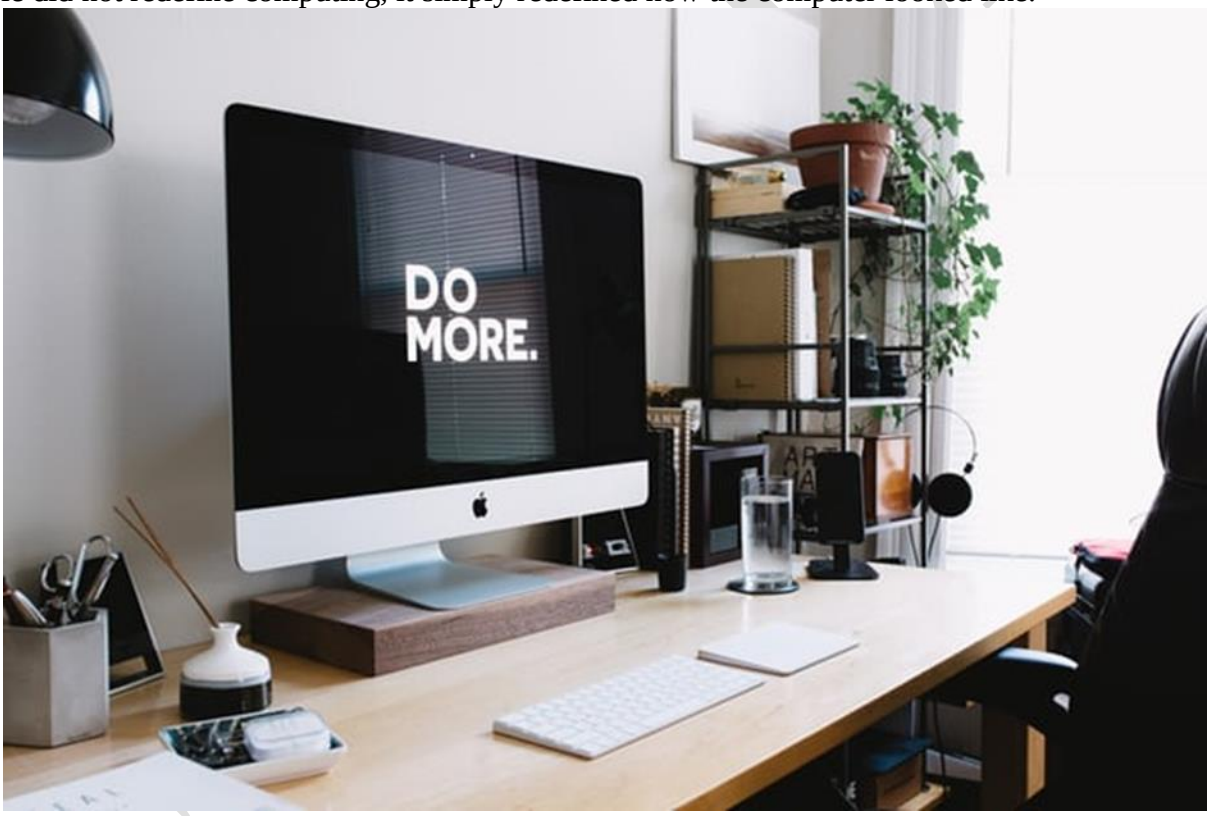


Image Credit: https://unsplash.com/@carlheyerdahl

Industrial design was instrumental in reviving Apple's fortune. In 1996, Apple was in trouble. Its market share was falling, and its share price was at below $5, 12 year low. Second quarter results in 1996 reported Apple losing $700+ million.
In December 1996, Apple bought NeXT Computer. The deal closed at $427 million. Apple got two things with this deal – foundation for the next generation operating system and Steve Jobs. Steve Jobs was back at Apple.

On his second day of the job, Steve met with top analysts and journalists to explain his plan to turn Apple around. Steve believed Apple lost ground in the market because it tried to be everything to everybody. Steve emphasized getting back to meeting the needs of Apple's core customers. **Industrial design was at the core of this strategy to turn around the company.**
In 1998, Apple began shipping iMac. iMac was an immediate success in the market and enabled Apple's turnaround story. From design and business perspective, iMac was the first of many products that turned industrial design into reality and made almost the same impact as the original Macintosh did in 1984. Share price rose from below $5 in 1997 to $12+ in 1998 to $35+ in 2000, a **600+% jump in ~3 years**.

Key Learnings

- Industrial design saved Apple. The share price of Apple started to climb after the launch of initial iMac. Designing iMac and successive products was done with existing team. The company was largely saved by existing team. Good design is a language, not a style – Massimo Vignelli. Apple put industrial design at its forefront by applying its principles repeatedly and iteratively to successive versions of iMac and other products. Aesthetics is leverage. The aesthetic-usability effect refers to users' tendency to perceive attractive products as more usable. People tend to believe that things that look better will work better. Apple's success is an excellent example of the competitive advantage of paying attention to aesthetics.
- Innovation was constant, rapid and iterative. The iteration of design was done from concept to manufacturing to launch.
- The design language of the product kept evolving. The product is built, tested and reviewed, then the design team improves on it and it's built all over again. This cycle takes at least 4-6 weeks at a time and may be run many times over a product's development lifecycle.
- This is a very costly approach, but it is one reason that Apple has a reputation for quality. The more you invest in design including user research and rapid prototyping with the goal of improving usability and user experience, the more likely you are to build incredible market transforming products.
- The design that led to success was in styling and bordering the iMac
    - All changes were to the external appearance on the front side of the glass than internal look, feel or behavior
    - Apple did not redefine computing, it simply redefined how the computer looked like
- Executive vision was key to the success of this strategy. If you do not have the vision, will and power at the highest level, the talent is almost certain to remain wasted and frustrated.
    - Giving designers the liberty to design, innovate and make sure that the product they turn out fulfill their customer's visions

    - Giving design team an independent reporting structure rolling upto Apple executive team
- There were failures along the way, but applying the learnings from failures was key to the success
    - If Steve Jobs had played it safe and not risked failure, he would have never succeeded the way he did
    - Risk can be mitigated by having the right tools, right training, right technique, right partners, so on and so forth, but risk can never be eliminated

Industry adopts design at its core

Many other companies have included design at the core of their organizational strategy. This includes Amazon, Google, Facebook, Microsoft, Spotify, Medium, IKEA, Lego and others. Google adopts Material Design, a visual language that synthesizes the classic principles of good design with the innovation of technology and science. Facebook supports a design process that is super free, intense and fast paced.

What has most value

- Executive vision that focuses on core customers
- Culture that supports rapid experimentation
- Iterative learning to design solutions – better, cheaper, faster

What is at the heart of your organization? How does your organization drive innovation?

Chapter Three: How do you design something really well

To design something well, you have to really grok what it's all about. User Experience (UX) design is all the 'behind the scenes' work that goes into creating an app, site, software, service. UI design stands for User Interface design, which is the visual or graphical side of design. UI is the IQ (Intelligent Quotient) of design, UX is the EQ (Emotional Quotient) of design. There's tremendous business value in investing in a great UX. Industry research shows >30% improvement in productivity, usage, satisfaction, loyalty, and revenue.

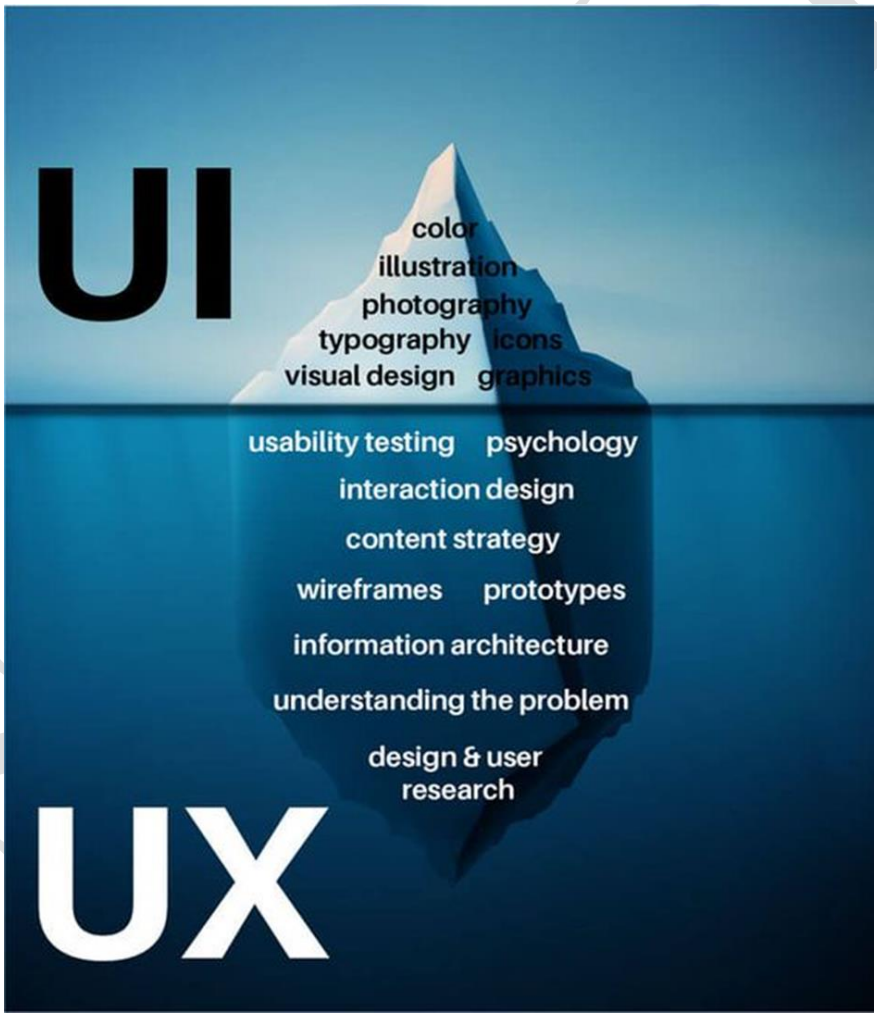


Image Credit: openclassrooms

Design is a funny word. Some people think design means how it looks. But, of course, if you dig deeper, it's really how it works. To design something really well, you have to 'get it'. You have to really grok [understand] what it's all about. - **Steve Jobs**

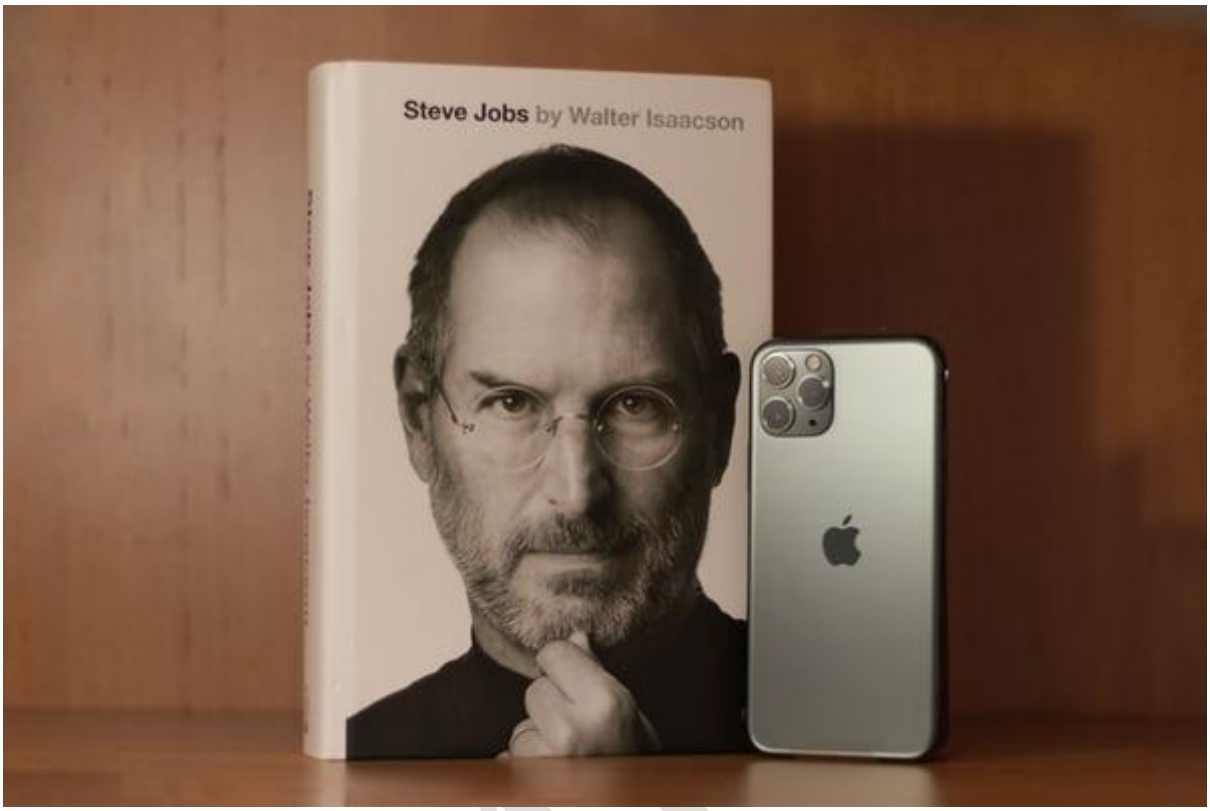


Image Credit: https://unsplash.com/@applefanboy

UX design is **User Experience design**. It's all the 'behind the scenes' work that goes into creating an app, site, software, service including -

- User research
- Design research
- Information architecture
- Industrial design
- Interaction design
- Experience design
- UI design
- Content strategy
- Rapid prototyping
- Rapid iteration
- Usability testing
- And more

Design is concerned with how things work, how they are controlled and the nature of the interaction between people and technology. Make technology easy to use. User experience (UX) designers make technology easier and more enjoyable to use. They create products and interfaces that are useful, usable, accessible to users.

Focus on understanding the habits, behaviors, motivations, emotions of the users. Understand deeply the problem and who you're designing for. This helps you prototype and iterate on solutions. You're not practicing UX design unless you're talking to actual users! Talk

early, talk often. The later in the process that a mistake is detected, the more expensive it is to fix.

- **Industrial design** is the professional service of creating and developing concepts and specifications that optimize the function, value and appearance of products and systems for the mutual benefit of both user and manufacturer (**Source**: Industrial Design Society of America's site)
- **Interaction design** focuses on how people interact with technology. The goal is to enhance people's understanding of what can be done, what is happening, what has just occurred. Interaction design draws upon the principles of psychology, design, art and emotion to ensure a positive, enjoyable experience.
- **Experience design** is the practice of designing products, processes, services, events and environments with a focus placed on the quality and enjoyment of the total experience.

UI design stands for User Interface design, which is the visual or graphical side of design. Some UX designers will also do some UI (UI & UX), but other UX designers will only go as far as research and wireframes. What's the difference between UI and UX design ? UI design is an integral part of UX design.

User Centered Design (UCD)

Design thinking is a powerful process of problem identification and solving that begins with understanding unmet customer needs. From that insight emerges a process for innovation that encompasses concept development, applied creativity, prototyping, experimentation. When design thinking approach is applied to business, the success rate for innovation improves substantially.

UCD is a development methodology

Use this methodology to create innovative solutions working collaboratively with your users. User understanding is about researching and identifying your primary users, meeting with them, observing them to understand their requirements (stated and unstated), goals, challenges and constraints. This is an important step that differentiates UCD from traditional waterfall development methodology.

UCD is interdisciplinary

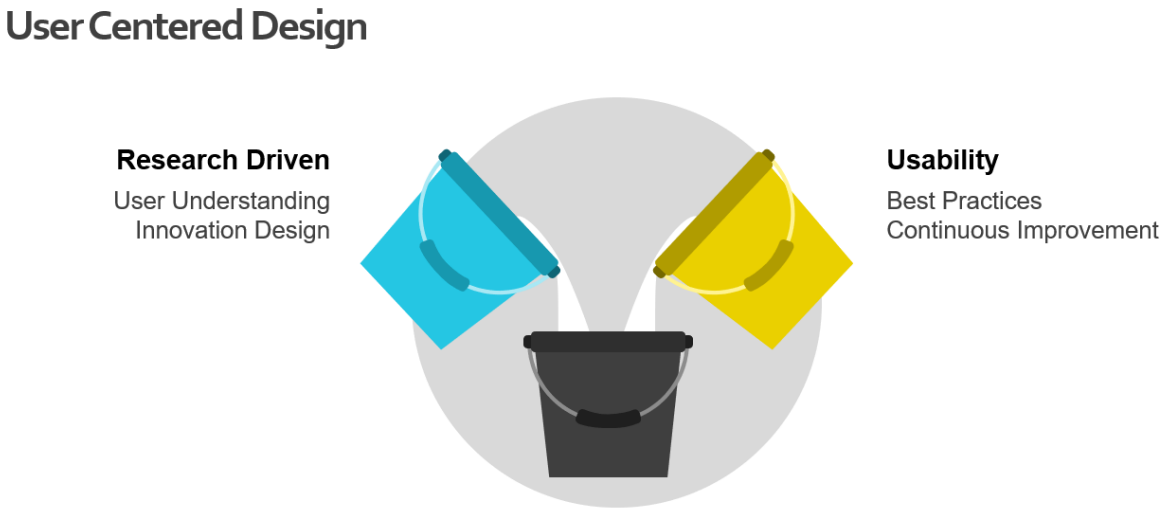
This includes end users, program managers, developers, testers and business stakeholders. Validate your design by developing prototypes, get early feedback from the users and improve the design based on the feedback.

UCD is an iterative process

You design, test, fail, try again. It's about building the optimal solution, not just building it optimal. Come up with creative solutions that your users will embrace. Create, inspire, support compelling and effective experiences through deep research driven user understanding and innovative design, best practices and continuous improvement in quality in use.

UCD empowers innovation

Typically, startups to enterprises spend all resources in development. However, they learn later that customers do not need some features. This spend could have been better focused on leveraging UCD principles. Companies spend enormous amount in marketing, but very little in understanding their users, what's working and what's not working for them. UCD empowers creativity and innovation through rapid iteration. Add a drop of UCD and see for yourself. The heart of UCD occurs during requirements and design.



Design Innovation Process

UCD arrives at solutions that are viable, feasible, desirable

Business Model

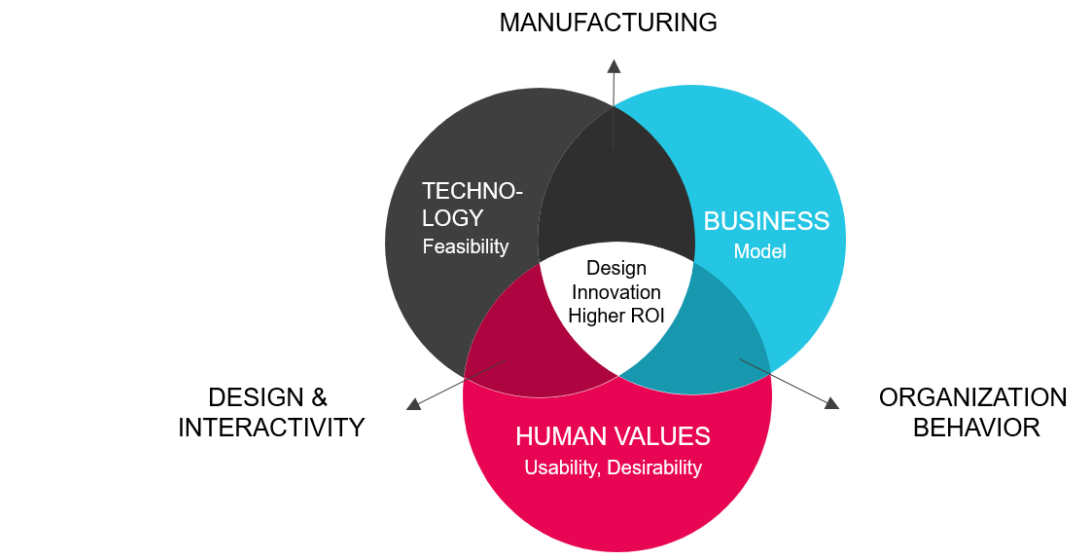
"What's viable?" Goals and requirements defined by the business which sets the foundation for the design of the application

Technology

"What's feasible?" Proposed technologies (Web, mobile, SharePoint, etc.) considered for development of the application

User Experience

"What's desirable?" Overall experience and satisfaction that a user has when using the application



UCD and Usability

UCD is a development process you use to develop innovative solutions that help your users accomplish their tasks quickly and easily.

Usability is a quality indicator of the output delivered by the UCD process. It refers to the degree to which solutions are easy to use, efficient, satisfying to users.

When it comes to usability, users say Don't Make Me Think.

Don't Make Me Think – Steve Krug

A classic. This book is your go-to source for anything on usability. Usability is a big part of UX, making this a great book to help you as a UX professional. Steve Krug states that good design is design where you do not have to think about how you should interact with the design. Good design makes it easy for you to complete your tasks.

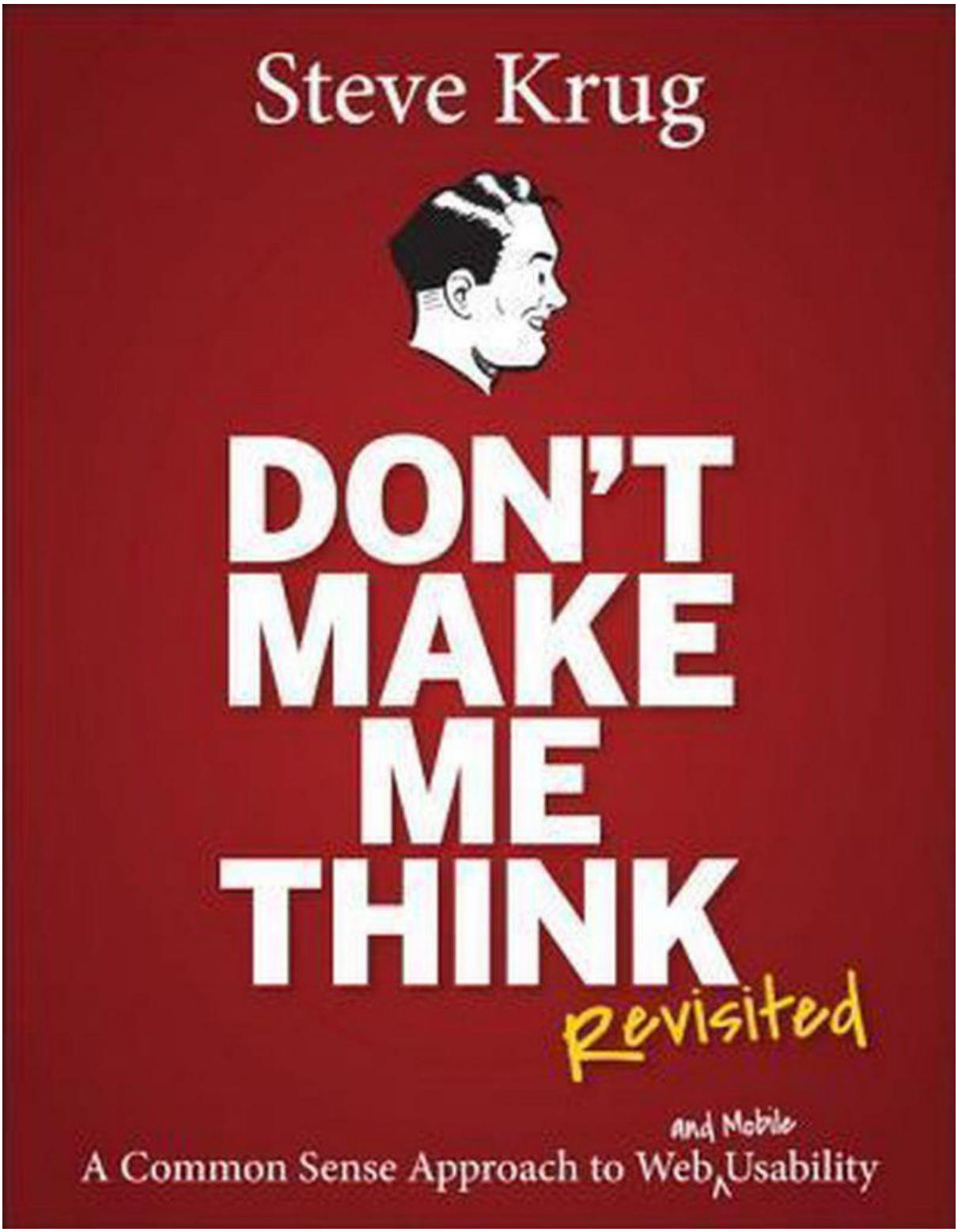
Revisiting 7 principles from Steve Krug's common sense approach to Web and mobile usability -

- Your goal should be for each page or screen to be self-evident, so that just by looking at it the average user can say '**I get it**'
- Graphical user interfaces have long been built on principles of shifting focus - picking up a tool, opening and closing a window, etc. - but they still leave us staring at a cluttered screen. If something requires a large investment of time—or looks like it will—it's less likely to be used.
- Get rid of half of the words on each page, then get rid of half of what's left. Make it simple. Make it memorable. Make it inviting to look at. Make it fun to read.
- As a user, I should never have to devote a millisecond of thought to whether things are clickable — or not
- The main thing you need to know about instructions is that no one is going to read them
- Occasionally, time spent reinventing the wheel results in a revolutionary new rolling device. But usually it just amounts to time spent reinventing the wheel.

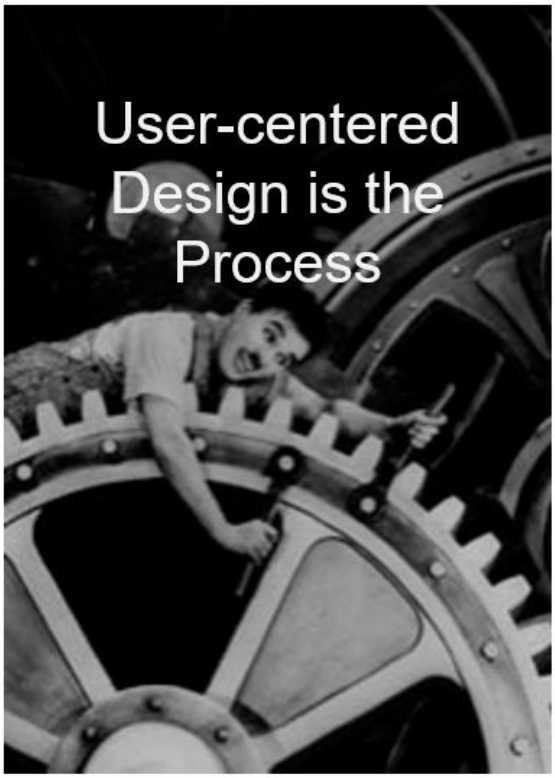
- The only way to find out if it really works is to test it

Other factors to keep in mind with respect to usability –

- The aesthetic-usability effect refers to users' tendency to perceive attractive products as more usable. People tend to believe that things that look better will work better. Apple's success is an excellent example of the competitive advantage of paying attention to aesthetics.
- A mental model is what the user believes about the system at hand. This model is based on belief, not facts. Individual users each have their own mental model. Understanding the concept of mental models can help you make sense of usability problems in your design. When you see people make mistakes on your site, the reason is often because they've formed an erroneous mental model.
- Consider adding a signature element. The signature element of iPod's design and user interface is the scroll wheel. Yet, for usability and cost reasons, it has gone through four distinct generations in the short life of the product. What is interesting is that the industrial design (ID) team, led by Jonathan Ive, has been able to accomplish this, and still preserve the essence of design language.



- If users accomplish their tasks in minimum steps without the need for additional help or training, that's good usability
- If users feel excited to use the solution, that's good usability
- If the solution does not break or errors, that's good usability

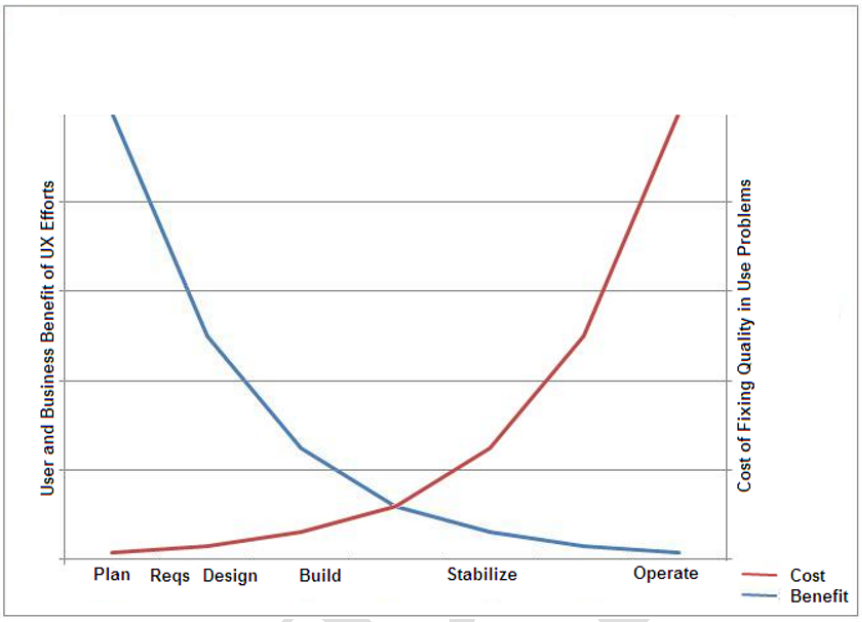


1:10:100 ratio

The cost of fixing usability issues reduces by leveraging UCD methodology. This is achieved by validating design prototypes early in the cycle and improving the design based on feedback.

Usability aware organizations follow the rule of thumb that once in development, it costs roughly 10 times as much as fixing the same problem in design. Once the system is released, it costs 100 times as much as fixing it in design. (**Source**: Book Cost Justifying Usability)

Cost / Benefit Analysis



There's tremendous business value in enabling great user experience. Industry research shows >30% improvement in productivity, usage, satisfaction, loyalty, and revenue.

Categories of Benefit

- Improved Business Effectiveness
- Faster realized ROI- productivity
- Improved NSAT/CPE and Loyalty
- Stronger brand association

Cost reduction

- For training and support
- For development cost through design reuse
- Reduction in rework and post-production fixes

Increased Customer, Partner and Employee Experience

- Improved ease of experience integration
- Focus on enhancements and new products

What has most value

Computer shouldn't be unusable. You don't need to know how to work a telephone switch to make a phone call, or how to use Hoover Dam to take a shower, or how to work a nuclear-power plant to turn on the lights.

Usability is a big part of UX. Good design is design where you do not have to think about how you should interact with the design. Good design makes it easy for you to complete your tasks. Learn more about what you stand to lose in the absence of good design. Learn more about how good design enabled Apple's turnaround story in 1997.

How do you engage with your users ? How do you measure if the products and services meet your users' stated and unstated needs ?

About Ramesh Chandak

I am a graduate with Fellow in Advanced Engineering from MIT (Cambridge, USA), Master's in Computer Engineering from Boston University (USA), Certificate in HCI from IIT Mumbai, Certificate in Global CIO Program from ISB Hyderabad.

A seasoned thought leader with 25+ years of global industry experience. In US, I worked for GTE Laboratories (now Verizon), CyberPuppy Software (start-up), World Bank, Bank of America. In India, I worked for Microsoft.

I have co-authored 16 books on technical topics including 3 best sellers with noted authorities in the industry (Oracle8 Bible, IIS Exam Cram, IIS Exam Prep) and co-edited another 16 books on technical topics. Do visit my blog https://www.digitalgarage1.com.

I have been an invited speaker at academia institutes across India, including IIT, BITS, IIIT, NIT, IIM, ISB. I mentored setting up Microsoft Innovation Centre (MIC) at Sri Aurobindo Institute of Technology (SAIT) in Indore. I have been an invited judge for Microsoft Imagine Cup worldwide online competition for past 4 consecutive years. I have won 27 awards at Microsoft and was member of Microsoft team at Windows 8 AppFest held in Bengaluru on 21-22 Sep 2012 that set a Guinness World Record.

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