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UNIT-1

FOUNDATIONS OF DESIGN

UNIT I FOUNDATIONS OF DESIGN

UI vs. UX Design - Core Stages of Design Thinking - Divergent and Convergent Thinking - Brainstorming and Game storming - Observational Empathy

UI Vs. UX DESIGN:

UX vs UI: what's the difference?

"UX design" stands for "User Experience design." UX teams study how users interact with a product or service to understand the users' needs. These insights allow designers to create an intuitive, efficient product that people will actually want to use.

"UI" is short for "User Interface." UI focuses on the screens, icons, buttons, visual elements and interfaces in a user experience.

What is UX design?

UX designers aim to create products with relevant, meaningful, usable and pleasurable experiences. They look at a product holistically and focus on meeting the users' needs. UX designers use a process called "user-centered design." The practice of UX design ensures that a product is easy to use and enjoyable. UX design practices could even make that experience pleasurable.

Interior designers and architects create physical spaces that are comfortable and easy to navigate; UX designers do the same for digital spaces. To make the best user experience, designers consider the context in which users will use the product (for instance, do they use it while on the move). They also design around the device the product appears on or what time of day the product gets the most usage.

Accessibility, information hierarchy and navigation flows are part of UX and require frequent collaboration with the UI designers to ensure the product works for the most users possible. The goal is to reduce "friction"—a term for unnecessary difficulty or stress when using a product.

What is UI design?

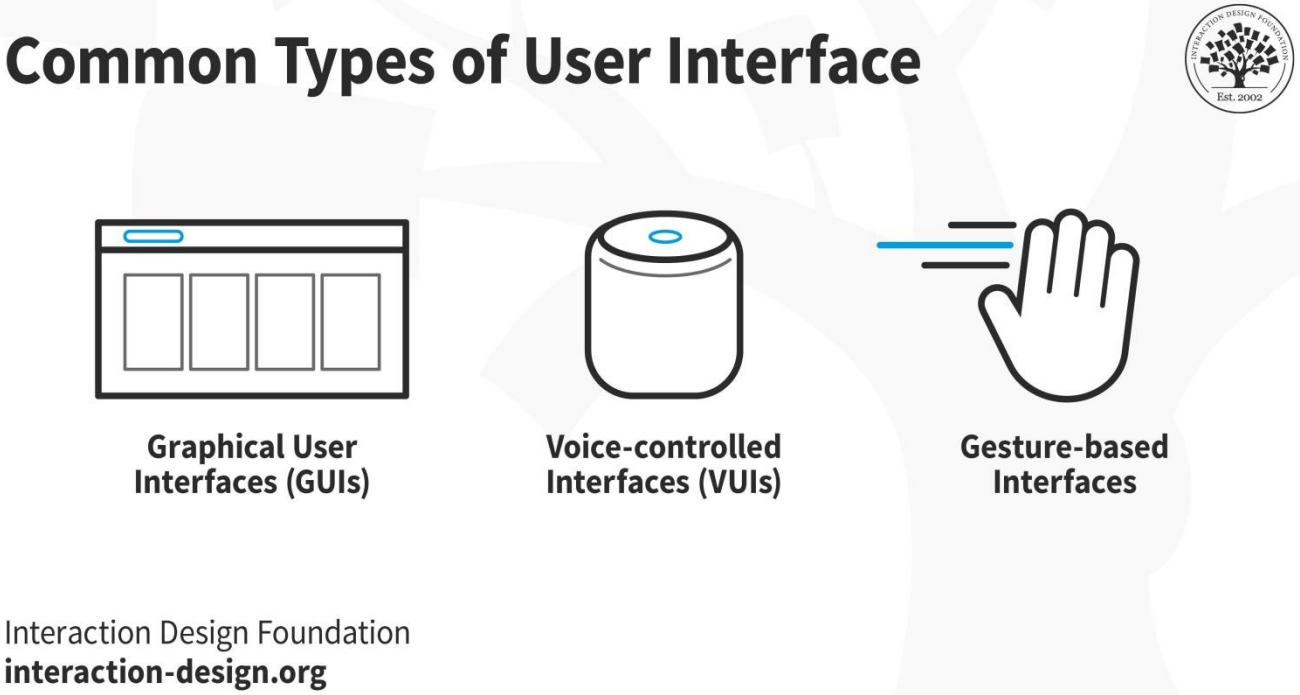
UI designers build interfaces for digital products or services centered on aesthetics and utility.

UI is more specialized than UX design because it exclusively focuses on the elements that users directly interact with, such as buttons and icons.

While UI elements tend to be visual, there are other types of UI, too—for example, voice- and gesture-based interfaces.

There's often a misconception that UI design is virtually the same as graphic design.

While there are similarities and they apply some of the same skills, UI designers create interactive visual elements (buttons, screen animations, layouts), and graphic designers make static elements (logos, header images). A user experience contains several user interfaces that create a whole product.



User interfaces are the most tangible aspects of a user's experience. It UI right, and people can better navigate a product that is appealing and intuitive.

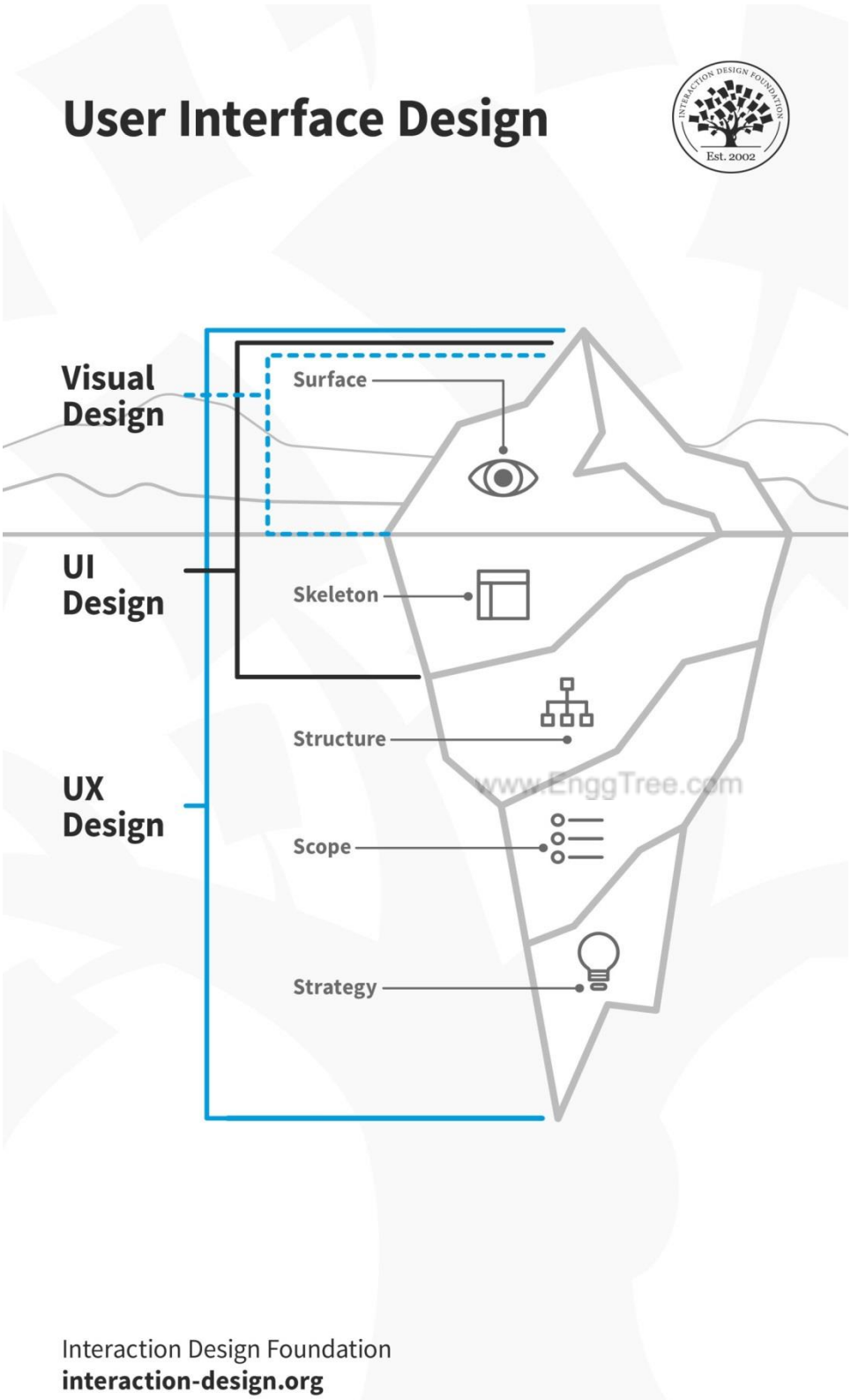
Examples of UX vs UI

User experience is a user's overarching, all-embracing, holistic experience. It encompasses everything the user sees and feels, including the problem the product is trying to solve and where a product is used. User interface refers only to the screen, buttons or other things that make up the interface.

Example:

From the moment you step into a grocery store to the moment you walk out with your groceries, you're in the store's user experience. Everything you see is designed with purpose, from the aisle size to the organization of the shelves, even the temperature. All of this forms the user experience. If you've gone shopping at your usual store, but instead of paying via a cashier, you opt for self-checkout, the interface you use to ring up your items and pay is part of the user interface.

In summary, UX includes UI, and UI is part of a user experience.



Like an iceberg, visual design is only the surface of a user experience. Underneath, there is much more, including a skeleton, structure, scope and strategy. These layers influence each other, so are by no means

independent. Decisions taken on one plane can affect other layers. New issues or opportunities could arise, which might impact the experience. For example, if the team encounters technical challenges or budgetary constraints during development, they might have to revisit some design decisions.

If you have the store's app on your phone or visit its website, that is part of the user experience. To fully enjoy that experience, the user interacts with the interface.

UX design decides what features are going to be in the app.
Will it have a loyalty program where you gain points for each purchase?
Will the user be able to track the points on the app?
Perhaps the app allows you to shop online or see the current specials on offer—all of that is part of the user experience.
However, the typeface, layout, icons, spacing and visual style are all decided by user interface design.

UX is more abstract. It incorporates a user's environment, mood and context.
UI, on the other hand, is more tangible—you directly interact with the UI.

Differences Between UX And UI Design:

The table below shows the most significant differences between UX and UI design:

UX Design	UI Design
Focuses on the holistic experience of the user	Focuses on the specific visual touch points of the user
Centers on strategy, structure and interaction design	Centers on surface-level aspects of design, including visuals
Involves studying the user's journey and designing information architecture	Involves designing the tangible elements of the experience such as visual style, e.g., color palettes, typography and layout
Outputs include personas, user journey maps, wireframes, prototypes	Outputs include mockups, high-fidelity layouts, animations and imagery
The goal of UX design is to identify and solve user problems.	The goal of UI is to create attractive, interactive and intuitive interfaces.

Generally, UX designers handle the initial steps in the product development process, followed by UI. The UX designer maps out the skeleton of a user journey. Then the UI designer creates the visual and interactive elements.

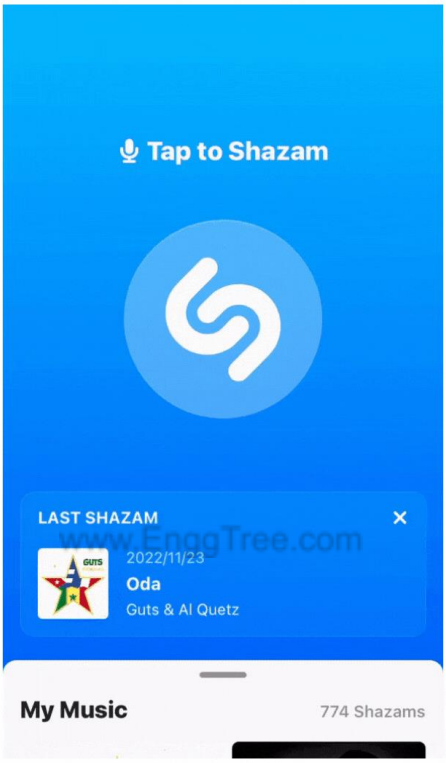
UX and UI Design: How Do They Work Together?

UX and UI overlap but are distinct disciplines. UX is the umbrella, and UI falls under it. Both are needed for a product to succeed—if you've got a website with an attractive interface but it's hard to use and navigate (a bad user experience), the website won't succeed. An old-fashioned, unappealing website that's straightforward and easy to use is not as much of an issue, but it can still affect a user's enjoyment of the product. They might prefer a competitor's product, one that's just as usable but much more aesthetically pleasing.

To illustrate how UX and UI work together, let's look at Shazam. Shazam identifies music playing around you. This app solves a real-life problem: how often have you heard a great song on the radio, at a shop or bar

but couldn't identify it? This user experience solves this specific problem. Now you can not only identify the song, but you can also store that song for future reference. Shazam connects to music streaming apps like Apple Music or Spotify and creates a playlist of all the tracks you have 'Shazamed.' The UI is simple and clean because that's what the user requires.

Imagine you've just turned on the radio, and the song that's playing is trailing off, coming to an end—you have just a few seconds to get your phone out. The app caters to this exact issue, as the interface is pared back, with just one large button on the screen. That button is animated to signal to the user to press it, with a line of text saying, "Tap to Shazam."



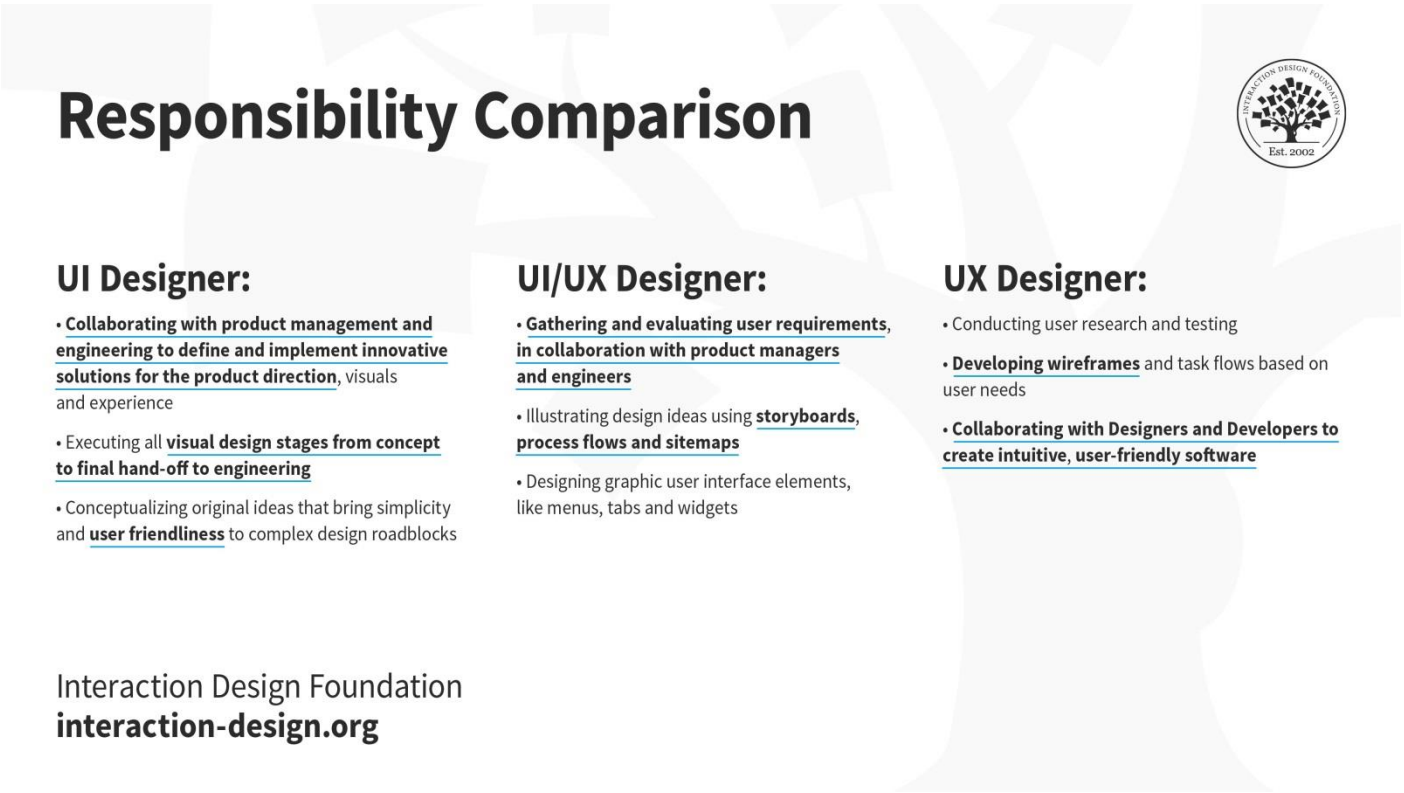
The animation, the icon and the text are all part of UI design and add to the positive user experience. It demonstrates how UX and UI can and should work together.

UX vs UI Design: Which Career Path Should be Taken?

UX and UI are intertwined. That's why so many job ads are for a UX/UI designer. If you're doing UX design, it would be helpful to have some UI skills, especially for projects with low time and resources. In an ideal world, however, the jobs would be separate, and the UX designer and UI designer would collaborate.

Having UX and UI design skills is beneficial, but you don't have to master both. Decide which path you would like to take and focus on building your skills and experience in that area. You'll likely pick up something about the other as they're interconnected. UX and UI design are in high demand and are generally well-paid, so this is the opportune moment to investigate a career in either of these disciplines.

Let's look at what you would be responsible for in each role to put yourself in the best position to decide which path you'd like to take. See our responsibility comparison below.



The soft skills you need for both roles are virtually the same and would be beneficial in both jobs. The hard skills are more distinct for each role. This list is not exhaustive but highlights some of the key soft and hard skills for UX and UI design.

UX Design

Soft skills	Hard skills
Empathy	Prototyping
Communication	User research techniques
Strategy	Analysis
Problem-solving	Wireframing
Collaboration	Information architecture

UI Design

Soft skills	Hard skills
Empathy	Prototyping
Communication	Animation
Creativity	Color theory
Adaptability	Typography
Collaboration	Design patterns

Part of what makes UX and UI design so appealing is there are so many transferable skills. Some of them are:
Graphic design
Project management
Research
Marketing
Customer service

What Does a UX Designer Actually Do?
UX design is varied and multi-disciplinary. Conduct user research through interviews, usability tests and card sorting (among other methods) to discover user behavior, needs and pain points (the users' problems). To develop products, you'll conduct competitor analyses and craft product strategies. Develop content, wireframes and prototypes.

What Does a UI Designer Actually Do?
UI involves in design's visual and creative aspects. In terms of aesthetics, Develop a visual design, including graphics and typography. UI focus on the interactivity of a project. UI ensure layouts work well, look good on various devices, and create animations and UI prototypes. UI designer will work closely with a developer so that your designs come to life exactly as you envisioned them.

CORE STAGES OF DESIGN THINKING

What is design thinking?

Definition:
Design thinking is a non-linear, iterative process that teams use to understand users, challenge assumptions, redefine problems and create innovative solutions to prototype and test.

Design thinking is a methodology which provides a solution-based approach to solving problems. It's extremely useful when used to tackle complex problems that are ill-defined or unknown—because it serves to understand the human needs involved, reframe the problem in human-centric ways, create numerous ideas in brainstorming sessions and adopt a hands-on approach to prototyping and testing.

Why is design thinking so important?

*In user experience (UX) design, it's crucial to develop and refine skills to understand and address rapid changes in users' environments and behaviors

*Design teams use design thinking to tackle ill-defined/unknown problems (aka wicked problems) because they can reframe these in human-centric ways and focus on what's most important for users.

*Of all design processes**,** design thinking is almost certainly the best for "thinking outside the box". With it, teams can do better UX research, prototyping and usability testing to uncover new ways to meet users' needs.

*Design thinking's value as a world-improving, driving force in business (global heavyweights such as Google, Apple and Airbnb have wielded it to notable effect) matches its status as a popular subject at leading international universities.

*With design thinking, teams have the freedom to generate ground-breaking solutions.

*Using it, your team can get behind hard-to-access insights and apply a collection of hands-on methods to help find innovative answers.

In essence, design thinking:

Revolves around a deep interest to understand the people for whom we design products and services.

Helps us observe and develop empathy with the target users.

Enhances our ability to question: in design thinking you question the problem, the assumptions and the implications.

Proves extremely useful when you tackle problems that are ill-defined or unknown.

Involves ongoing experimentation through sketches, prototypes, testing and trials of new concepts and ideas.

Design Thinking Makes You Think Outside the Box

Design thinking can help people do out-of-the-box or outside-the-box thinking. People who use this methodology:

Attempt to develop new ways of thinking—ways that do not abide by the dominant or more common problem-solving methods.

Have the intention to improve products, services and processes. They seek to analyze and understand how users interact with products to investigate the conditions in which they operate.

Ask significant questions and challenge assumptions. One element of outside-the-box / out-of-the-box thinking is to falsify previous assumptions—i.e., make it possible to prove whether they're valid or not.

As you can see, design thinking offers us a means to think outside the box and also dig that bit deeper into problem-solving. It helps us carry out the right kind of research, create prototypes and test our products and

services to uncover new ways to meet our users' needs.

Design Thinking is for Everybody

Design thinking is not only for designers but also for creative employees, freelancers and leaders who seek to infuse it into every level of an organization. This widespread adoption of design thinking will drive the creation of alternative products and services for both business and society.

The process is firmly based on how you can generate a holistic and empathic understanding of the problems people face. Design thinking involves ambiguous, and inherently subjective, concepts such as emotions, needs, motivations and drivers of behavior.

In a solely scientific approach (for example, analyzing data), people are reduced to representative numbers, devoid of emotions. Design thinking, on the other hand, considers both quantitative as well as qualitative dimensions to gain a more complete understanding of user needs. For example, you might observe people performing a task such as shopping for groceries, and you might talk to a few shoppers who feel frustrated with the checkout process at the store (qualitative data). You can also ask them how many times a week they go shopping or feel a certain way at the checkout counter (quantitative data). You can then combine these data points to paint a holistic picture of user pain points, needs and problems.

Design Thinking Has a Scientific Side

Design thinking is both an art and a science. It combines investigations into ambiguous elements of the problem with rational and analytical research—the scientific side in other words. This magical concoction reveals previously unknown parameters and helps to uncover alternative strategies which lead to truly innovative solutions.

The scientific activities analyze how users interact with products, and investigate the conditions in which they operate. They include tasks which:

Research users' needs.

Pool experience from previous projects.

Consider present and future conditions specific to the product.

Test the parameters of the problem.

Test the practical application of alternative problem solutions.

Once you arrive at a number of potential solutions, the selection process is then underpinned by rationality. As a designer, you are encouraged to analyze and falsify these solutions to arrive at the best available option for each problem or obstacle identified during phases of the design process.

With this in mind, it may be more correct to say design thinking is not about thinking outside the box, but on its edge, its corner, its flap, and under its bar code—as Clint Runge put it.

Resetting Our Mental Boxes and Developing a Fresh Mindset

Thinking outside of the box can provide an innovative solution to a sticky problem. However, thinking outside of the box can be a real challenge as we naturally develop patterns of thinking that are modeled on the repetitive activities and commonly accessed knowledge we surround ourselves with.

The Design Thinking Process

Design thinking is essentially a process which moves from problem to solution via some clear intermediate points. The classic approach, as proposed by Herbert A Simon, is offered here:

Definition – where the problem is defined as best as possible prior to solving it
Research – where the designers examine as much data as they feel necessary to be able to fully contribute to the problem solving process
Ideation – where the designer commences creating possible solutions without examining their practicality until a large number of solutions has been proposed. Once this is done, impractical solutions are eliminated or played with until they become practical.
Prototyping – where the best ideas are simulated in some means so that their value can be explored with users
Choosing – where the best idea is selected from the multiple prototypes
Implementing – where that idea is built and delivered as a product
Testing – where the product is tested with the user in order to ensure that it solves the original problem in an effective manner
There are many other design thinking processes outlined in literature – most of which are a truncated version of the above process combining or skipping stages.

The Principles of Design Thinking

Human – all design is of a social nature
Ambiguity – design thinking preserves and embraces ambiguity
Re-design – all design processes are in fact re-design of existing processes
Tangibility – the design process to make something tangible will facilitate communication of that design

Core stages of design thinking:

We focus on the five-stage design thinking model proposed by the hasso plattner institute of design at stanford (the d.school) because they are world-renowned for the way they teach and apply design thinking.

The five stages of design thinking, according to the d.school, are:

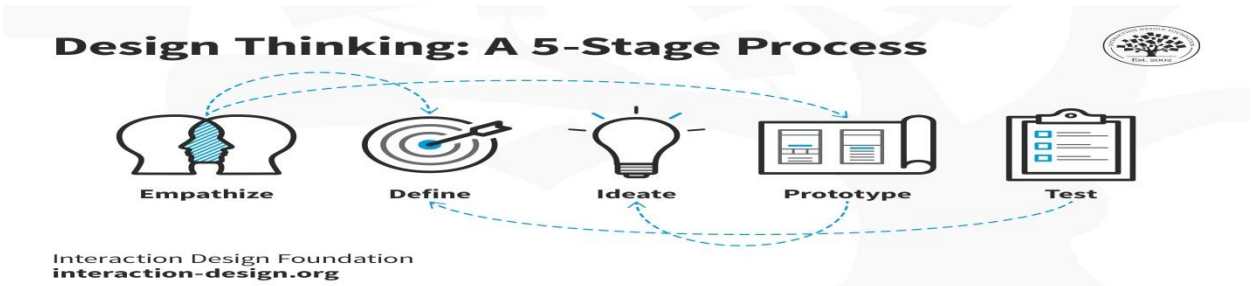
Empathize: research your users' needs.

Define: state your users' needs and problems.

Ideate: challenge assumptions and create ideas.

Prototype: start to create solutions.

Test: try your solutions out.



Design thinking is an iterative and non-linear process that contains five phases: 1. Empathize, 2. Define, 3. Ideate, 4. Prototype and 5. Test.

Stage 1: Empathize—Research Your Users' Needs

Empathize: the first phase of design thinking, where you gain real insight into users and their needs.

The first stage of the design thinking process focuses on user-centric research. It is needed to gain an empathic understanding of the problem you are trying to solve. Consult experts to find out more about the area of concern and conduct observations to engage and empathize with your users. You may also want to immerse yourself in your users' physical environment to gain a deeper, personal understanding of the issues involved—as well as their experiences and motivations. Empathy is crucial to problem solving and a human-centered design process as it allows design thinkers to set aside their own assumptions about the world and gain real insight into users and their needs.

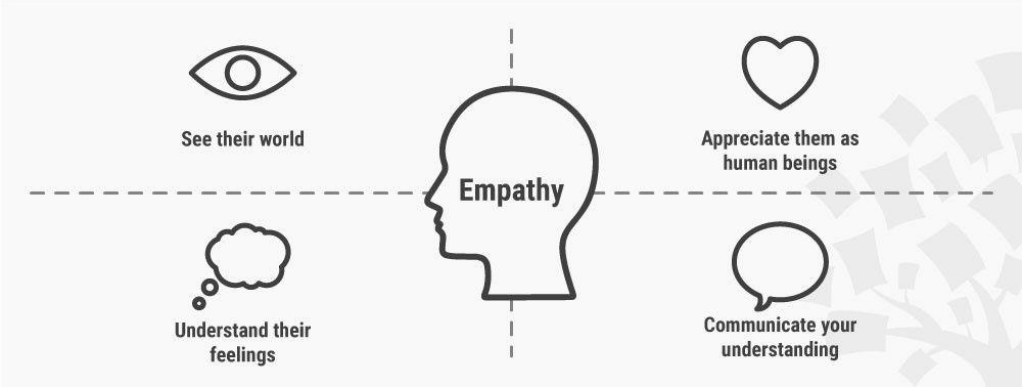
Depending on time constraints, you will gather a substantial amount of information to use during the next stage. The main aim of the Empathize stage is to develop the best possible understanding of your users, their needs and the problems that underlie the development of the product or service you want to create.

Empathize with Real People – Leave Your Assumptions Outside

Empathize is design thinking's first stage for a reason. It's the first step on the road to thoughtfully designed products that prove the designers built with a compassionate eye for their users. Empathy is a naturally occurring characteristic which people have in varying degrees. However, they can improve their ability to empathize as a soft skill. Anyone in a design team will have preconceived ideas about the many situations people find themselves in as users. It's unavoidable – you can't unlearn your life experience. Therefore, you should always adopt a beginner's mindset to be able to view and analyze situations with users objectively.

To empathize is to research. So, you should constantly remind yourself to question everything you observe instead of judging. You should also listen to others open-mindedly rather than focus on points that confirm your biases. Because our biases will naturally creep into how we view the world and the situations we

consider, as designers—or design thinkers—we must catch and overcome these before they distort our research. You must become fully objective before you can start to see through your users' eyes and interpret their viewpoints optimally. They are the experts. You must understand the users' dimensions of use (e.g., tasks) and their feelings (e.g., motivations) before you can work towards delighting them through your design.



How to Empathize to Get the Right Insights
You have a range of options, including:

Observing real users. Ask these questions to shift from concrete observations to abstract motivations:
"What?" – You detail your observations.
"How?" – You analyze how users do things (e.g., with difficulty).
"Why?" – You make educated guesses about the users' emotions and motivations.
Conducting photo- and/or video-based studies in users' natural environments or sessions with the design team or consultants – You record these users while they try to solve an issue you propose to resolve with your design.
Personal photo/video journals – You ask users to record their own experiences with approaching a problem. These may capture their pain points more accurately.
Interviewing users – Your team uses brainstorming to first find the right questions to ask in a generally structured and natural flow. Then, you can directly ask users for their insights in an intimate setting where they can respond earnestly to open-ended questions.
Engaging with extreme users – You find the extreme cases within your userbase to determine the greatest degrees of users' needs, problems and problem-solving methods. You can then see the full scope of problems which typical, non-extreme users might run into. If you can satisfy an extreme user, you can satisfy any user.
Analogous empathy – Your team finds effective analogies to draw parallels between users' problems and problems in other fields. This way, you can get insights you'd otherwise overlook.
Sharing inspiring stories – Your team shares stories about what they have observed so you draw meaning from these and note fascinating details.
Bodystorming – You wear equipment (e.g., goggles, gloves, torso attachments) to gain first-hand experience of your users in their environment.
Empathy maps and customer journey maps – Your team should have at least one of these as a reference point to appreciate the users' perspectives.
Personas to establish accurate portraits/profiles of users who'll interact with your product.
Whichever approaches you take, beware of formulating solutions at this stage. Aim to realistically envision possible scenarios where users experience problems. Empathize is not just a key part of design thinking. It's

also pivotal to user-centered design and user experience (UX) design. When your design team remains aware of your users' realities and passionate about helping real people solve real problems, you'll reap precious insights which you can ultimately translate into products your users will love.

Stage 2: Define—State Your Users' Needs and Problems

Define: the second phase of design thinking, where you define the problem statement in a human-centered manner.

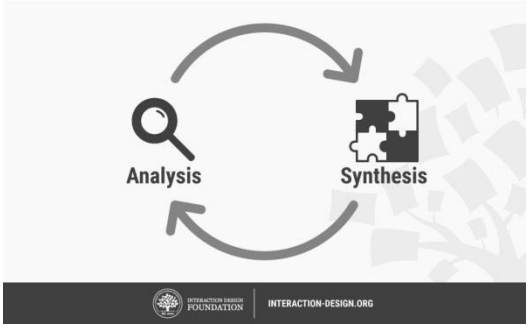
In the Define stage, you will organize the information you have gathered during the Empathize stage. You'll analyze your observations to define the core problems you and your team have identified up to this point. Defining the problem and problem statement must be done in a human-centered manner.

For example, you should not define the problem as your own wish or need of the company: "We need to increase our food-product market share among young teenage girls by 5%."

You should pitch the problem statement from your perception of the users' needs: "Teenage girls need to eat nutritious food in order to thrive, be healthy and grow."

The Define stage will help the design team collect great ideas to establish features, functions and other elements to solve the problem at hand—or, at the very least, allow real users to resolve issues themselves with minimal difficulty. In this stage, you will start to progress to the third stage, the ideation phase, where you ask questions to help you look for solutions: "How might we encourage teenage girls to perform an action that benefits them and also involves your company's food-related product or service?" for instance.

In the Define stage you synthesise your observations about your users from the first stage, the Empathise stage. A great definition of your problem statement will guide you and your team's work and kick start the ideation process (third stage) in the right direction. The five stages are not always sequential — they do not have to follow any specific order and they can often occur in parallel and be repeated iteratively. As such, the stages should be understood as different modes that contribute to a project, rather than sequential steps.



Before we go into what makes a great problem statement, it's useful to first gain an understanding of the relationship between analysis and synthesis that many design thinkers will go through in their projects.
Analysis is about breaking down complex concepts and problems into smaller, easier-to-understand constituents. We do that, for instance, during the first stage of the Design Thinking process, the Empathise stage, when we observe and document details that relate to our users. Synthesis, on the other hand, involves creatively piecing the puzzle together to form whole ideas. This happens during the Define stage when we organise, interpret, and make sense of the data we have gathered to create a problem statement.
What are Problem Statements?
Problem statements are concise descriptions of design problems. Design teams use them to define the current and ideal states, and to freely find user-centered solutions. Then, they use these statements—also called points of view (POVs)—as reference points throughout a project to measure the relevance of ideas they produce.
How to Write a Problem Statement?
Well-constructed, valid and effective problem statements are vital for your design team to navigate the entire design process. Essential to design thinking, problem statements are what teams produce in the Define stage. To find the best solutions, your team must know what the exact problems are—i.e., you first need to define a problem statement.

The goal is to articulate the problem so everyone can see its dimensions and feel inspired to systematically hunt for suitable solutions. When you unite around a problem statement, your team will have a common view of how users see what they must tackle. From there, all your team will know exactly what to look for and what to avoid. Therefore, you should make your problem statements:

Human-centered: Frame problem statements from insights about users and their needs.

Have the right scope:

Broad enough to permit creative freedom, so you don't concentrate too narrowly on specific methods for implementing solutions or describing technical needs; but

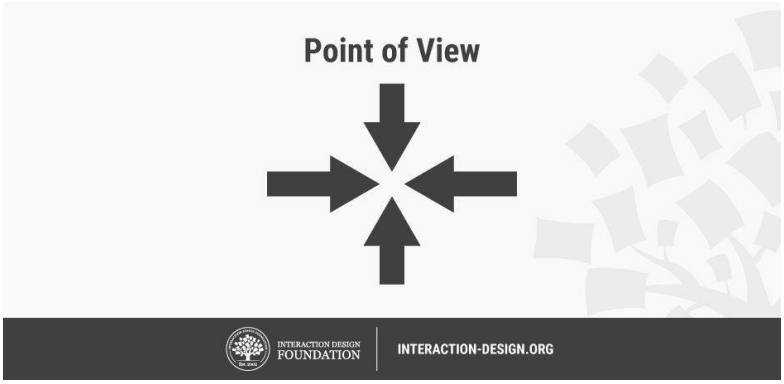
Narrow enough to be practicable, so you can eventually find specific solutions.

Based on an action-oriented verb (e.g., "create" or "adapt").

Fully developed and assumption-free.

Design teams sometimes refer to a problem statement as a "point of view" (POV) because they should word problem statements from the users' perspective and not let bias influence them. Your team will have a POV when it comes up with a narrowly focused definition of the right challenge to pursue in the next stage of the design process.

With an effective POV, your team can approach the right problem in the right way. Therefore, you'll be able to seek the solutions your users want.

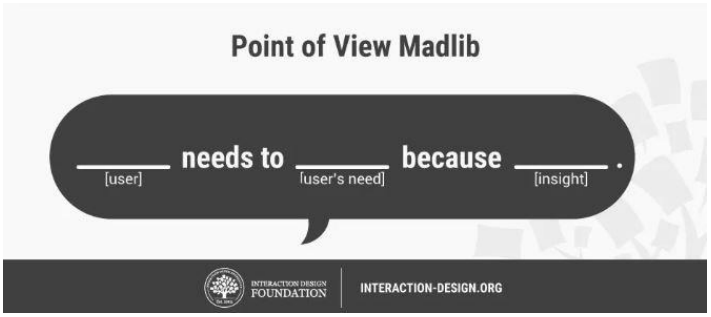


How to Define Problem Statements through a Point of View Madlib

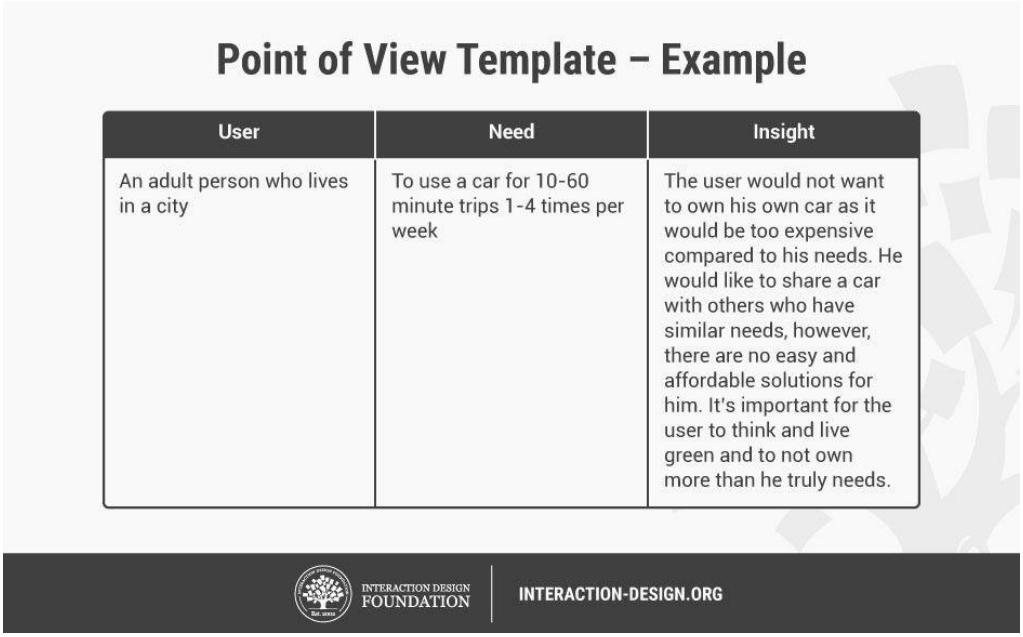
To define a problem statement, your team must first examine recorded observations about users. You must capture your users' exact profile in the problem statement or POV. So, you need to synthesize research results and produce insights that form solid foundations. From these, you can discover what those specific users really require and desire—and therefore ideate effectively.

Teams typically use a POV Madlib to reframe the challenge meaningfully into an actionable problem statement. The POV madlib is a framework you use to place the user, need and insight in the best way. This is the format to follow:

[User… (descriptive)] needs [need … (verb)] because [insight… (compelling).]



You articulate a POV by combining these three elements—user, need, and insight—as an actionable problem statement that will drive the rest of your design work. Find an example below.



With a valid problem statement, your team can explore the framed "why" questions with "how"-oriented ones. That's how you proceed to find potential solutions. You'll know you have a good problem statement if team members:

Feel inspired.

Have the criteria to evaluate ideas.

Can use it to guide innovation efforts.

Can't find a cause or a proposed solution in it (which would otherwise get in the way of proper ideation).

When your team has a good problem statement, everyone can compare ideas, which is vital in brainstorming and other ideation sessions. It also means everyone can keep on the right track. Problem statements are powerful aids because they encourage well-channeled divergent thinking.

Rather than rush toward solutions that look impressive but aren't effective, your team can work imaginatively to find the right ones. Once you've discovered what's causing problems, you can give users the best solutions in designs they like using.

What Makes a Good Problem Statement?
A problem statement is important to a Design Thinking project, because it will guide you and your team and provides a focus on the specific needs that you have uncovered. It also creates a sense of possibility and optimism that allows team members to spark off ideas in the Ideation stage, which is the third and following stage in the Design Thinking process. A good problem statement should thus have the following traits. It should be:

Human-centered. This requires you to frame your problem statement according to specific users, their needs

and the insights that your team has gained in the Empathise phase. The problem statement should be about the people the team is trying to help, rather than focusing on technology, monetary returns or product specifications.

Broad enough for creative freedom. This means that the problem statement should not focus too narrowly on a specific method regarding the implementation of the solution. The problem statement should also not list technical requirements, as this would unnecessarily restrict the team and prevent them from exploring areas that might bring unexpected value and insight to the project.

Narrow enough to make it manageable. On the other hand, a problem statement such as , "Improve the human condition," is too broad and will likely cause team members to easily feel daunted. Problem statements should have sufficient constraints to make the project manageable.

As well as the three traits mentioned above, it also helps to begin the problem statement with a verb, such as "Create", "Define", and "Adapt", to make the problem become more action-oriented.
How to Define a Problem Statement
Methods of interpreting results and findings from the observation oriented Empathise phase include:

Space Saturate and Group and Affinity Diagrams – Clustering and Bundling Ideas and Facts
In space saturate and group, designers collate their observations and findings into one place, to create a collage of experiences, thoughts, insights, and stories. The term 'saturate' describes the way in which the entire team covers or saturates the display with their collective images, notes, observations, data, experiences, interviews, thoughts, insights, and stories in order to create a wall of information to inform the problem-defining process. It will then be possible to draw connections between these individual elements, or nodes, to connect the dots, and to develop new and deeper insights, which help define the problem(s) and develop potential solutions. In other words: go from analysis to synthesis.

When you've defined your design challenge in a POV, you can start to generate ideas to solve your design challenge. You can start using your POV by asking a specific question starting with: "How Might We" or "in what ways might we". How Might We (HMW) questions are questions that have the potential to spark ideation sessions such as brainstorms. They should be broad enough for a wide range of solutions, but narrow enough that specific solutions can be created for them. "How Might We" questions should be based on the observations you've gathered in the Empathise stage of the Design Thinking process.

For example, you have observed that youths tend not to watch TV programs on the TV at home, some questions which can guide and spark your ideation session could be:

How might we make TV more social, so youths feel more engaged?

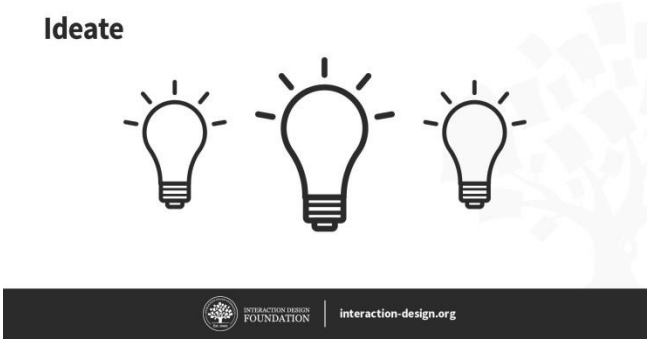
How might we enable TV programs to be watched anywhere, at anytime?

How might we make watching TV at home more exciting?

The HMW questions open up to Ideation sessions where you explore ideas, which can help you solve your design challenge in an innovative way.
Why-How Laddering
For this reason, during the Define stage designers seek to define the problem, and will generally ask why.

Designers will use why to progress to the top of the so-called Why-How Ladder where the ultimate aim is to find out how you can solve one or more problems. Your How Might We questions will help you move from the Define stage and into the next stage in Design Thinking, the Ideation stage, where you start looking for specific innovative solutions. In other words you could say that the Why-How Laddering starts with asking Why to work out How they can solve the specific problem or design challenge.

Stage 3: Ideate—Challenge Assumptions and Create Ideas



Ideate: the third phase of design thinking, where you identify innovative solutions to the problem statement you've created.

During the third stage of the design thinking process, designers are ready to generate ideas. You've grown to understand your users and their needs in the Empathize stage, and you've analyzed your observations in the Define stage to create a user centric problem statement. With this solid background, you and your team members can start to look at the problem from different perspectives and ideate innovative solutions to your problem statement.

There are hundreds of ideation techniques you can use—such as Brainstorm, Brainwrite, Worst Possible Idea and SCAMPER. Brainstorm and Worst Possible Idea techniques are typically used at the start of the ideation stage to stimulate free thinking and expand the problem space. This allows you to generate as many ideas as possible at the start of ideation. You should pick other ideation techniques towards the end of this stage to help you investigate and test your ideas, and choose the best ones to move forward with—either because they seem to solve the problem or provide the elements required to circumvent it.

Ideation Will Help You:

Ask the right questions and innovate.

Step beyond the obvious solutions and therefore increase the innovation potential of your solution.

Bring together perspectives and strengths of team members.

Uncover unexpected areas of innovation.

Create volume and variety in your innovation options.

Get obvious solutions out of your heads, and drive your team beyond them.

Ideation Methods to Spark Innovative Ideas

There are hundreds of ideation methods. Some methods are merely renamed or slightly adapted versions of more foundational techniques. Here you'll get brief overview of some of the best methods:

Brainstorm

Braindump

Brainwrite

Brainwalk

Challenge Assumptions

SCAMPER

Mindmap

Sketch or Sketchstorm

Storyboard

Analogies

Provocation

Movement

Bodystorm

Gamestorming

Cheatstorm

Crowdstorm

Co-Creation Workshops

Prototype

Creative Pause

Active Facilitation

Although many of us may have previously participated in a Brainstorm session, it is not always easy to facilitate a truly fruitful ideation session, which may be the reason why many of us have had negative experiences in the past. However, Ideation sessions can indeed be fun and exciting, but they demand a lot of preparation and team member concentration in order to be fruitful. To sit the team down with a blank piece

of paper and ask them to come up with ideas will likely result in failure. Likewise, to have everyone shout out their own ideas is likely to result in failure.

People need guidance, inspiration and activities, in a physical and cognitive manner, in order to get the process started. Ideation is a creative and concentrated process; those involved should be provided with an environment that facilitates free, open, and the non-judgemental sharing of ideas.

In Ideation sessions, it's important to create the right type of environment to help create a creative work culture with a curious, courageous, and concentrated atmosphere. Instead of using a boardroom with the CEO sitting at the head of the table, Design Thinking and Ideation sessions require a space in which everyone is equal. The Ideation room must have sufficient space for people to feel comfortable, but the atmosphere shouldn't be sterile, and team members shouldn't have to shout in order to be heard. You should also designate someone to take down contributors' ideas and draw/write them on the whiteboard/wall/poster. If the process begins to slow down and people seem to be running into a dead-end, the facilitator should impose constraints, such as: "what if there was no top-level navigation bar?" or "How-might-we go about the task if we were 8 years old?" Alternatively, you might want to set targets, such as filling a brainstorming sheet within ten minutes. To start understanding what it takes to facilitate a successful Ideation session, we'll take a closer look at the best Brainstorming rules.

Ideation Methods to Select Ideas

Once the Ideation session is complete, the ideas must be collected, categorized, refined, and narrowed down, so the team is able to select the best solutions, ideas, and strategies from a shortlist. These methods can help you select the best idea at the end of an Ideation session:

Post-it Voting or Dot Voting.

Four Categories Method

Bingo Selection

Idea Affinity Maps

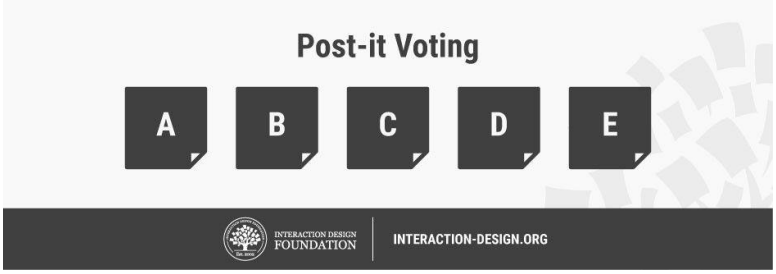
Now Wow How Matrix

Six Thinking Hats

Lean Startup Machine Idea Validation Board

Idea Selection Criteria

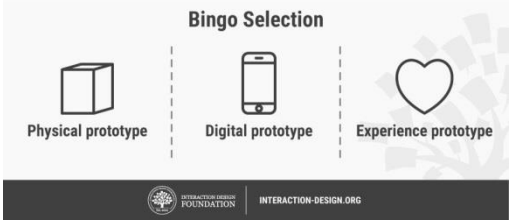
In the following section, we'll provide you with a brief introduction to some of the best methods.



Stage 4: Prototype—Start to Create Solutions

In post-it voting, all members are given a number of votes (three to four should do) in order to choose their favorite ideas. Ideas that are generated in the Ideation sessions are written down on individual post-its, and members can vote by using stickers or a marker to make a dot on the post-it note corresponding to the ideas they like. This process allows every member to have an equal say in choosing from the shortlisted ideas.

The four categories method involves dividing ideas according to their relative abstractness, ranging from the most rational choice to the 'long shot' choice. The four categories are the rational choice, the most likely to delight, the darling, and the long shot. Members then decide upon one or two ideas for each of these categories. This method ensures that the team covers all grounds, from the most practical to those ideas with the most potential to deliver innovative solutions.



Prototype: the fourth phase of design thinking, where you identify the best possible solution.

The design team will now produce a number of inexpensive, scaled down versions of the product (or specific features found within the product) to investigate the key solutions generated in the ideation phase. These prototypes can be shared and tested within the team itself, in other departments or on a small group of people outside the design team.

This is an experimental phase, and the aim is to identify the best possible solution for each of the problems identified during the first three stages. The solutions are implemented within the prototypes and, one by one, they are investigated and then accepted, improved or rejected based on the users' experiences.

By the end of the Prototype stage, the design team will have a better idea of the product's limitations and the problems it faces. They'll also have a clearer view of how real users would behave, think and feel when they interact with the end product.

Types of Prototyping
Prototyping methods are generally divided into two separate categories: low- and high-fidelity prototyping.
Low-Fidelity Prototyping

Low-fidelity prototyping involves the use of basic models or examples of the product being tested. For example, the model might be incomplete and use just a few of the features that will be available in the final design, or it might be constructed using materials not intended for the finished article, such as wood, paper, or metal for a plastic product. Low-fidelity prototypes can either be models that are cheaply and easily made, or simply recounts or visualizations of them.

Examples of low-fidelity prototypes:

Storyboarding.

Sketching (although Bill Buxton, a pioneer of human-computer interaction, argues sketching is not an example of prototyping).

Card sorting.

'Wizard of Oz'.

Pros of Low-Fidelity Prototyping

Quick and inexpensive.

Possible to make instant changes and test new iterations.

Disposable/throw-away.

Enables the designer to gain an overall view of the product using minimal time and effort, as opposed to focusing on the finer details over the course of slow, incremental changes.

Available to all; regardless of ability and experience, we are able to produce rudimentary versions of products in order to test users or canvas the opinions of stakeholders.

Encourages and fosters design thinking.

Cons of Low-Fidelity Prototyping

An inherent lack of realism. Due to the basic and sometimes sketchy nature of low-fi prototypes, the applicability of results generated by tests involving simple early versions of a product may lack validity.

Depending on your product, the production of low-fi prototypes may not be appropriate for your intended users. For instance, if you are developing a product bound by a number of contextual and/or dispositional constraints (i.e., physical characteristics of your user base, such as users with disabilities), then basic versions that do not reflect the nature, appearance, or feel of the finished product may be of scant use; revealing very little of the eventual user experience.

Such prototypes often remove control from the user, as they generally have to interact in basic ways or simply inform an evaluator, demonstrate, or write a blow-by-blow account of how they would use the finished product.

High-Fidelity Prototyping

High-fidelity prototypes are prototypes that look and operate closer to the finished product. For example, a 3D plastic model with movable parts (allowing users to manipulate and interact with a device in the same manner as the final design) is high-fi in comparison to, say, a wooden block. Likewise, an early version of a software system developed using a design program such as Sketch or Adobe Illustrator is high-fi in comparison to a paper prototype.

Pros of High-Fidelity Prototyping

Engaging: the stakeholders can instantly see their vision realized and will be able to judge how well it meets their expectations, wants, and needs.

User testing involving high-fi prototypes will allow the evaluators to gather information with a high level of validity and applicability. The closer the prototype is to the finished product, the more confidence the design team will have in how people will respond to, interact with, and perceive the design.

Cons of High-Fidelity Prototyping

They generally take much longer to produce than low-fi prototypes.

When testing prototypes, test users are more inclined to focus and comment on superficial characteristics, as opposed to the content (Rogers, Preece, and Sharp, 2011).

After devoting hours and hours of time producing an accurate model of how a product will appear and behave, designers are often loathed to make changes.

Software prototypes may give test users a false impression of how good the finished article may be.

Making changes to prototypes can take a long time, thus delaying the entire project in the process. However, low-fi prototypes can usually be changed within hours, if not minutes, for example, sketching or paper prototyping methods are utilized.

Due to the pros and cons of low-fi and high-fi prototyping, it should be no surprise that low-fi prototyping is the usual option during the early stages of a Design Thinking project, while high-fi prototyping is used during the later stages, when the test questions are more refined.

Guidelines for Prototyping
It is important to remember that prototypes are supposed to be quick and easy tests of design solutions. Here are a few guidelines that will help you in the Prototyping stage:

Just start building
Design Thinking has a bias towards action: which means if you have any uncertainties about what you are trying to achieve, your best bet is to just make something. Creating a prototype will help you think about your idea in a concrete manner, and potentially allow you to gain insights into ways you can improve it.

Don’t spend too much time
Prototyping is all about speed; the longer you spend building your prototype, the more emotionally attached you can get with your idea, thus hampering your ability to objectively judge its merits.

Remember what you’re testing for
All prototypes should have a central testing issue. Do not lose sight of that issue, but at the same time, do not get so bound to it so as to lose sight of other lessons you could learn from it.

Build with the user in mind
Test the prototype against your expected user behaviors and needs. Then, learn from the gaps in expectations and realities, and improve your ideas.

Stage 5: Test—Try Your Solutions Out

Test: the fifth and final phase of the design thinking process, where you test solutions to derive a deep understanding of the product and its users.

Designers or evaluators rigorously test the complete product using the best solutions identified in the Prototype stage. This is the final stage of the five-stage model; however, in an iterative process such as design thinking, the results generated are often used to redefine one or more further problems. This increased level of understanding may help you investigate the conditions of use and how people think, behave and feel towards the product, and even lead you to loop back to a previous stage in the design thinking process. You can then proceed with further iterations and make alterations and refinements to rule out alternative solutions. The ultimate goal is to get as deep an understanding of the product and its users as possible.

5 Guidelines for Conducting a Test

1. Show, don't tell: let your users experience the prototype
Make sure to introduce yourself. Never, ever say you are the designer, even if you are. People will be less honest with feedback if they think you are the author and won't want to hurt your feelings. Explain how long the session should take, what your expectations are for them and what they are going to be doing. Always ask if they have any questions before starting.

Avoid over-explaining how your prototype works, or how it is supposed to solve your user's problems. Let the users' experience in using the prototype speak for itself, and observe their reactions.

2. Ask Participants to Talk Through Their Experience
When participants are exploring the prototype, ask them to tell you what they're thinking. Let them know that they should think out loud and speak what's on their minds during the entire test session. This doesn't come naturally to people, so you may have to prompt the participant during the test to remind them. In your intro to the test, make sure to let them know you are expecting this and give an example. You want them to let you know what they expect to happen when they select something or what they were expecting to see on the screen based on the title or location.

3. Observe Your Participants
Be a neutral observer. Observe how your participants use your prototype and resist the urge to correct them when they misinterpret how it's supposed to be used. Mistakes are valuable learning opportunities. Remember that you are testing the prototype, not the participant.

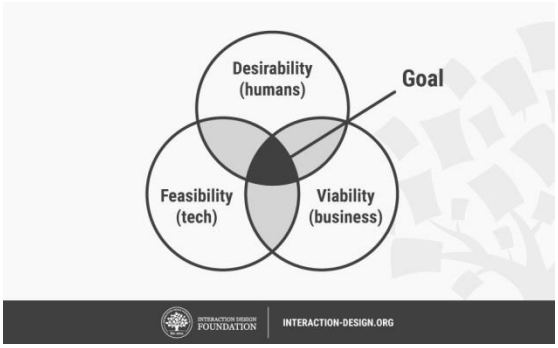
4. Ask Follow-Up Questions
Always follow up with questions, even if you think you know what the participant means. Ask questions such as "What do you mean when you say ___?", "How did that make you feel?", "What did you expect

would happen?" and, most importantly, "Why?".

5. Negative Feedback is Your Way to Learn and Improve

When you test your ideas and prototypes, remember that negative feedback is an important way to learn and improve. You might feel a sting in the moment when you hear a person complain about how difficult your prototype is to use, but try to get used to the idea that such feedback will help you in the long run. You will uncover problems that you and your team might not have even considered.

The End Goal: Desirable, Feasible and Viable Solutions



The design thinking process doesn't follow a fixed sequence of steps, but it has an ideal end point. The end goal of every design thinking project is a solution that is desirable, feasible and viable.

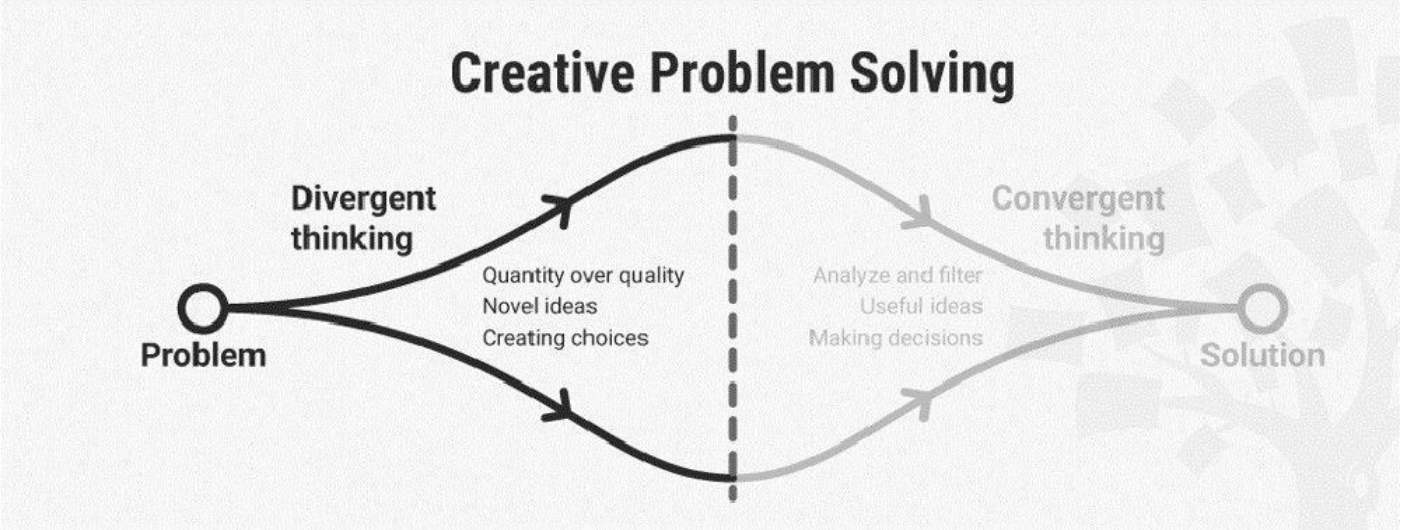
Desirability focuses on people. It's what puts the "human" in human-centered design. Your solution is desirable if it appeals to the needs, emotions and behaviors of the people you target.

Feasibility is about technology. Is your design solution technically possible or does it depend on a technology that's yet to be invented (or good enough for regular use)?

Viability is about whether your design solution works as a business. Is there an appropriate business model behind your solution, or would it collapse after a few years without investor or donor contributions? Design thinking is not about making a profit, but good design solutions should be self-sustaining. That way, you can continue to support and improve your solution way beyond the project deadline.

Overall, you should understand that these stages are different modes which contribute to the entire design project, rather than sequential steps.

DIVERGENT AND CONVERGENT THINKING



What is Divergent Thinking?

Divergent thinking is an ideation mode which designers use to widen their design space as they begin to search for potential solutions. They generate as many new ideas as they can using various methods (e.g., oxymorons) to explore possibilities, and then use convergent thinking to analyze these to isolate useful ideas.

Divergent Thinking Can Open up Endless Possibilities

The formula for creativity is structure plus diversity, and divergent thinking is how you stretch to explore a diverse range of possibilities for ideas that might lead to the best solution to your design problem. As a crucial component of the design thinking process, divergent thinking is valuable when there's no tried-and-tested solution readily available or adaptable. To find all the angles to a problem, gain the best insights and be truly innovative, you'll need to explore your design space exhaustively. Divergent thinking is horizontal thinking, and you typically do it early in the ideation stage of a project. A "less than" sign (<) is a handy way to symbolize divergent thinking – how vast arrays of ideas fan out laterally from one focal point: Design team members freely exercise their imaginations for the widest possible view of the problem and its relevant factors, and build on each other's ideas. Divergent thinking is characterized by:

Quantity over quality – Generate ideas without fear of judgement (critically evaluating them comes later).

Novel ideas – Use disruptive and lateral thinking to break away from linear thinking and strive for original, unique ideas.

Creating choices – The freedom to explore the design space helps you maximize your options, not only regarding potential solutions but also about how you understand the problem itself.

Divergent thinking is the first half of your ideation journey. It's vital to complement it with convergent thinking, which is when you think vertically and analyze your findings, get a far better understanding of the problem and filter your ideas as you work your way towards the best solution.

A Method to the "Madness" – Use Divergent Thinking with a Structure

Here are some great ways to help navigate the uncharted oceans of idea possibilities:

Bad Ideas – You deliberately think up ideas that seem ridiculous, but which can show you why they're bad and what might be good in them.

Oxymorons – You explore what happens when you negate or remove the most vital part of a product or concept to generate new ideas for that product/concept: e.g., a word processor without a cursor.

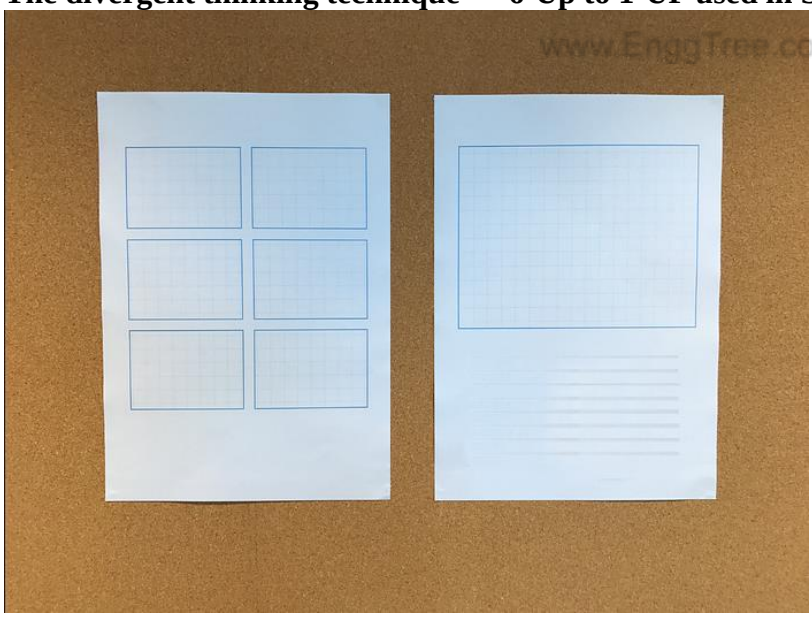
Random Metaphors – You pick something (an item, word, etc.) randomly and associate it with your project to find qualities they share, which you might then build into your design.

Brilliant Designer of Awful Things – When working to improve a problematic design, you look for the positive side effects of the problem and understand them fully. You can then ideate beyond merely fixing the design's apparent faults.

Arbitrary Constraints – The search for design ideas can sometimes mean you get lost in the sea of what-ifs. By putting restrictions on your idea—e.g., "users must be able to use the interface while bicycling"—you push yourself to find ideas that conform to that constraint.

Divergent thinking has been a core technique of good ideation in the design and creative industries. But there's still a lot of potential to expand these techniques further and add value to other disciplines such as sales and operations.

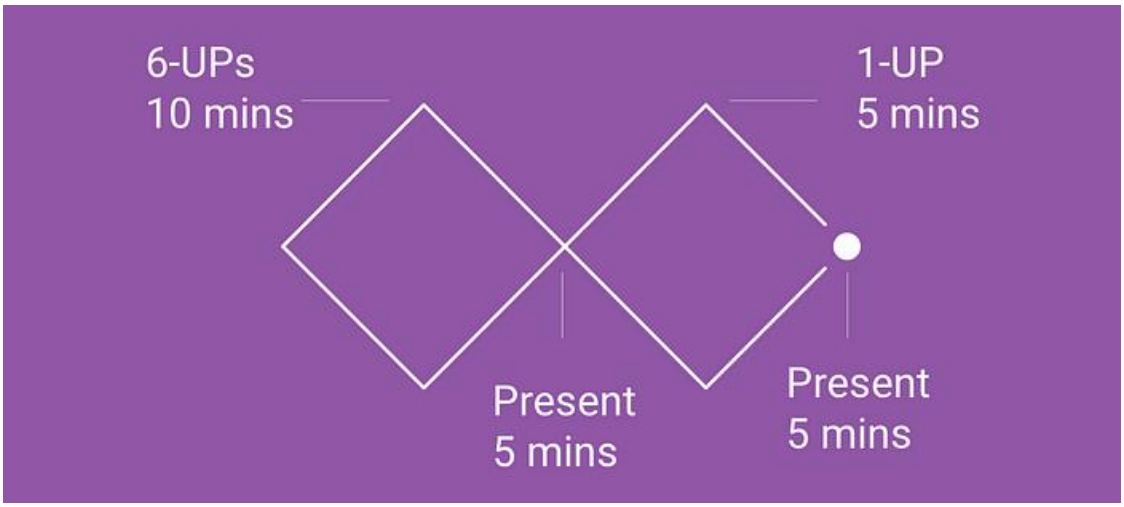
The divergent thinking technique — 6-Up to 1-UP used in SEEK company



It's a structured framework that goes along these lines:

Consider the challenge
Diverge by spending 10 minutes drafting 6 different ideas (6-UP template)
Present each idea for a minute and seek feedback

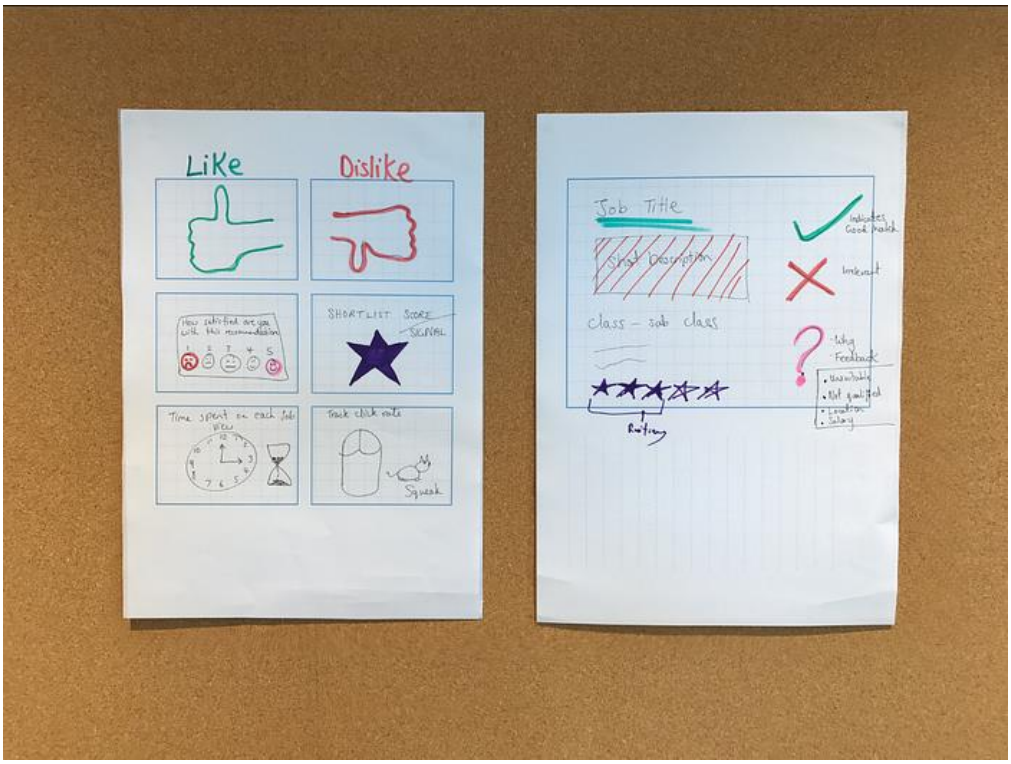
Converge by developing the most promising idea further
Diverge again (1-UP template)
Converge by presenting, or consider further and seek out feedback.



At this point you will have very quickly:

grown your first idea into a number of ideas
received some early feedback and
increased your likelihood of ending up with a better solution.

The great thing about divergent thinking is that it's not about design, it's about ideation. So regardless of the discipline, generating ideas in this structured way can be useful for all sorts of things.



The great thing about divergent thinking is that it's not about design, it's about ideation. So regardless of the discipline, generating ideas in this structured way can be useful for all sorts of things.
While divergent thinking is not a design-only practice, it's commonly used in the design and creative industries. But there is the potential to use these techniques elsewhere.

How to Think and Work Divergently – 4 Ideation Methods

1. Oxymorons

With this method, you explore what happens when you remove what's most essential about a product or concept (e.g., a service) to generate new ideas for the product or concept.
Oxymorons is a divergent ideation method. With the Oxymorons method, you explore what happens when you remove what's most essential about a product or concept to generate new ideas for that product or concept. When you set up a constraint like this, you force yourself to think about new uses that you might not have thought about for the original product. The trick is to think about the product or idea you're working on, write down what its most essential characteristics are and take it from there. It will help you to know that the word oxymorons means rhetorical maneuvers that use seeming self-contradictions to reveal a paradox or illustrate rhetorical points. Oxymorons are also used in general as a contradiction in terms when you want to describe something which appears to be a contradiction, but is actually possible—for example, "living dead" or "bitter-sweet".

This is What You Do

1. Choose a product or a service and figure out, "What's the essential characteristic?"
Think of a concrete feature, not something abstract
2.Imagine what the product would be like without that essential characteristic. Imagine, for example, if you had a word processor without a cursor, you couldn't choose where to write; or if you had a PowerPoint presentation, but you didn't have a projector to show your slides during your presentation.

3.Write down your ideas for what the product without the essential characteristic could be used for—or imagine other contexts in which it could be used. For example, a word processor without a cursor could be used in a creative writing exercise where you practice not editing what you have written. If the word processor places the cursor randomly, you might use it to make some form of abstract poetry. If you were not in the context of working, but wanted to force yourself to take time off, having the cursor disappear from your word processor would force you to work in a different manner or to do something other than working
4.Then consider your original product again. Could you make any improvements or come up with any new features inspired by the ideas you generated in step 3? For example, think about ways to help users take breaks from writing, or ways to make it easier to create playful content that doesn't fit into the horizontal lines of a typical word processor.

Best Practice
You can use the method as an individual or in a group.
It's a good idea to decide beforehand how much time you want to spend on each part of the exercise, especially in a group setting.
Do a test run on your own and see how much time you spent if you're unsure on what's fitting for your project

2. Random Metaphor
This method pushes you to think about your project in new ways, so it's great when you want to think more broadly about the idea or product you're working on.

Random Metaphors is a divergent ideation method. It pushes you to think about your project in new ways, so it's a great method when you want to think more broadly about the idea or product you're working on.

1.Pick a random item in your surroundings or a random word in a dictionary. Write down as many attributes and associations as you can think of for the object you've picked. For example, if you pick a houseplant, you could write: "green, alive, growing, soil, needs to be taken care of, photosynthesis".
2. Pretend that a genius in your field told you that the thing you just picked is a good metaphor for an item/word/concept you're working on. Come up with an explanation for how the thing you picked is a good metaphor. For example, a plant is a great metaphor for a word processor because, they both grow over time (a word processor grows when you add new features), they both need to be taken care of (for a word processor you have to be sure to provide support for the users and fix bugs in the programming). As you can see from our examples, the metaphors don't have to be great. In fact, they probably won't be—since you picked a totally random item
3. Use the metaphors you came up with to improve or change your product. For example, come up with ways to ensure that new features in a word processor are introduced organically so they seem like a natural evolution to ensure that users won't be confused when they encounter something new

Best Practice
You can use the method as an individual or in a group.
It's a good idea to decide beforehand how much time you want to spend on each part of the exercise, especially in a group setting. Do a test run on your own and see how much time you spent if you're unsure on what's fitting for your project.

3. Brilliant Designer of Awful Things
You can use the method when you work to improve a design or product that has one or more known problems. The method helps you see the positive sides of the problem to ensure that you fully understand it

before you make changes to a design and to help you ideate about ways to improve the product beyond just fixing what is wrong with it.

Brilliant Designer of Awful Things is a divergent ideation method. You can use the method when you work to improve a design or product that has one or more known problems. The method helps you to see the positive sides of the problem to ensure that you fully understand it before you make changes to a design and to help you ideate about ways to improve the design or product beyond just fixing what is wrong with it.

Follow These 4 Steps

1.Write down the features which are problematic in your product or idea. For example, you've got a battery level indicator on a camera with just 2 levels: 50% and 100%.

2.Analyze why each of the features you wrote down is problematic. For example, it's problematic that the battery level indicator can show 50% but then nothing smaller before it runs out of power. The user has no warning of when she needs to charge it.

3. Imagine that each of the problematic features was designed by the most brilliant designer you know—someone who usually does things for a good reason. Then try to come up with reasons for why the feature was designed the way it was. For example, you could have: "Adding a third battery level indicator would take up space on the tiny screen; we would then have to create a bigger screen, and that would leave no space for the flash because it's a compact camera." or "User research uncovered that users are more likely to charge the camera right away instead of waiting until the last minute and thus less likely to run out of power when they don't know what their battery level is below 50%."

4.Consider the good reasons in step 3. Is there a grain of truth in some of the good reasons that you need to consider when you create the redesign? Do any of them spark related ideas for your redesign? For example, could you design something that nudges your users towards charging their camera? For instance, maybe you could design a camera stand that doubles as a charger.

Best Practice

You can use the method as an individual or in a group. It's a good idea to decide beforehand how much time you want to spend on each part of the exercise, especially in a group setting. Do a test run on your own and see how much time you spent if you're unsure on what's fitting for your project.

4. Arbitrary Constraints

This is a great method to inspire ideation and think outside of the box, because you push yourself to think about the idea or product you're working on in new ways when you place arbitrary constraints on your ideation.

Arbitrary Constraints is a great method to inspire ideation and think outside of the box, because you push yourself to think about the idea or product you're working on in new ways when you place arbitrary constraints on your ideation.

Here's What You Do:

1.Write down 10–20 arbitrary constraints on individual pieces of paper and place all the pieces face down. For example, here are some constraints for a mobile phone:"use while bicycling" or "to be used by a blind person". You can also print out our list of arbitrary constraints, cut them out and place them face down.

2.Think about the idea or product you're working on and then pick a random piece of paper with a constraint on it. For example, a mobile phone… "that you can use while bicycling".

3.Come up with as many ideas as possible for your product that works with the arbitrary constraint. For example, the user can wear a headset and call up people on their contact list via voice control. Keep working until you run out of ideas.

4. Look through your ideas and consider how each idea could make sense without the arbitrary constraint. For example, it would make sense to be able to call people on your contact list using a headset in many other situations than bicycling

Arbitrary Constraints

Here are some arbitrary constraints to help you get started:
We've also converted these arbitrary constraints into cards that you can cut out and use!
You'll find them at the end of this template.
Arbitrary Constraints
can be used while bicycling
can be used by a blind person
something we can create in 1 week
can be used by a 3-year-old
can be used no matter what your language is
can be used by multiple users at the same time
can be used underwater/while in water
something we can create without a budget
can be used in complete darkness
can be used with no hands
can be used with no internet connection
must have physical controls

Best Practice

You can use the method as an individual or in a group.
It's a good idea to decide beforehand how much time you want to spend on each part of the exercise, especially in a group setting.
Do a test run on your own and see how much time you spent if you're unsure on what's fitting for your project.

Three Phases and Modes of Thinking in Ideation

Let's create an overview of the various modes of thinking in ideation and in creativity. Even though we break them up here to grasp them, it's important to note that these thinking modes work together. In fact, they are deeply dependent on each other.

You use the divergent thinking mode in the early stages of your creative ideation sessions. At this stage, it's important that you get lots of new ideas. You broaden up your design space,and you should envision your possibilities as endless. Your thinking will often start from a single point of focus, and then you'll expand further and further as you create new and unique ideas. This divergent phase is a time for disruptive and lateral thinking. Divergent thinking is a generative cognitive activity, where the quantity of ideas is more important than the quality**.**

B) Emergent Thinking

Emergent thinking is an in-between thinking style which leverages ideas generated in the early divergent stage as stimuli to allow the generation of additional ideas. It's a phase where you and the rest of the ideation group build upon initial ideas to make new connections and combine and spark new ideas. The early, more chaotic divergent sessions should provide a wide enough range of stimuli to make this possible—and, again, disruptive lateral thinking should be utilized.

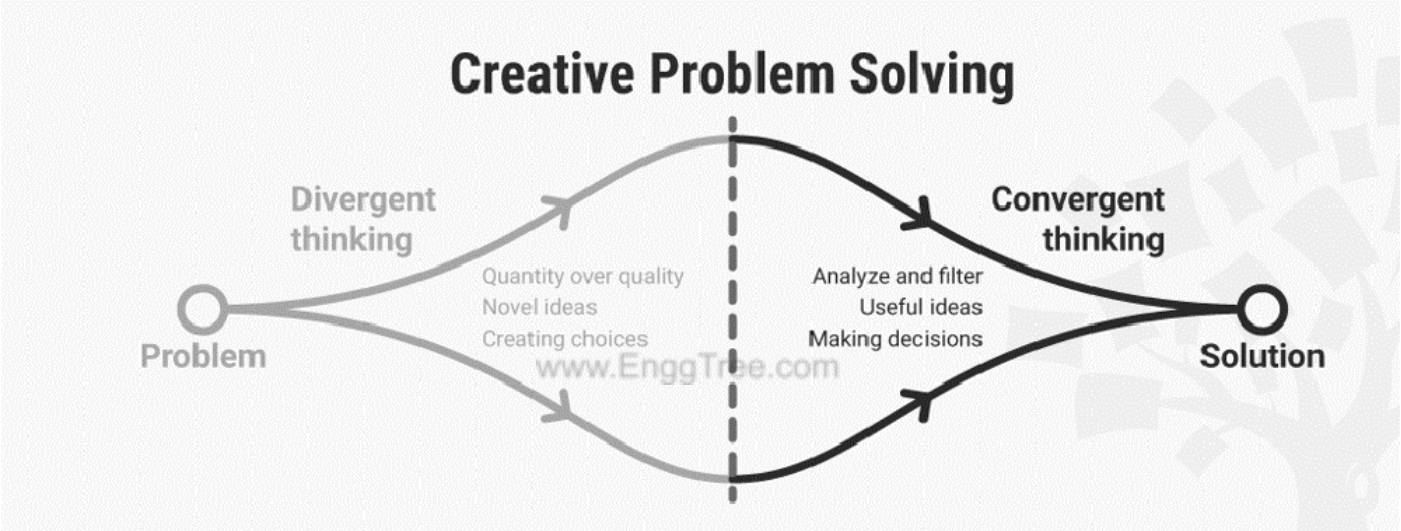
C) Convergent Thinking

Convergent thinking occurs towards the end of ideation sessions and closes off these sessions through

allowing your team to sift through ideas, group them into themes, pick out common threads and ultimately decide upon winners and losers. In this sense, it's good to remember that ideation is not meant to be a wild frenzy of chaos. Impractical or impossible solutions do need to be weeded out, and the overly ambitious ones need to be shelved for later consideration in certain cases. This convergent phase is therefore where you make decisions through the lenses of desirability, viability and feasibility. Your creative process shouldn't end with these decisions, though—this is merely the first time you will prune and prepare your best ideas ahead of the rest of your creative process: Let's say you're creating a new app. In this case, you would of course want to prototype and test it and not leave it at this ideation stage.

Convergent thinking relies on a more vertical, linear and analytical style of thinking, though using it means you all still need to maintain a good degree of creativity to ensure ideas with merit are not rejected merely because they do not follow logical norms.

What is Convergent Thinking?



Convergent thinking is an ideation mode which designers use to analyze, filter, evaluate, clarify and modify ideas they have generated in divergent thinking. They use analytical, vertical and linear thinking to find novel and useful ideas, understand the design space possibilities and get closer to potential solutions.

Convergent Thinking – the Other Side of the Ideation "Coin"

After design teams generate as many ideas as possible in the divergent thinking part of ideation sessions, convergent thinking helps them systematically see whether their ideas might work as real-world solutions. The structure is to:

Sift through ideas.

Group them into themes.

Find common threads.

Decide on winners and losers.

Convergent thinking helps tighten your focus when evaluating each idea. For example, if your design problem concerns users with errands, one idea might be an app for users to control their cars remotely to

send/collect goods. You'd then examine it through three lenses:

Desirability – "Would users want this?" (Or would they fear accidents, hacking, theft, etc.?)

Viability – "Could a brand mass-produce and support it?" (Or would it be unsustainable/too expensive?)

Feasibility – "Is it doable?" (Or would security, sensory and emergency-backup features take years/decades to perfect?)

Then, considering state-of-the-art technology and other factors, you might abandon this idea as impracticable or shelve it for future consideration.

See Ideas in a New Light with Convergent Thinking

Convergent thinking isn't a clinical process that automatically results in optimal solutions. Rather, you need a careful, creative mindset to:

Look past logical norms (which we use in everyday critical thinking);

See how an idea stands in relation to the problem; and

Understand the reality/dimensions of that problem.

As you work more insightfully, you can begin to understand the idea in the context of what's going on in the problem domain. And only with an accurate understanding of the problem can you determine the best criteria to judge an idea with. Otherwise, it's easy to overlook the problem domain's complexity and apply just your existing knowledge (e.g., "It looks like something that a mega menu could help with."). Some dimensions of it may be unlike anything you'll recognize. By studying problems and ideas on their own terms, though, you can avoid misidentifying them with assumptions.

Thinking convergently helps overcome many obstacles, even if alternative ideas can also cause problems. Sometimes, a clearer understanding might show you the best solution straightaway. Or you might use that understanding to generate new ideas and newer understandings. Whether you're fine-tuning novel ideas through thought-provokingly fresh lenses or suddenly finding yourself inspired to work on a prototype to test, convergent thinking helps advance your creative process. That's why it's vital in a design process such as design thinking.

How to Use Convergent Thinking to Find Novel and Useful Ideas

Some techniques to help you focus creatively are:

Externalization – You sketch ideas to make all the tacit knowledge and underlying assumptions about your project visible and then identify that knowledge (including its limits) to help understand the problem domain.

Three-Way Comparisons – You compare three similar products to see how each differs from the other two.

What are 3-Way Comparisons?

Three-way comparisons are a convergent ideation method designers use to map their assumptions and tacit knowledge about familiar domains to new domains. They compare three related items in all possible combinations to uncover hidden attributes, understand the problem domain better and find insights to use innovatively.

Compare Three Things – Find More in Each

A vital skill underpinning a designer's creativity is to bring tacit knowledge out into the open where it can be analyzed and insights shared. Sometimes, we have deep-held assumptions about designs, concepts, etc. These can range from an item's smallest qualities up to critical factors of the mental model users adopt when encountering problems in context. If we take things for granted, we might overlook crucial points. That's why it's essential to isolate errors in how we envision design-related matters, and hopefully pinpoint previously unheard-of ways to access users.

Whenever we compare similar things, we can clearly map what makes them distinct as we systematically examine each's qualities. The simplest way is to compare two items; by asking what's similar and different, you can quickly compile a list. So, by identifying and discussing the distinctions between (e.g.) a menu on a webpage versus on a phone, you can make sense of the various characteristics of each.

However, a three-way comparison can help you uncover far more. This approach comes from the repertory grid technique used to map personality traits. It's especially useful for exposing and expressing qualities which might otherwise lie buried under assumptions and bias. For example, you might compare a dropdown menu with a cascading menu with a pie menu. By starting with "How is A like B but different from C?" you proceed through different orders of comparison (e.g., "How is C like A but different from B?"). Consequently, you'll force yourself to stretch beyond those obvious standard differences and engage the subjects more open-mindedly. In our video example, distinctions include:

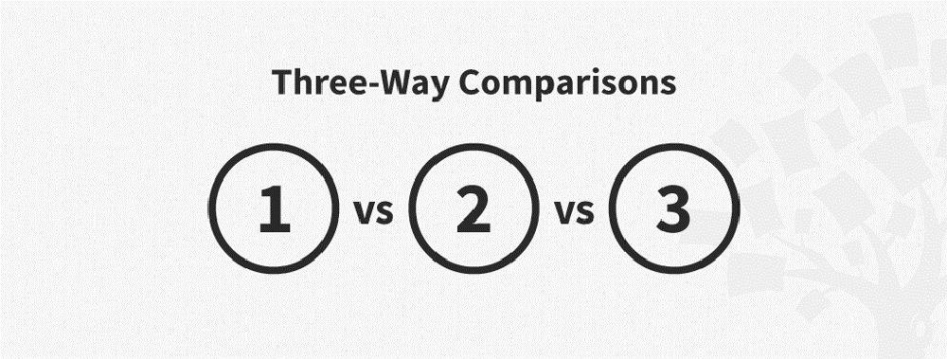
Grapes are smaller – one serving contains more of them.

Apples are contiguous, whereas oranges are segmented.

Oranges are the "messiest" to eat.

Grapes are to wine as apples are to cider – the priority you give helps define how you see the world.

By making these distinctions, you expose the categories you've involved. Also, when you list these inherent qualities, categories, etc., it's far easier to spot new differences more easily and (potentially) new contexts of use.



How to Use 3-Way Comparisons

1. Pick three designs/products in the domain you're interested in. (One of these can be your own if you work in that domain.) They should be similar, so you/your users must put effort into considering differences between them. If, for example, you're designing a new user interface menu and you want to understand the domain better, you can choose three existing menu types for comparison: dropdown versus cascading versus pie.

2. Compare each design to the other two. Here's where you identify your own assumptions. Write down how each differs from the others. For example, from comparing how the dropdown differs from the cascading and pie menus, you notice a dropdown menu is horizontal and simpler.

Keep going as long as possible. If stuck, try considering a different dimension in which to compare the menus.

3. To make comparisons involving your users: Sitting down with one user at a time, show them the different designs and ask them to compare these: e.g., "Please list as many ways as you can think of how a dropdown menu is different from a cascading menu and a pie menu."

Write down what each user lists as different. Users will likely soon get stuck, but encourage them to persevere by assuring them that no comparisons are silly. You can also encourage them to compare the designs in other dimensions which they haven't considered yet. (Note: As users can find this hard, it's best to keep adding users until no new attributes are mentioned.)

4. Consider the lists of attributes in relation to the domain you want to design for: After making comparisons, you'll have three lists of attributes (one for each design). If you've involved users, you should combine the users' lists, so you have a list for each design that summarizes what every user said.

More Specific and More General – You place some temporary constraints on your project to get a more specific overview to help you generate ideas, and you stand back to get a more abstract overview.

Embrace Opposites – You find overlaps between different categories or opposites to spot new design opportunities.

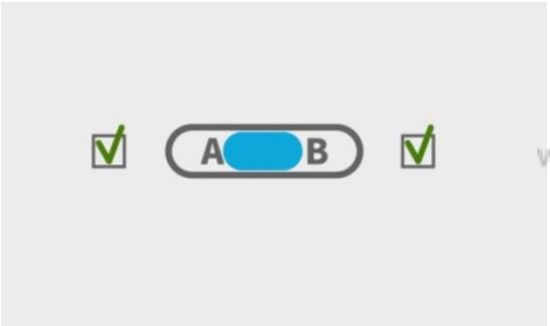
Embrace opposites is a convergent ideation method which designers use to explore their design space by finding overlaps between different categories or opposites. When they chart and compare two apparent opposites, they might find features that are common to both—and ones that are not—and spot new design opportunities.

Appearances can Deceive – Go Behind the Scenes with Embrace Opposites

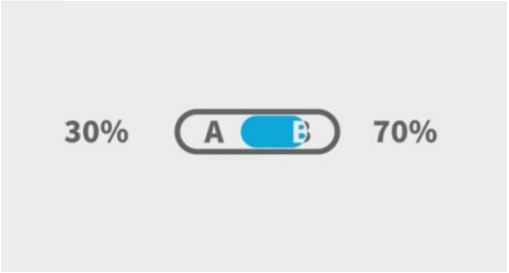
In our complex world, it's simpler to differentiate things by thinking in terms of dichotomies or opposites (e.g., books and websites) even when they have overlapping attributes. Distinguishing things this way helps us make quick decisions: (e.g.) "good" or "bad" as absolute values, without considering the many degrees in between that describe something's/someone's qualities. However, reality is usually too complicated to categorize with "either/or" labels. Often, things that seem totally opposed (e.g., political parties, personalities) share characteristics. For example, what does an "introvert" look like? Or an "extrovert"? Can someone be both?

In ideation, you can embrace opposites to see if you can enrich a problem and focus on designing innovative features. For example, consider a simple switch:

If A is "Off" and B is "On", these are categorical distinctions. However, if A and B were other items that were opposed or distinct (e.g., menus and radio buttons), you might see them in dimensional terms, instead, and ask if they share features. Also, you might be able to design for a combination of these, perhaps with more of one than the other:

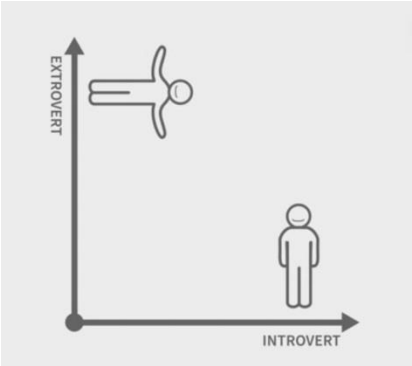


or:



So, you can get a deeper understanding of a design problem and the elements you're working with if you analyze the categories and dichotomies you perceive. Dimensions tend to be richer than categories, but trickier to work with. To envision this, let's re-approach our extrovert-introvert dichotomy. We might flip it into a graph, so:

becomes:



This makes it easier to look for common elements and neutral ones if we divide our graph into 4 squares, where:

Top left = More Extroverted	**Top right = Design Possibilities!**
Bottom left = Neutral	**Bottom right = More Introverted**

So, you might find a dimension to manipulate in your own project. It might be (e.g.) a menu (A) that pulls down and includes radio buttons (B) – anywhere where elements of both apparent opposites work simultaneously. At least, you can confirm when "opposites" are indeed distinct.

How to Embrace Opposites

Try these steps to identify design possibilities:

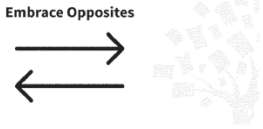
Create an overview of the different categories or opposites you have in a current design problem. (E.g.) You might say that the desktop version of an application and the mobile version of the application belong in two different categories: desktop and mobile.

Dissolve the categories and ask yourself "In what ways can my application be both desktop and mobile?". On the surface, it can't (users either use their phones or desktops to view your application). But are there any situations where it can? (E.g.) a tablet is in some ways in between the two. It has a big screen like a desktop, but a smartphone's touchscreen interactivity.

List all the overlaps you find.

Go through your list and consider how big the overlap for each item is, whether it's mostly one or the other (remember our x-and-y-axis graph above). Now place the items on your list there. E.g., a tablet is probably midway between a desktop and a smartphone, but a laptop with a touchscreen is more like a desktop computer than a smartphone.

Consider which consequences the overlaps have for your design. Should you use the same interaction principles for all of these devices? If not, how many versions do you need? If your application is specialized, maybe the mobile with a touchscreen is the perfect device for it and you should forget about all the other versions.



Make Things Opposite
Embrace opposites is also helpful if you disagree with the design goal:

Reverse your problem statement. E.g., you wanted to help people feel more inclined to use public transportation than their cars. Now, imagine you wanted to make people more inclined to use their cars. What would that take? How can you try to make people spend even more time in their cars? How can you make it even nicer to drive the car and less attractive to use public transportation? E.g., you could:

Simply decrease the number of bus routes in the area;

Have it so there's only one bus in the morning, one in the evening;

Make bus tickets more expensive;

Lengthen the routes;

Have the driver play really loud techno music on routes which elders often use.

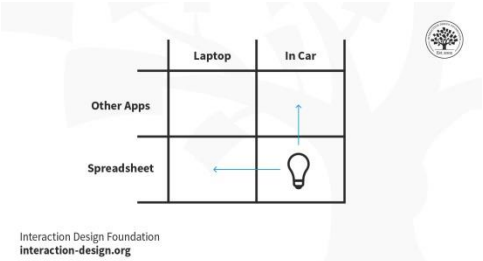
Now, turn those insights around. E.g., you could research to see what areas most people are taking busses in. Then, you could make more busses available more frequently in those areas and offer fewer busses where there are rarely any passengers.

Overall, remember that determining the opposite of something can be complicated. However, the effort can pay big dividends.

Multiple Classifications – You compare aspects of items using a matrix to widen your inspiration, spot market gaps, analyze trends and rules and examine related qualities.
What are Multiple Classifications?
Multiple classifications is a convergent ideation method where designers explore the design space to find opportunities for new products. Using matrices, they compare aspects of items to widen their inspiration, spot market gaps, find and analyze trends and rules, and see if related qualities hint at inventive designs.
Explore More Possibilities with Multiple Classifications
A single-classification system (or taxonomy) is ideal for organizing items in libraries, computer folders, etc. Also, it's easier to list similarities between (e.g.) two types of fish than between fish and birds. The downside to categorizing items this way, though, is the need to put things with similar features in one place. That can obscure other similarities and block insights.

Multiple classifications can help you find and understand how items are similar while you analyze their differences. Consider two circles and two squares – one red, one yellow of each. How would you group them: by shape or color? Using a taxonomy, you'd describe one common attribute at a time. However, with multiple classifications, you can describe both simultaneously. And, in ideation, you can explore and map your design space far more extensively and tap powerful market opportunities.

Enter a Matrix!
You can use several different, but related, methods:

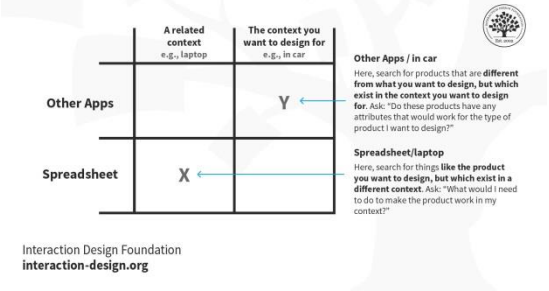


1. Spread your search for inspiration – To develop a new design concept: e.g., productivity apps for autonomous (self-driving) car users:

a. Draw a 2-by-2 matrix – on one axis, write the context you want to design for (here, "car") and another context that's different but still relevant.

b. On the other axis, write the type of product you want to design (e.g., "productivity apps/spreadsheets") and then one that contains all other kinds of products.

This matrix gives you 4 categories. You'll want to analyze 2 ("X" and "Y"):



2. Identify Gaps – In our example, you could notice that many apps didn't include spreadsheets. So, you could see if an app that uses spreadsheets might help autonomous car users.

a. Using your matrix, find all the systems (e.g., books) discussing the area you want to research (so, spreadsheet/laptop and other apps/in car).

b. Complete your matrix with the information you've found. E.g., you should have items to insert in 3 spaces in the matrix's category pairs, but now you'll likely notice a gap (e.g., in the bottom-right corner). This could be a market opportunity.

3. Analyze and Discover Trends and Rules – If you've found a pattern in your design space, it'll be far easier

to design relevant products if you find and understand the rules and trends in that space.

a. Draw a matrix with the categories you expect to find and start to research.

b. E.g., you notice a trend that exclusive brands' websites don't advertise prices, but volume brands' do. So, draw a matrix of whether different website types advertise prices. Research websites and put your findings in the matrix to see if you're right.

In our example, the pattern is predictable. However, if you find that the pattern looks different from what you expect, ask yourself why. Can you deduce any general rules? What does that mean for your design? You may have discovered a space where no other products exist.

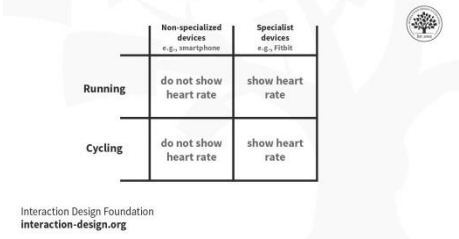
4. Uncover Abstractions – To see if a general rule you've spotted might apply for all items (e.g., devices) of that type and, if so, why.

On a 2-by-2 matrix (or larger) mark the categories you'll compare and explore.

E.g. (below), imagine you've spotted a general rule about fitness apps for running and cycling, since specialist devices (e.g., Fitbits) in one column share a property (they show the heart rate) and non-specialist devices such as smartphones share another (they don't show it). Ask yourself if this generalization holds true for all phones versus specialist devices.

Search for the reason (e.g., because phones lack heart-rate sensors). So, now, having noticed a relationship between types of designs (e.g., devices suitable for a fitness app), you can explore the potential for what one design can do.

This abstracted knowledge is your understanding of why the relationship exists. Then, you can reapply it to see if you can design things on your matrix's left-hand side (so, generalist devices such as smartphones) that have similar features/capabilities to those on the right-hand side. For example, maybe a phone could track someone's heart rate in another way (e.g., through its microphone or other sensors).



Overall, good judgment is essential. Sometimes, there'll be a valid reason a product doesn't exist (e.g., it would be hazardous). Sometimes, though, you might find you've stumbled on a lucrative market gap.

Teasing Apart, Piecing Together (TAPT) – You break down an experience into its elements, reconstruct it with a better understanding of what's involved and re-imagine it in a new context**.**

BRAINSTORMING

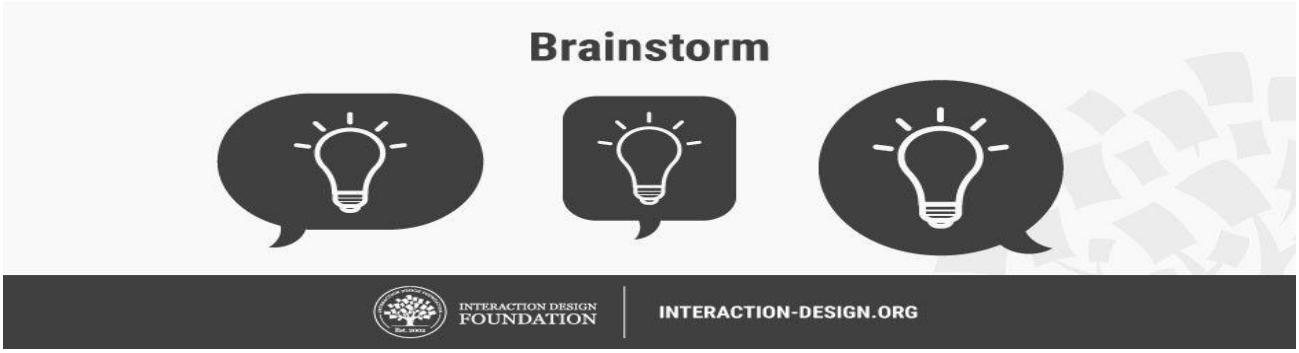
Brainstorming

Brainstorming is a method design teams use to generate ideas to solve clearly defined design problems. In controlled conditions and a free-thinking environment, teams approach a problem by such means as "How Might We" questions. They produce a vast array of ideas and draw links between them to find potential solutions.

How To Use Brainstorming Best

Brainstorming is part of design thinking. You use it in the ideation phase. It's extremely popular for design teams because they can expand in all directions. Although teams have rules and a facilitator to keep them on track, they are free to use out-of-the-box and lateral thinking to seek the most effective solutions to any design problem. By brainstorming, they can take a vast number of approaches—the more, the better—instead of just exploring conventional means and running into the associated obstacles. When teams work in a judgment-free atmosphere to find the real dimensions of a problem, they're more likely to produce rough answers which they'll refine into possible solutions later. Marketing CEO Alex Osborn, brainstorming's "inventor", captured the refined elements of creative problem-solving in his 1953 book, Applied Imagination. In brainstorming, we aim squarely at a design problem and produce an arsenal of potential solutions. By not only harvesting our own ideas but also considering and building on colleagues', we cover the problem from every angle imaginable.

Everyone in a design team should have a clear definition of the target problem. They typically gather for a brainstorming session in a room with a large board/wall for pictures/Post-Its. A good mix of participants will expand the experience pool and therefore broaden the idea space.



Rules for Brainstroming:

Brainstorming may seem to lack constraints, but everyone must observe eight house rules and have someone acting as facilitator.

1. Set a time limit

d-school emphasises that the facilitator has to be intentional about setting aside a period when your team will be in "brainstorm mode". In this time frame, it's the sole goal to come up with as many ideas as possible,

and during this period judgements of those ideas are prohibited. Typically, a Brainstorm will take around 15-60 minutes. It can be shorter or longer, depending on the difficulty of the problem and the motivation and experience of the group.

Best practice tip:

"Invest energy into a short period of time, such as 15 or 30 minutes of high engagement. Get in front of a whiteboard or around a table, but take an active posture of standing or sitting upright. Get close together." – dschool, Bootcamp Bootleg

2. Start with a problem statement, Point of View, How Might We questions, a plan or a goal – and stay focused on the topic

Alex Osborn, the father of the Brainstorming technique, emphasises that brainstorming sessions should always address a specific question or problem statement (also called a Point of View) as sessions addressing multiple questions are inefficient. Begin with a good problem statement or question. Design Thinkers and other ideation specialists have further developed this approach into the art of framing problem statements via methods. Specifically, these are "How Might We" questions.

"How Might We" Questions

Once you've defined your design challenge in a Point Of View (POV) statement, you can start to use "How Might We" (HMW) questions to reframe your POV and open up the design challenge to look for solutions. Instead of saying "We need to design X or Y", for example, you can add "How Might We" to the beginning and ask "How might we design X or Y?".

Why and When to Ask "How Might We"

The "How Might We" (HMW) technique maintains a level of ambiguity on purpose because its job is to open up the exploration space to a range of possibilities. It's a rewording of the core user need which you uncovered through deep interrogation of the problem in the Empathize phase, and synthesized in the Define phase. Let's break the question down into its component parts now to see how it achieves this task:

"How"	"Might"	"We"
"How" suggests that we do not yet have the answer. "How" helps us set aside prescriptive briefs and explore a variety of endeavors, instead of merely executing on what we "think" the solution might be.	**"Might" emphasizes that our responses are possible solutions, not the only solution.** "Might" also allows for exploration of multiple possible solutions, and means we won't settle for the first idea that comes to mind.	**"We" immediately brings in the element of collaboration.** "We" reminds us that the idea for the optimal solution will most likely come from collective and collaborative teamwork.

"How Might We" (HMW) questions serve as a transition step between the Define and Ideate phases of design thinking. They help you identify topics that represent subsets of your POV before you move on to the mass generation of ideas in the Ideate phase. In this way, HMW questions provide the best way to open up brainstorm and other ideation sessions where you can explore ideas to solve your design challenge in an innovative and user-centered way.

The HMW method is cleverly constructed to open up the field for new ideas, admit that we do not currently know the answer to the design challenge and encourage a collaborative approach to design solutions. Your

HMW questions should be broad enough to generate a wide range of solutions during ideation sessions, yet narrow enough that specific solutions can be created for them.

For example, if your POV is: "Teenage girls need to eat nutritious food to thrive and grow in a healthy way."—the HMW question may go as follows:

- How might we make healthy eating appealing to young females?
- How might we inspire teenage girls towards healthier eating options?
- How might we make healthy eating something which teenage girls aspire towards?
- How might we make nutritious food more affordable?

These are simple examples, all with their own subtle nuances that may slightly influence different approaches and techniques in the Ideate phase. Regardless, your HMW questions will ensure that your upcoming ideation and design activities are informed with one of more HMW questions that can spark the imagination of you and your team and align well with the core insights and user needs you've uncovered

Best Practice Guide to Asking "How Might We"

01: Ensure your POV hits the sweet spot: Without a statement of a clear vision or goal in a well-framed Point Of View, "How Might We" questions are obviously meaningless.The technique requires a well-framed objective (a POV in other words) which is neither too narrow nor too broad.

02: Always begin with your Point of View (POV): HMW questions should always relate to your POV. Rephrase and reframe your POV as several questions by adding "How Might We" at the beginning.

03: Break up your POV with multiple HMWs: You can digest and ideate on your design challenge further when you segment it up into smaller actionable and meaningful questions. Five to ten HMW questions for one POV is a good starting point.

04: HMW questions come before solutions: It's often helpful (and logical) to brainstorm the HMW questions before the solutions brainstorm.

05: Check the breadth of your HMWs: Look at your HMW questions and ask yourself if they allow for a variety of solutions. If they don't, broaden them. Your HMW questions should generate a number of possible answers and become a launch pad for your ideation sessions.

06: Ensure your HMWs are focused: On the other hand, if your HMW questions are too broad, you may need to narrow them down. You should aim for a scope that's narrow enough to direct the start of your ideation sessions, yet broad enough to give you room to explore wild ideas.

3. Defer judgement or criticism, including non-verbal

The facilitator should always set a positive, unthreatening tone and tell participants to reserve criticism for a later critical stage in the ideation process. A Brainstorming session is not the time and the place to evaluate ideas, and you should avoid executional details. It's crucial that participants are feeling confident by being in a safe environment so they have no fear of being judged by others when they put forward wild ideas. You should create equal opportunities for all participants. The best ideas often come from practitioners, students, and people who dare to think differently – and not necessarily only from the highly skilled and experienced managers.

Best practice tip: The facilitator should suspend judgement. This way, participants will feel free to generate unusual ideas. As a facilitator, you will find that it can even be a great idea to prohibit the word "no". You'll be surprised to see how effective this tool is and how it helps open up minds and creates a collaborative, curious, and friendly ideation environment. And you'll find that it's pretty fun too when team members have to initially say "yes" to even the weirdest ideas. Giving out half-thought-out ideas or strange suggestions is normally not socially accepted, is socially frowned on and leads to people holding back in normal situations.

Brainstorming deliberately gives permission to be “stupid” and “child-like”.

4. Encourage weird, wacky, and wild ideas
These new ways of thinking might give you better solutions.

"It is easier to tone down a wild idea than to think up a new one.”
– Alex Osborn, the father of the Brainstorming technique

“Wild ideas can often give rise to creative leaps. In thinking about ideas that are wacky or out there we tend to think about what we really want without the constraints of technology or materials. We can then take those magical possibilities and perhaps invent new technologies to deliver them.”
– OpenIDEO, 7 Tips on Better Brainstorming

5.Aim for quantity
Aim for as many new ideas as possible. The assumption is that the greater the number of ideas you generate, the bigger your chance is of producing a radical and effective solution. Brainstorming celebrates the maxim “quantity breeds quality”.

6.Build on each others' ideas
As suggested by the slogan "1+1=3", Brainstorming stimulates the building of ideas by a process of association. Embrace the most out-of-the-box notions and build, build, build. Be positive and build on the ideas of others. Brainstorming works well when participants use each other's ideas to trigger their own thinking. Our minds are highly associative. One thought easily triggers another. When we use the thoughts of others, then these will stop us getting trapped by our own thinking structures.

Best practice tip: Try to say and encourage others to say “and” instead of “but”. It takes practice, but this little trick works surprisingly well.

7. Be visual
Best practice tip: At IDEO, they encourage you to use coloured markers to write on Post-its and put them on the wall—or sketch your idea. Nothing gets an idea across faster than drawing it. It doesn’t matter how terrible of a sketcher you are! It's all about the idea behind your sketch. And d.school has two great ideas for you:

“There are at least two ways to capture the ideas of a brainstorming:
1. Scribe: the scribe legibly and visually captures on the board ideas that team members call out. It is very important to capture every idea, regardless of your own feelings about each idea.
2. All-in: Each person will write down each of his or her ideas as they come, and verbally share it with the group. It is great to do this with post-it notes, so you can write your idea and then stick it on the board.”
– dschool, Bootcamp Bootleg

8. One conversation at a time
Listen to each other and elaborate on each other’s ideas. Don’t get obsessed with your own ideas. You’re here to ideate together.

To capture everyone's ideas in a brainstorming session, someone must play "scribe" and mark every idea on the board. Alternatively, write down your own ideas as they come, and share these with the group. Often, design problems demand mixed tactics: brainstorming and its sibling approaches – braindumping (for individuals), and brainwriting and brainwalking (for group-and-individual mixes).

Risks of Brainstorming:

Brainstorming involves harnessing synergy – we leverage our collective thinking towards a variety of potential solutions. However, it's challenging to have boundless freedom. In groups, introverts may stay quiet while extroverts dominate. Whoever's leading the session must "police" the team to ensure a healthy, solution-focused atmosphere where even the shiest participants will speak up. A warm-up activity can cure brainstorming "constipation" – e.g., ask participants to list ways the world would be different if metal were like rubber.

Another risk is to let the team stray off topic and/or address other problems. As we may use brainstorming in any part of our design process—including areas related to a project's main scope—it's vital that participants stick to the problem relevant to that part (what Osborn called the "Point of View"). Similarly, by framing problems with "How Might We" questions, we remember brainstorming is organic and free of boundaries. Overall, your team should stay fluid in the search for ways you might resolve an issue – not chase a "holy grail" solution someone has developed elsewhere. The idea is to mine idea "ore" and refine "golden" solutions from it later.

Should you Forget Brainstorming?

Brainstorm, as great as it can be, has some obvious weaknesses, most of them human factors. Whenever a group of people gets together to work collectively on anything, we inevitably find some members dominating over others. Introverts take a back seat and prefer working away in a quieter self-reflective manner, while extroverts, especially egoistical ones, put a stake in the ground and try to own the show.

Here's the problem: Most pieces of research on brainstorming are rigorous but irrelevant to the challenge of managing creative work. For starters, comparing whether creativity happens best in groups or alone is pretty silly when you look at how creative work is actually done. At creative companies like IDEO, people switch

between both modes so seamlessly that it is hard to notice where individual work ends and group work starts.

Should Your Team Brainstorm as a Group or as Individuals?
Best practice: Switching between the two modes of individual and collective ideation sessions can be seamless—and highly productive. Alex Osborn's 1950s classic Applied Imagination gave advice that is still relevant: Creativity comes from a blend of individual and collective ideation.

Siblings of Brainstorming
Brainstorming (group sessions) has three siblings which you should get to know: Braindumping (individual sessions), Brainwriting (a mix of individual and group sessions) and Brainwalking (another mix of individual and group sessions).

It's often a good idea to do individual ideation sessions like braindumping, brainwriting and brainwalking before and after brainstorming group sessions.

Braindump – Individual Brainstorm

Braindump as a means to free up mental energy and allow freethinking. Holding onto your own thoughts, unfinished tasks, or unexplored ideas creates mental blockages and prevents freethinking. Furthermore, Braindump is an amazing technique to help quiet employees get a voice.

Should Your Team Brainstorm as a Group or as Individuals?

Best practice:
Switching between the two modes of individual and collective ideation sessions can be seamless—and highly productive Creativity comes from a blend of individual and collective ideation

Best practice: How

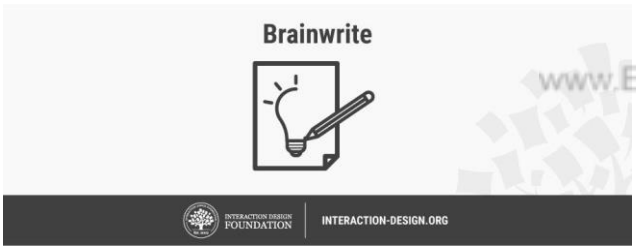
If you were the facilitator, you'll brief ideation participants upfront on the problem statement, goals and important insights from previous research and findings.
Then ask all participants to write down their ideas as they come.
It's important that each participant does this individually – and silently.
Provide participants with sheets of paper, idea cards or traditional Post-it notes. Sticky notes are great, because they allow people to write their ideas down individually – one idea per note.
Give participants between 3 and 10 minutes to get ideas they have been thinking of off their chests.
After reaching the time limit of approximately 3-10 minutes, each participant will say a few words about his or her ideas and stick them on a board or wall. You should avoid initial discussions about notes when team members are presenting them. Ideas that come out of early braindump sessions should be shared verbally with the entire team in order to spark new streams of thinking or combinations of ideas.
While sticking the ideas up and presenting them, the group will also group duplicates together.

When all team members have presented their ideas, you can select the best ideas, which you

can continue to build and elaborate on in other ideation sessions. There are various methods you can use such as “Post-it Voting”, “Four Categories”, “Bingo Selection”, “Six Thinking Hats”, and “Now Wow How Matrix”.

Sticky notes are great for braindump sessions, because they allow people to write their ideas down individually – one idea per note. After reaching the time limit of approximately 3-10 minutes, each participant will say a few words about his or her ideas and stick them on a board or wall.

Brainwriting



Brainwriting is a technique where participants write ideas onto cards and then pass their idea cards on to the next person, moving those cards around the group in a circle as participants build on the ideas of others. Participants perform this technique in complete silence—and they are forced to build on, instead of criticise, other participants' ideas. The cycle can be repeated multiple times and can be applied to chunks of the problem being addressed, depending on the need. The beauty of brainwriting is that it levels the playing field immediately, and it removes many of the obstacles of group brainstorming. With traditional verbal brainstorming, the number of ideas which can be expressed at once is limited, and the time it takes to get through a number of ideas is much longer, which results in many participants forgetting or becoming confused while others shout out ideas. This is especially so for those who are shy or introverted or who may be at a disadvantage due to being less senior or unfamiliar with the specialisations being discussed.

Brainwriting is an excellent starting point for ideation sessions, and can serve as a means to maximise the initial braindump, or as a way to refocus if other ideation methods go haywire. Before the chaos of group ideation muddles people's thinking, help them get their initial thoughts out in the open with an introductory brainwriting session and use the results later to build on further with other techniques.

Best Practice
If you were the facilitator, you'd brief ideation participants upfront on the problem statement, goals and important user insights from previous research and findings.

Encourage participants to jot down ideas on their idea cards for 3-5 minutes before passing on their ideas when you make the call.

Ideally, participants pass on idea cards 3-10 times depending on the problem statement and goals.

This all happens silently and without any interference or communication.

Encourage participants to push themselves for more ideas at least a couple of times, in the few minutes they have, in order to maximize the output and variation.

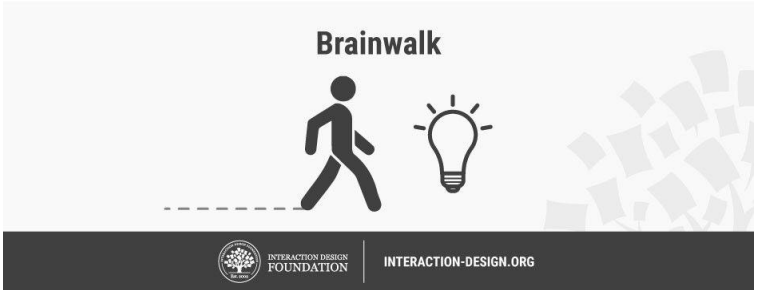
You should stoke the session with encouragement and provide questions or statements which push participants to think outside of their comfort zones.

The cycle can be repeated multiple times and can be applied to chunks of the problem being addressed, depending on the need.

After ending the cycle, each participant will briefly verbally present the thoughts on the idea card he/she ends up with by the end of the cycle to the rest of the team—in order to spark new streams of thinking or combinations of ideas. If you were the facilitator, you would often be taking notes on a white board.

When all team members have presented their idea cards, you can select the best ideas which you can continue to build and elaborate on in other ideation sessions. There are various methods you can use such as "Post-it Voting", "Four Categories", "Bingo Selection"and "Now Wow How Matrix".

Brainwalking



Brainwalking is very similar to brainwriting with one small but highly impactful difference. Instead of passing idea cards or notes from one participant to another, participants have to get up from their seats and move to another spot around the brainstorming table or even to another table altogether. Bryan Mattimore came up with this technique; he's a specialist in the art of ideation and facilitation. Mattimore has many years and thousands of sessions of experience conducting ideation sessions. In his book Idea Stormers, he describes brainwalking as the: 'single best technique to use to begin an ideation session'.

Brainwalking gets people out of their seats, gets them moving, keeps energy levels up and mixes things up enough so that the group as a whole does not get stuck delving too long down the same one-way street, without a quick exit or U turn available. Brainwalking works best when it is easy to flip or to start from scratch.

Brainstorming is the most frequently practiced form of ideation. We recommend that you mix it with Brainwriting, Brainwalking and Braindumping and other ideation methods. Idea generation is an art form, which is dependent on appointing an experienced facilitator and having an experienced team

GAMESTORMING

Gamestorming is a set of ideation and problem-solving methods that are purposely gamified in order to dramatically increase levels of engagement, energy, and collaboration during group sessions. It involves some of the methods we've already mentioned, while adding gamification.

What is Gamification?
Gamification is a technique which designers use to insert gameplay elements in non-gaming settings, so they enhance user engagement with a product or service. By weaving suitably fun features such as leaderboards and badges into an existing system, designers tap users' intrinsic motivations so they enjoy using it more.

The Appeal of Gamification in User Experience (UX) Design
Gamification is a powerful tool to drive user engagement for several reasons. It's not about transforming user interfaces into games. Instead, you use it to inject fun elements into applications and systems that might otherwise lack immediacy or relevance for users

The Challenge for UX Designers
Gamification is notoriously difficult. You should strike a cautious balance between the "fun factor" and the tone of the subject matter. Moreover, you must tailor the gameplay and the rewards precisely to the users. Simultaneously, you must fulfill certain user needs if "players" are to use the system without forcing themselves to. Such needs include:

Autonomy – Users' actions must be voluntary; you shouldn't push them to adopt desired behaviors but instead insert subtle elements/prompts which they can find on their own and therefore feel in control of their experience.

Relatedness – Users need to feel that your brand cares about what matters to them. Customizing your design's content and tone to them are especially useful for fostering their loyalty.

Competence – Related to autonomy, this need is about keeping users comfortable as they discover your design by never feeling overwhelmed or confused. For example, as users typically don't like reading lots of text, you can use icons (e.g., a heart for "Save to Favorites") or progressive disclosure.

Major Gamification Pitfalls:

Manipulation – Gamification is about motivating users by enabling them to have fun, not tricking them into doing things.

Building a Game – If you overdo the game features, you'll defeat the purpose of incentivizing users to complete real-world tasks.

Magic Paint – The system you're gamifying must be good per se. If it's subpar, gamification cannot make it a success.

Getting Gamification Right

To get gamification right, it's vital to know both the users and exactly how they should fulfill the goal or purpose of your gamified design, every step of the way. You also should understand that motivations will vary according to the task, objective and player. Likewise, the gamification mechanics must suit the users. So, when you choose to implement a leaderboard, points system, relationship-based approach, badges, etc., you should:

Enhance the experience from the users'/players' viewpoints by inserting the right gamification mechanics – First, do UX research to pinpoint who those "players" are and understand how they see their world. For instance, does their work environment suit a challenge-oriented experience with points, awards and competition? Or how about time constraints to complete the boring tasks and compulsory e-learning? Or might these seem adversarial and demotivate some users? Would a more discreet approach with elements of a journey of discovery and private personal achievement markers work best? From your research, you can create personas to help understand likely player types. From there, you can tailor a system that's right for all stakeholders involved.

Evaluate your design to monitor its effectiveness in bolstering user engagement – usability testing is invaluable here.

A FEW EXAMPLES OF GAMIFIED IDEATION SESSIONS INCLUDE:

Fishbowl: An ideation session in which participants sit in two circles, one smaller and one larger surrounding the smaller one. Participants in the inner circle discuss their ideas and brainstorm while participants in the outer circle listen, observe, and document the ideas and conversation points without saying anything. This forces some to listen and others to engage in brainstorming.

The Anti-Problem: The idea is based on flipping the problem. In the Anti-Problem is the opposite of the real problem that needs to be solved. In this session you seek to solve the anti-problem. This may provide inspiration that you could not have gotten access to by focusing purely on the real challenge, though it may generate ideas which are still related to the problem space. The ideas you generate can then be re-flipped to bring them back into the realm of the real problem.

Cover Story: This involves using a template that forces participants to create a cover story, including main image, headline, quotes, and sidebars with associated facts etc. It is a good method for vision generation sessions and helps create a cohesive picture of a broad subject area using the primary characteristics.

OBSERVATIONAL EMPATHY

What is empathy?

Empathy is the ability designers gain from research to understand users' problems, needs and desires fully so that they can design the best solutions for users. Designers strive for empathy by deeply probing users' worlds, to define their precise problems and then to ideate towards solutions that improve users' lives.

Empathy is the ability to understand and identify with another person's context, emotions, goals and motivations. In order to design great experiences, successful design firms actively search for empathic insights into their target group. In a design context, empathy serves a distinct purpose: to inspire design decisions in the early stages of the process. At IDEO, for example, the design team is so convinced about the positive effect it has on their projects that they actively advocate it to inspire other designers and innovators. Here, you'll learn how you can develop empathy for your target group.

Using empathy in the design process is on the one hand about collecting subjective information and on the other hand about objectively analysing it. The best way to collect the subjective information is to embed yourself in the context of your target group and gain personal insights into the experiences they have. There are three different approaches for you to use:

Looking at what people do

Asking people to participate

Trying things yourself

These should be used together to get empathic on an affective and a cognitive level.

Why is Empathy Important in a Design Process?

The aim of empathic design studies is not to seek solutions for recognized problems, but rather to look for design opportunities as well as develop a holistic understanding of the users. Design empathy is not only information and facts but also inspiration and food for ideas.

The Four Steps in Developing Empathy for your Target Group

As we mentioned before, there are three approaches to collecting the subjective information that you need so as to gain empathy for your target group. Each approach involves four general steps.

Discovery: enter the user's world and make contact with the user. This will help you get into the right mind-set to understand the user. Let's say you're designing a new workflow for employees working at a self-service food court to improve their efficiency. Maybe you have never exchanged more than a few words with the people behind the counters of a self-service food court. You don't know them. Walking around behind the scenes and getting a glimpse of the hours they put in and the limited space they have to move around in helps you get into the right mind-set. It triggers your designer's curiosity.

Immersion: wander around in the user's world to collect qualitative data. This helps you take the user's point of reference. When you start to collect data actively by participating as a member of the food court team,

talking to them during coffee breaks and taking pictures of things that stand out to you, you start to experience the context from your users' point of view.

Connection: resonate with the user, and recall your own experiences to connect and create meaning. This step may occur naturally while collecting the data. For example, when you find out how irritated the employees are by the lack of communication about changing menus and special offers, you might recall how it felt when you were in design school and teachers forgot to communicate clearly about changing mandatory literature for the next exam! Not having the right information to do your job properly may lead to a feeling of helplessness. You remember how it feels. You understand and identify with their context and feelings. You have empathic insights.

Detachment: step back into the role of designer, reflect and create ideas. While it may seem sufficient to get the empathic insights by following the previous steps, you need to look at your subjective data with a designer's mind so as to translate the empathic insights into ideas. A feeling of frustration about the lack of communication may seem solvable by actions directed at the team manager at first. Even so, after creating an overview of the insights and reflecting on it more objectively, you can use the informal communication that is already used between team members to create solutions that will give them a stronger feeling of control.

When you're designing a new workflow, for example for employees working at a self-service food court to improve their efficiency, you need to get empathic insights so as to understand who you're designing for. In the discovery step, you just wander around to trigger your curiosity. In the immersion step, you start to collect qualitative data in the user's context. In the connection step, you start to create meaning from the data you gather, by connecting them to your own experiences. You finally step back into the role of the designer to reflect and create ideas in the detachment step.

These steps reflect the balance you need between collecting subjective information on the one hand and objectively analysing it on the other. However, these steps are not terms that you are likely to use when you are trying to organise time and resources around the design research phase of a project. Rather than talking about immersion and detachment, you will be speaking in terms of collecting and analysing the qualitative data. Collecting information from your target group is the overlap between the immersion and connection steps. Analysis of the collected data is the detachment step.

The four steps in developing empathy for your target group are discovery, immersion, connection and detachment. In your day-to-day design process, you're more likely to refer to these steps as collecting and

analysing data.

How to Collect the Data You Need to Develop Empathy

Looking at what people really do in their current natural context or with prototypes you expose to them — This is a matter of observation of behaviours, interactions and products. Depending on the design assignment, you can plan to focus on certain aspects of the context. In any case, you will record your observations for further analysis and communication. You can do this by using notes, sketches of routes on maps, photographs, videos, etc. For example, mapping medical equipment and nurses on a hospital ward can lead to insights into how to improve the efficiency of workflows which your target audience will experience. And recording a video of walking a route through a government building at the eye-level height of a wheelchair user can lead to insights into how to improve the experience of accessibility.

Asking people to participate by recording their behaviour and context or by expressing their thoughts and feelings — You can do this without embedding yourself in the user's context by using a probes kit for context mapping (a collection of exercises designers give to a target group in a design project so as to obtain an understanding of their lives). However, embedding yourself in a context when asking people to participate may give deeper insights. For example, you might have seniors in a nursing home hand out cards with a pre-printed message which thanks the recipient, typically—in this case—a caregiver, an administration person or a member of the ancillary services (e.g., a janitor or cook). You could walk around with them when they give each one to a person they choose, thereby giving *you* enormous insights into the reasons behind their choices and the interactions these generate. Also here, you should use recording methods, such as filming or photographing, to preserve the data for later use.

Trying things yourself: to gain personal insights into the kinds of experiences others may have — This method is most time-consuming, but it may lead to different and more emotional insights. Resonating with the user on an emotional level may be easiest when you, for example, clean toilets in an office building for a few days and experience the mess people leave behind and the times people don't greet you like they do their colleagues. It is possibly the most difficult data to capture, but diary-style notes can be a good basis.

While all three approaches focus on gaining empathy, the first is more objective (more focused on cognitive aspects) and the last more subjective (more focused on affective aspects). Both are relevant in connecting with your users, so a mix of approaches will be most useful.

How to Analyse the Data Needed so as to Develop Empathy

The data you collect is very diverse, from personal impressions to pictures, quotes, maps and sketches. When analysing, your focus is on finding patterns or clusters that 'stand out' in some way as being an opportunity for design. For these patterns or clusters to emerge, you need to use your designer's intuition, but you can help it along with techniques borrowed from qualitative

research methods.

Best practice for an analysis process:

Gather all data into one room. Lay the materials out on tables and walls so you can see everything. Get two or three members of your design team together for the analysis.

Look at the data and start to see if some have similar themes. You can base these themes on underlying problems, recurrence of negative feelings, or anything else that sticks out and seems relevant to your design problem. Don't worry if you find it difficult at first. This step in the analysis process will get better with experience. Stick with it.

Label or cluster your data into categories, based on the themes you find. Use sticky notes and markers in different colours to indicate which pieces of data belong together.

Summarise the findings. At first, this could be an unorganised list of all conclusions. Then, you may add a hierarchy or (again) categories. Finally, you can summarise the findings in personas, requirements, mental models, scenarios, flowcharts or graphs. This will allow you to use the insights in any step of the remaining process and communicate them to stakeholders.

Empathy – The Glow You Put in Your Users' and Customers' Hearts

To understand your users/customers fully, you must see and feel their worlds from their perspective. And to access these core vantage points, you'll first need the right research methods. You want to gather reliable information from which you can distill your users' essences, as personas, to take forward in your design process. In user-centered design, user experience (UX) design and elsewhere, you need empathy. It even has a themed stage in the design thinking process: Empathize.

Your biggest challenge is to dig deep into your users'/customers' subconscious; they can't fully explain their precise needs. Designing for the human world is tricky, especially when users/customers access brands across many touchpoints and channels (e.g., online). In service design, ethnography is key to understanding their habits, motivations, pain points, values and whatever else influences what they think, feel, say and do on their user journeys. In ethnographic field studies, you observe what these users/customers do. Four methods are:

Shadowing – following users/customers around to get a day-in-the-life-of feel of what they experience.

Unstructured/Semi-structured Interviews – exploring hard-to-reach areas of their behavior in a naturalistic atmosphere, not systematically questioning them. This "hanging out" with them yields more honest, accurate insights. It's usually better to conduct semi-structured interviews,

strung loosely around an "areas-to-cover" framework in a discussion guide.

Diary Studies – letting users self-report. As with surveys, you rely on users to record things for you. Unlike surveys, diary studies help to capture "after-effects" over (typically) a 1-to-2-week period. Note: diary studies alone can't reveal pain points effectively; they're best combined with interviews.

Video Ethnography – video-recording enough material of participants in their environment as users/customers to gather insights about them.

How to Discover What Users Really Want
It's best to remain informal and open-minded.

Here's what to consider for an ethnographic study where you directly observe users interacting with a service (e.g., booking short-stay accommodation):

Introduction – Thank them and briefly explain your research's purpose.

Context – Look around and note your users' surroundings.

Note/observe/ask – Encourage them to continue their activities as though you weren't there, letting you observe and ask as few questions as possible. When you do ask questions, ensure they're open-ended and encourage more observations (e.g., "How?").

Touchpoints & Channels – Pay attention to the touchpoints and service channels your users interact with (e.g., paying for room/property bookings by phone).

Tools – Note which tools these customers use throughout their journey.

Familiarity with Domain/Task – Note how comfortable they are with the various tools and tasks they use/perform.

Service Artifacts – Pay attention to the artifacts that are important throughout the service experience between the customers' various touchpoints:

Physical items

Cognitive constructs (e.g., the customer's changing understanding of the steps involved)

Social or emotional elements (e.g., hunting for a lockbox in an unfamiliar street)

Disconnects – Notice these, which happen anytime customers experience a problem with the service (e.g., they can't access the accommodation/property).

Needed ecosystem support – Watch for the points in the service where support from the backstage of the service is needed (e.g., the service-providing organization/agency must contact the landlord if the customer can't).

Wrap-up – Thank them at the end of the session and answer any relevant questions they have.

For Semi-structured interviews, order and ask your questions properly, stringing them loosely in a discussion guide featuring the following types of questions:

Introductory – e.g., "What was it like the last time you…?"

Follow-up – on what they've just said.

Probing – ask them to give an example/explain something.

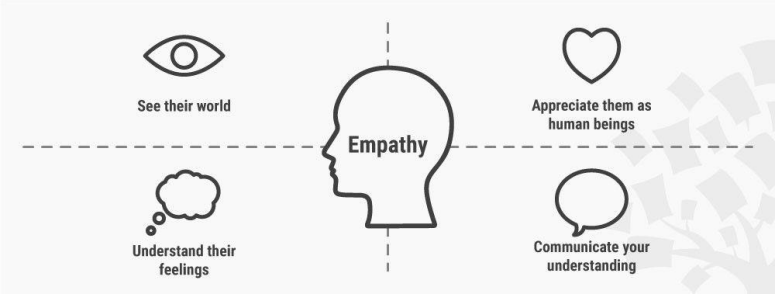
Specifying – if their descriptions are too general.

Direct – to introduce topics, etc.

Indirect – if you sense a direct question might lead the user, etc.

Structuring – to get back on-topic, etc.

Interpreting – to confirm you've understood the previous answer correctly.



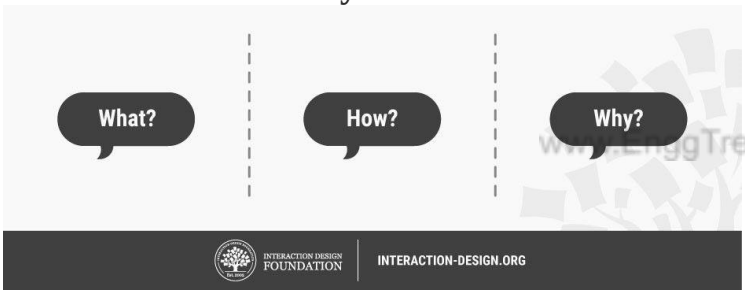
Developing Empathy towards People

The first stage (or mode) of the Design Thinking process involves developing a sense of empathy towards the people you are designing for, to gain insights into what they need, what they want, how they behave, feel, and think, and why they demonstrate such behaviors, feelings, and thoughts when interacting with products in a real-world setting.

To gain empathy towards people, we as design thinkers often observe them in their natural environment passively or engage with them in interviews. Also, as design thinkers, we should try to imagine ourselves in these users' environment, or stepping into their shoes as the saying goes, in order to gain a deeper understanding of their situations. In the following sections, we will outline some methods from d.school Bootcamp Bootleg that will allow you to gain empathy towards your users.

If we are to empathize with users, we should always try to adopt the mindset of a beginner. What this means is that, as designers (or design thinkers), we should always do our best to leave our own assumptions and experiences behind when making observations. Our life experiences create assumptions within us, which we use to explain and make sense of the world around us. However, this very process affects our ability to empathize in a real way with the people we observe. Since completely letting go of our assumptions is impossible (regardless of how much of a checkered reputation the word "assumption" has!), we should constantly and consciously remind ourselves to assume a beginner's mindset. It's helpful if you always remind yourself never to judge what you observe, but to question everything—even if you think you know the answer—and to really listen to what others are saying.

Ask What? How? Why?



UX designers' attitudes towards their work stem from natural curiosity, inquisitive behavior and constant critical appraisal of everything they encounter. Looking for the underlying factors and motives that drive users' behaviors and needs is what leads to successful design.

By asking the three questions — What? How? Why? — we can move from concrete observations that are free from assumptions to more abstract motivations driving the actions we have observed. During our observations, for instance, we might find separately recording the "Whats", "Hows" and "Whys" of a person's single observation helpful.

In "What", we record the details (not assumptions) of what has happened. In "How", we analyze how the person is doing what he/she is doing (is he/she exerting a lot of effort? Is that individual smiling or frowning?). Finally, in "Why", we make educated guesses regarding the person's motivations and emotions. These motivations we can then test with users.

Photo and Video User-based Studies

Photographing or recording target users, like other empathizing methods, can help you uncover needs that people have which they may or may not be aware of. It can help guide your innovation efforts, identify the right end users to design for, and discover emotions that guide behaviors.

Personal Photo and Video Journals

In this method, you hand over the camera to your users and give them instructions, namely to take pictures of or video-record their activities during a specified period. The advantage is that you don't interfere or disturb the users with your personal presence, even though they will adapt and change their normal behavior slightly as they know that you'll watch the video or see the photo journal later. In a similar way to using personas, by engaging real people, as designers we gain invaluable personal experiences and stories that keep the human aspect of design firmly in mind throughout the whole process.

Interviews

Interviews are an important part of the UX designer's skillset for empathizing with users. However, an interview will yield only minimal results if you are not prepared to conduct it with genuine empathy.

One-on-one interviews can be a productive way to connect with real people and gain insights. Talking directly to the people you're designing for may be the best way to understand needs, hopes, desires and goals. The benefits are similar to video- and camera-based studies, but interviews are generally structured, and interviewers will typically have a set of questions they wish to ask their interviewees. Interviews, therefore, offer the personal intimacy and directness of other observation methods, while allowing the design team to target specific areas of information to direct the Design Thinking process.

Engaging with Extreme Users

Extreme users are few in number, but it doesn't mean you should disregard them and aim just for the main bulk of users instead. In fact, they can provide excellent insights that other users may simply be unprepared to disclose.

By focusing on the extremes, you will find that the problems, needs and methods of solving problems become magnified. First, you must identify the extremes of your potential user base; then, you should engage with this group to establish their feelings, thoughts and behaviors, and then look at the needs you might find in all users. Consider what makes a user extreme and you'll tend to notice it's the circumstances involved. A basic example is a grocery store shopping cart and a shopper with five very young children in tow – there are two fold-down seats in the cart, but the other kids (who are also too young to walk) must go somewhere. Our shopper is, therefore, an extreme user of the shopping cart design.

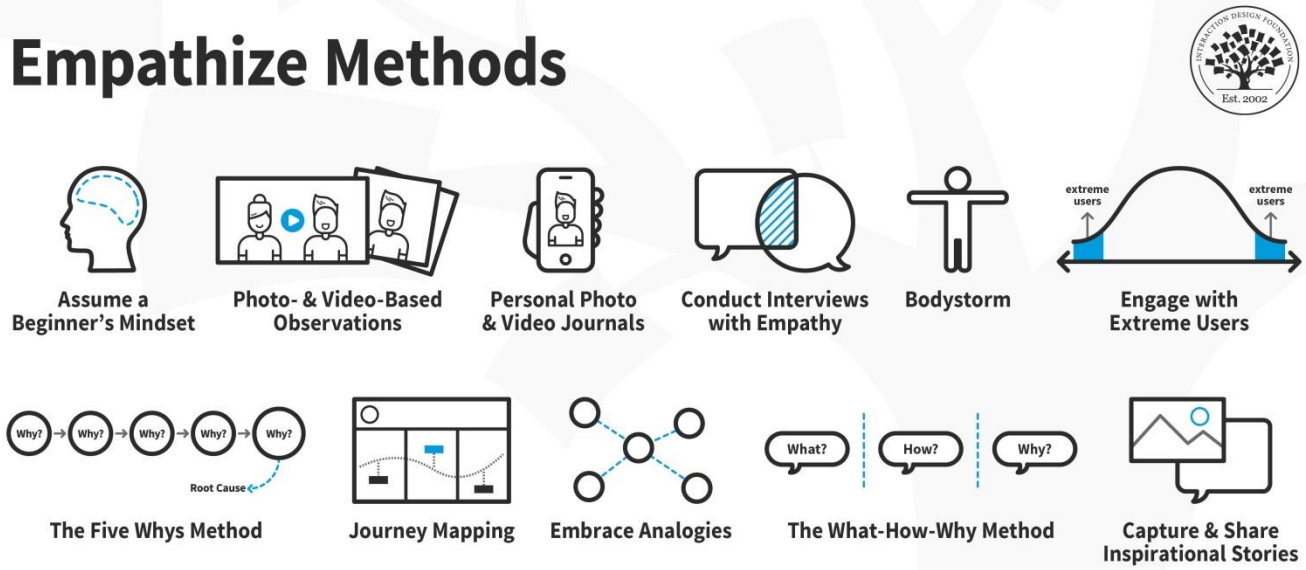
On the one hand, if you can manage to please an extreme user, you should certainly be able to keep your main body of users happy. On the other hand, it is important to note that the purpose of engaging with extreme users is not to develop solutions for those users, but to sieve out problems that mainstream users might have trouble voicing; however, in many cases, the needs of extreme users tend to overlap with the needs of the majority of the population. So, while you may not be able to keep everyone happy at all times with your design, you can certainly improve the chances that it will not frustrate users.

Analogous Empathy

Using analogies can help the design team to develop new insights. By comparing one domain with another, we as designers can conjure different solutions that would not necessarily come to mind when working within the constraints of one discipline. For example, the highly stressful and time-sensitive procedure of operating on a patient in a hospital emergency room might be analogous to the process of refuelling and replacing the tires of a race car in a pit stop. Some of the methods you might use in analogous empathy include comparing your problem and another in a different field, creating an 'inspiration board' with notes and pictures, and focusing on similar aspects between multiple areas.

Sharing Inspiring Stories

In the words of the great author Terry Pratchett, “People think that stories are shaped by people. In fact, it's the other way around.” We might paraphrase slightly here, as it’s true that products are shaped by the stories that people tell about them.



What’s good to note is this empathic phase of design thinking is named differently depending on which version of the methodology you follow. Different schools and companies which use design thinking have called empathic research "the Empathize stage" (as we do), "the understand phase," "the hear phase," and simply "looking," as well as a number of other terms. Regardless of which phrase you’re familiar with, the core is essentially the same — empathy is deeply human-centric and is essential at the start of any design process.

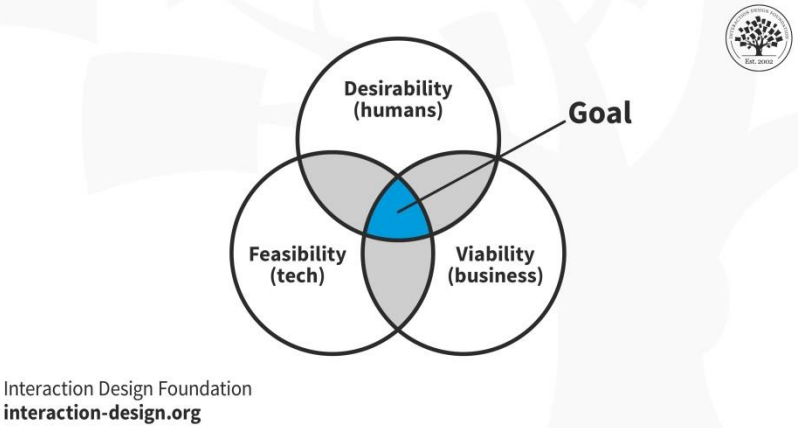
Empathy is Crucial to Business Success

Empathy can also be deemed an essential component of business solutions when you look at things from the perspective of profit. You may create solutions which completely miss the mark if you develop solutions in isolation — you need to gain essential insights about your users if you want to remain relevant in the market.

Many leaders within the fields of innovation, learning and entrepreneurship have pointed to three key parameters which define a successful product or service: desirability, feasibility and viability.

It’s not enough that the technology exists (i.e., feasibility is present) and that profits or business benefits may be derived (i.e., it is viable). Users need to feel a sense of desirability towards a

solution. We can only design a desirable product or service when people's needs, experiences, wants and preferences are properly understood.



One clear example of this is the iPod. Many MP3 players came and went throughout the late 1990s, and didn't create much of an impact. Then, along came the iPod in 2001. It not only provided a technological solution, but also delivered a completely desirable and viable experience. This meant Apple took the lead in the market and continued to hold it for many years to come, generating huge profits along the way.

Empathy Helps You Read Between the Lines

Empathy is also the only way to thoroughly understand what people mean, rather than just absorb what they say. You'll have noticed by now people do not necessarily always cover the details when they share stories and other information.

PANIMALAR INSTITUTE OF TECHNOLOGY

DEPARTMENT OF CSE

R-2021

ACADEMIC YEAR :2022-2023

BATCH :2021-2025

YEAR/SEM :III/V

SUBJECTCODE/TITLE :CCS370/UI AND UX DESIGN

UNIT-2

FOUNDATIONS OF UI DESIGN

UNIT II FOUNDATIONS OF UI DESIGN

Visual and UI Principles - UI Elements and Patterns - Interaction Behaviors and Principles – Branding - Style Guides

VISUAL AND UI PRINCIPLES

Visual design

- Visual design aims to improve a design's /product's aesthetic appeal and usability with suitable images, typography, space, layout and color.
- Visual design is about more than aesthetics. Designers place elements carefully to create interfaces that optimize user experience and drive conversion.

Visual Design is Aesthetic, Strategic Design

- **Visual design gives first impression**

Users' first impressions typically form in 50 milliseconds. This fact reflects the visceral level of emotional design-in other words, the user's first impression of or reaction to a design. If users don't like what is show, they will leave. So, visual design is a vital part of your work as a designer.

- **Purpose of visual design**

Visual design is used to create and organize elements to
A) lead the user's eye to an item's functionality
B) make the aesthetics consistent.

- **Need of visual design**

Designers compose and arrange website content around each page's purpose to ensure that content gives off the right visual cues.
The smallest and subtlest details will affect what users think and how they feel. So, designers must always show users the right things in the right way.

- **Challenges for visual designers**

1. User uncertainty. Therefore, a visual design should draw their attention to the important aspects and strike the balance between a fresh, powerful design and something users expect to see.
2. The application of visual design will depend on product, its organization/industry and its users
3. A major factor in visual design is that designers work to accommodate user limitations such as cognitive load.

THE KEY ELEMENTS & PRINCIPLES OF VISUAL DESIGN

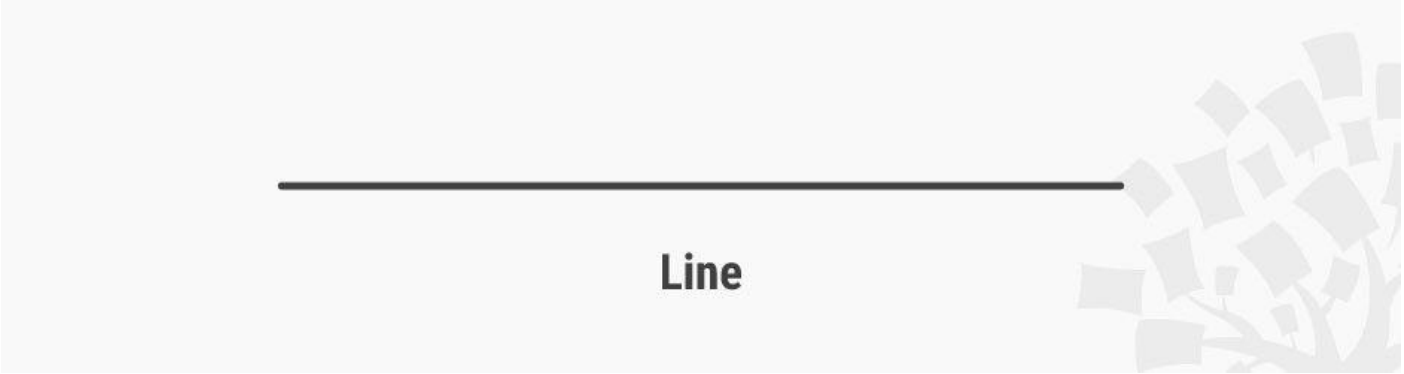
Visual design is about creating and making the general aesthetics of a product consistent. To create the aesthetic style of a website or app, designers work with fundamental elements of visual design, arranging them according to principles of design.

Elements of Visual Design

Any product — from software products such as websites and apps to hardware products such as toasters and hairdryers — can be broken down into fundamental elements of visual design as follows:

LINE

Lines are strokes connecting two points, and the most basic element of visual design. We can use them to create shapes, and when we repeat them, we can form patterns that create textures**.**

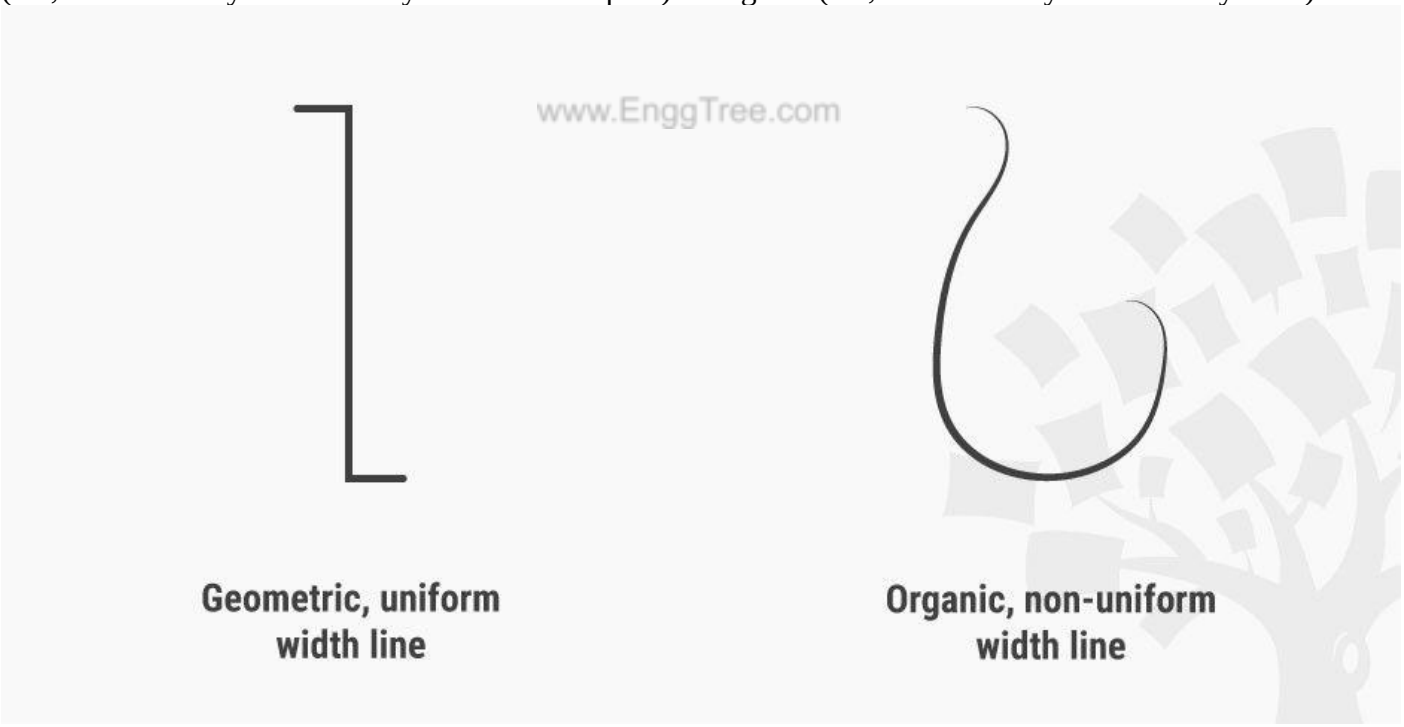


A line connects two points and is the simplest element of design.

Properties of line

Lines can possess a large variety of properties that allow us to convey a range of expressions.

For example, lines can be thick or thin, straight or curved, have uniform width or taper off, be geometric (i.e., look like they are drawn by a ruler or compass) or organic (i.e., look like they are drawn by hand).



Lines are simple, but can convey different emotions by using different properties.

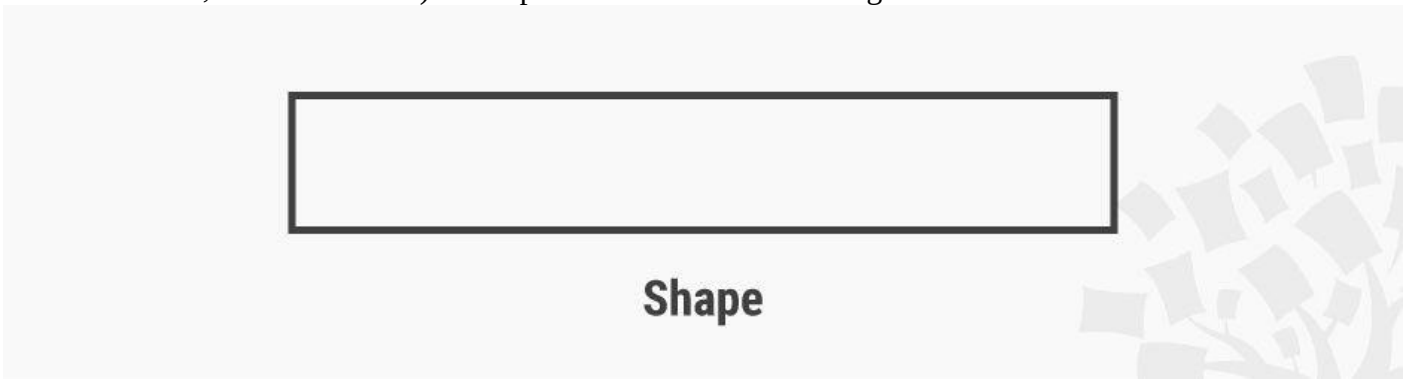
A line can also be implied: that is, suggested by forming an invisible connection between other elements.

Example: In the logo of the Interaction Design Foundation, for instance, the words “Interaction Design

Foundation" around the tree connect to create a semicircular implied line.

SHAPE

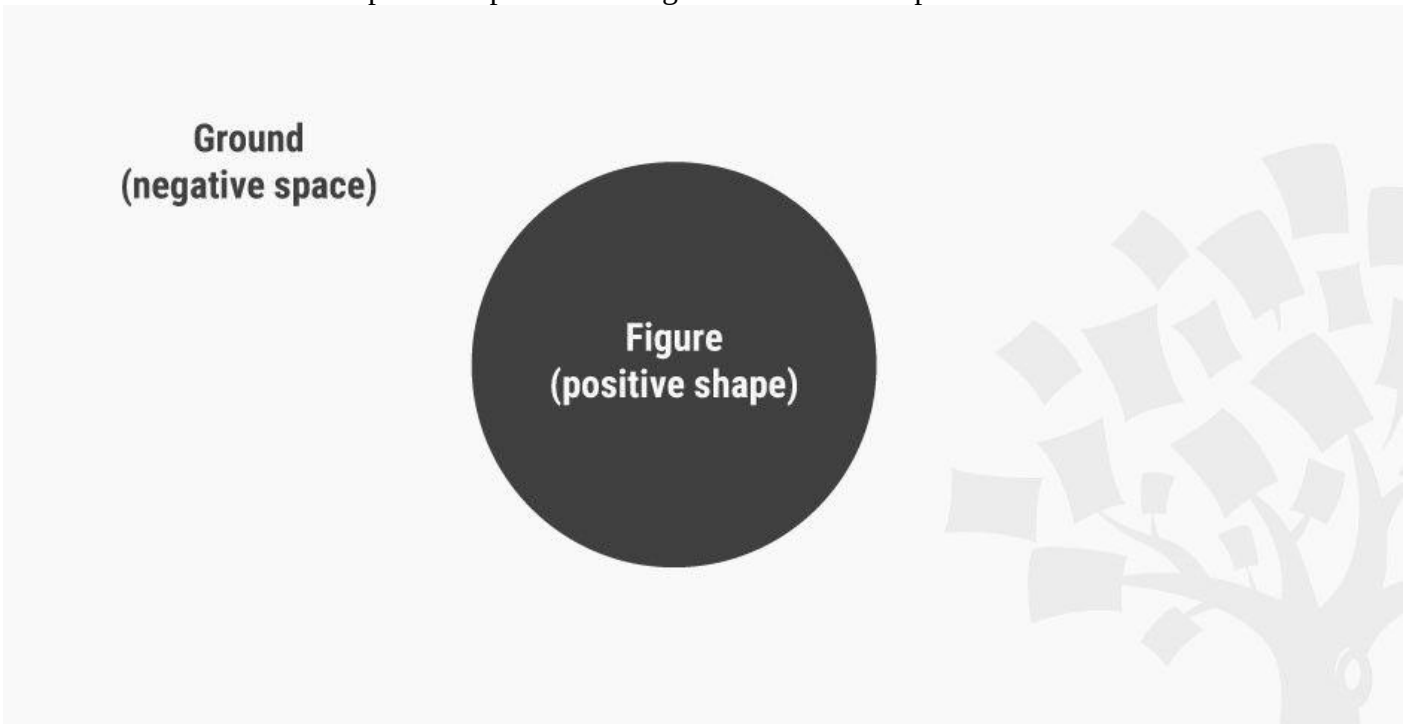
Shapes are self-contained areas, usually formed by lines (although they may also be formed by using a different colour, value or texture). A shape has two dimensions: length and width.



We tend to identify objects by their basic shapes, and only focus on the details (such as lines, values, colours and textures) on closer inspection. For this reason, shapes are crucial elements that we designers use for quick and effective communication.

NEGATIVE/WHITE SPACE

Negative space (also known as white space) is the empty area around a (positive) shape. The relation between the shape and the space is called figure/ground, where the shape is the figure and the area around the shape is the ground. Negative space is just as important as the positive shape itself — because it helps to define the boundaries of the positive space and brings balance to a composition.



Negative space, also called white space, is the empty area around a positive shape. You can choose to see

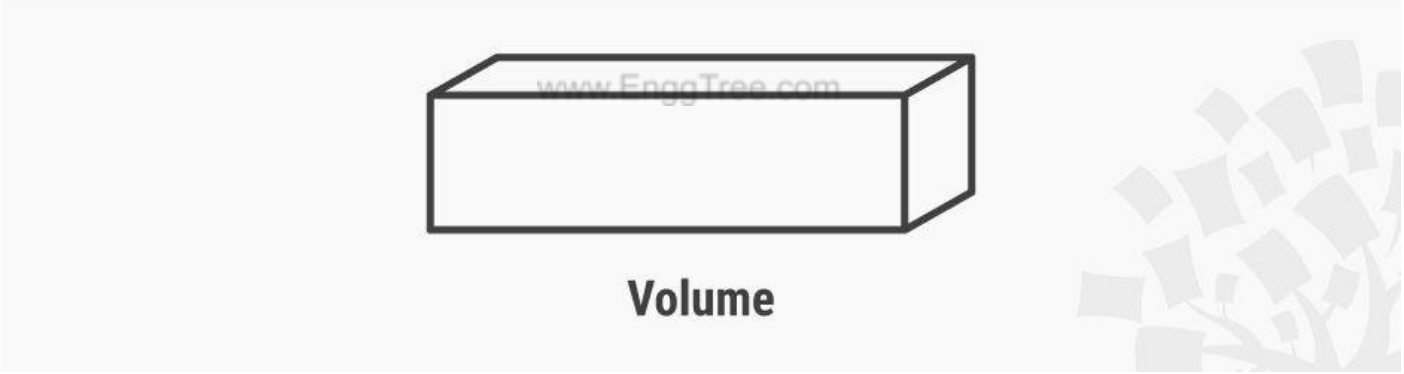
this as a blue ball set against a light blue rectangle — or, is it a light blue rectangle with a hole in it?

Some designs make use of negative space to create interesting visual effects. For example, the famous World Wide Fund for Nature (WWF) logo makes use of the confusion between positive shape and negative space to create the image of a panda.

WWF's logo doesn't explicitly draw out the entire panda: it cleverly uses negative (white) space around the black shapes to suggest the rest of the panda.

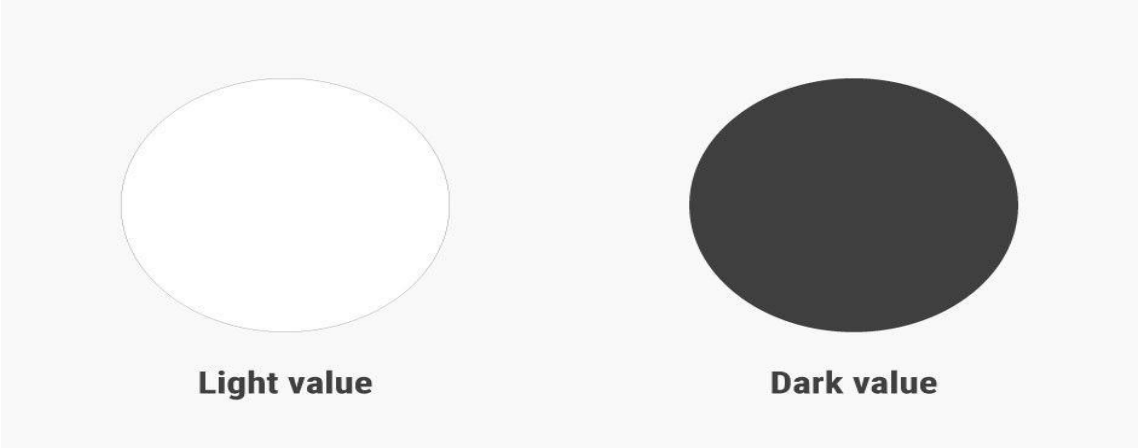
VOLUME

Volume applies to visuals that are three-dimensional and have length, width and depth. We rarely use volume in visual design, because most digital products end up being viewed on a 2D screen, although some apps and websites do use 3D models and graphics.

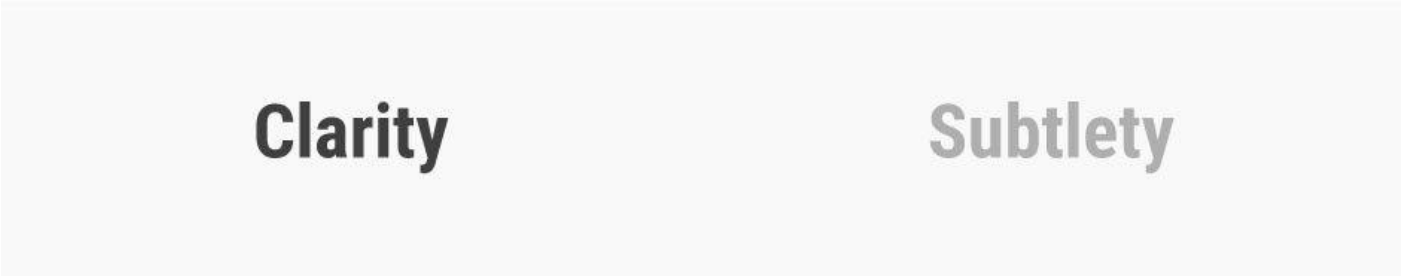


VALUE

Value, quite simply, describes light and dark.



A design with a high contrast of values (i.e., one which makes use of light and dark values) creates a sense of clarity, while a design with similar values creates a sense of subtlety. We can also use value to simulate volume in 2D, for instance, by using lighter values where the light hits the object and darker values for shadows.



Differences in values create clear designs, while designs using similar values tend to look subtle.

COLOUR

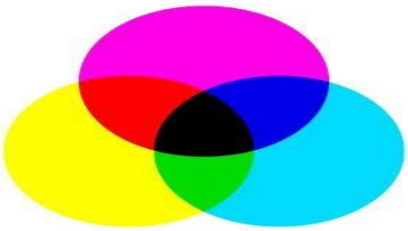
Colour is an element of light. Colour theory is a branch of design focused on the mixing and usage of different colours in design and art. In colour theory, an important distinction exists between colours that mix subtractively and colours that mix additively.

SUBTRACTIVE MIX

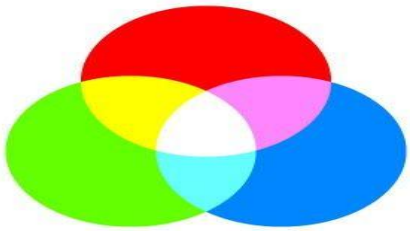
In paint, colours mix subtractively because the pigments in paints absorb light. When different pigments are mixed together, the mixture absorbs a wider range of light, resulting in a darker colour. A subtractive mix of cyan, magenta and yellow will result in a black colour. A subtractive mix of colours in paint and print produces the CMYK (i.e., Cyan, Magenta, Yellow and blacK) colour system.

ADDITIVE MIX

In digital design, where the product shows up on a screen, colours mix additively, since the screen emits light and colours add to one another accordingly. When different colours are mixed together on a screen, the mixture emits a wider range of light, resulting in a lighter colour. An additive mix of red, blue and green colours on screens will produce white light. An additive mix of colours on digital screens produces the RGB (i.e., Red, Green, Blue) colour system.



Subtractive mix
(in print)



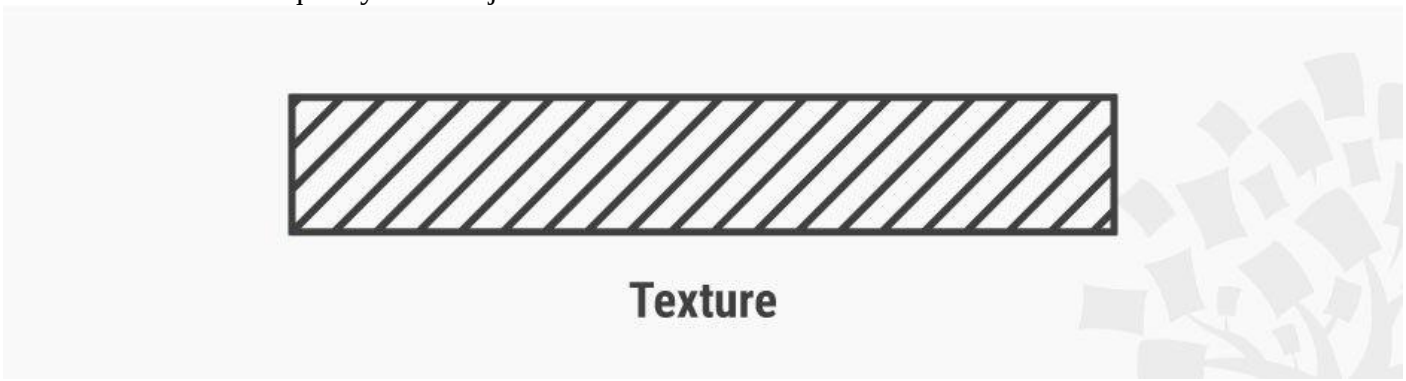
Additive mix
(on screen)

The subtractive mix of colours in paint and print produces the CMYK colour system. The additive mix of colours on digital screens produces the RGB colour system.

We use colours in visual design to convey emotions in and add variety and interest to our designs, separate distinct areas of a page, and differentiate our work from the competition.

TEXTURE

Texture is the surface quality of an object.



Texture can be created by a repeated pattern of lines, or by using tiled images of textures. Above, the diagonal lines add a ‘grip’ effect to an otherwise ‘smooth’ rectangle.

Types of texture

There are two types of textures: tactile textures, where you can feel the texture, and implied textures, where you can only see — i.e., not feel — the texture. Most visual designers will work with implied textures, since screens are unable to produce tactile textures.

Example:

The app icon designs in iOS 6 and earlier mimic the glossy texture of glass to incite users to tap them. Later, Apple introduced a linen fabric texture to much of its user interface.

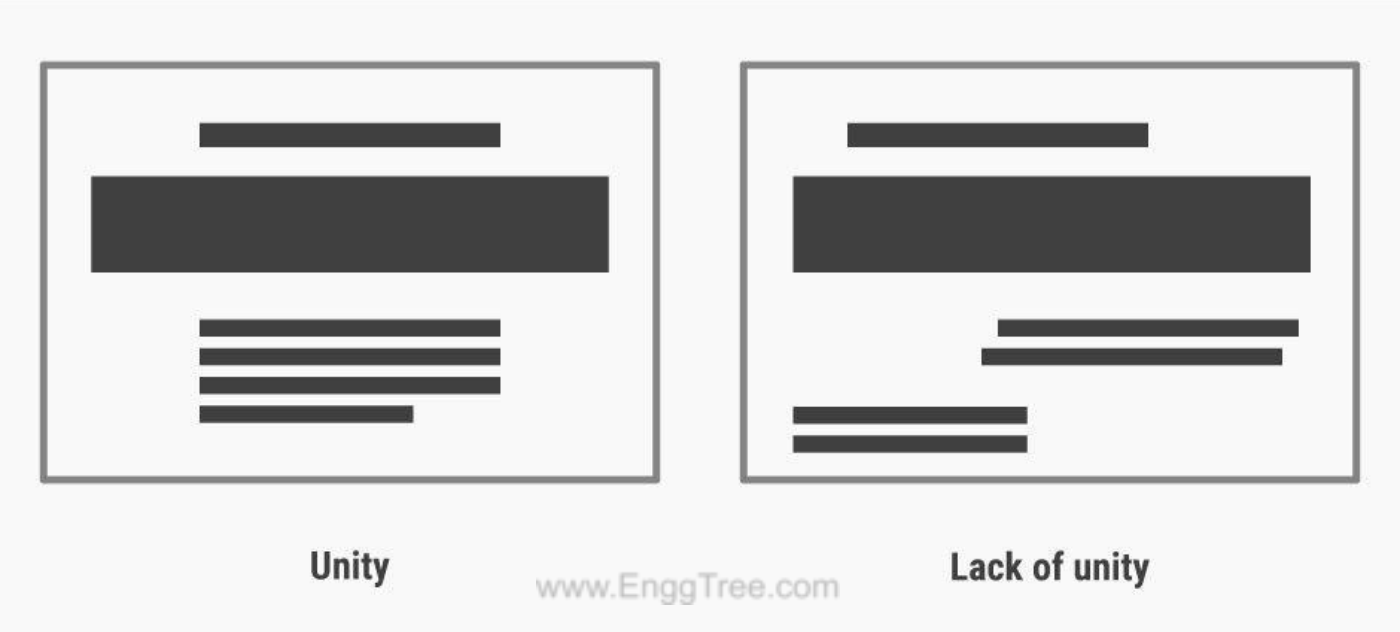
iOS 1-6 app icons feature a glossy texture so that they look like actual buttons.

VISUAL DESIGN PRINCIPLES

The elements of visual design — line, shape, negative/white space, volume, value, colour and texture — describe the building blocks of a product's aesthetics. On the other hand, the principles of design tell how these elements can and should go together for the best results. Many of the principles below are closely related and complement one another.

Unity

Unity has to do with creating a sense of harmony between all elements in a page. A page with elements that are visually or conceptually arranged together will likely create a sense of unity.



A lack of unity in designs can create a sense of unease and chaos. Our eyes govern our judgements.
When we're designing websites, we can make use of a grid for achieving a sense of unity, since elements organised in a grid will follow an orderly arrangement.

Gestalt

Gestalt refers to our tendency to perceive the sum of all parts as opposed to the individual elements. The human eye and brain perceive a unified shape in a different way to the way they perceive the individual parts of such shapes. In particular, we tend to perceive the overall shape of an object first, before perceiving the details (lines, textures, etc.) of the object.

Gestalt is the reason that we can see a square, circle and triangle even though the lines are not complete. We

see the whole formed by the dotted lines first, before perceiving the separate dotted lines in each of the images.

Example:

The WWF logo,is an example of making use of the principle of gestalt to create interesting designs. By placing the parts of a panda near one another and strategically, the design makes use of our tendency to view the whole of an image rather than its parts, thereby creating an illusion of a panda.

Need for gestalt

Gestalt is important, for instance, in making separate sections of a website distinct by increasing the white space between them. As designers, we should make sure that the parts of a website we group together by using gestalt principles — i.e., if they are close to one another, have the same shape, and/or are similarly sized — are indeed conceptually grouped together.

Designs with clear sections are easier to process and scan than those without clear distinctions between sections — especially if the sections are conceptually distinct.

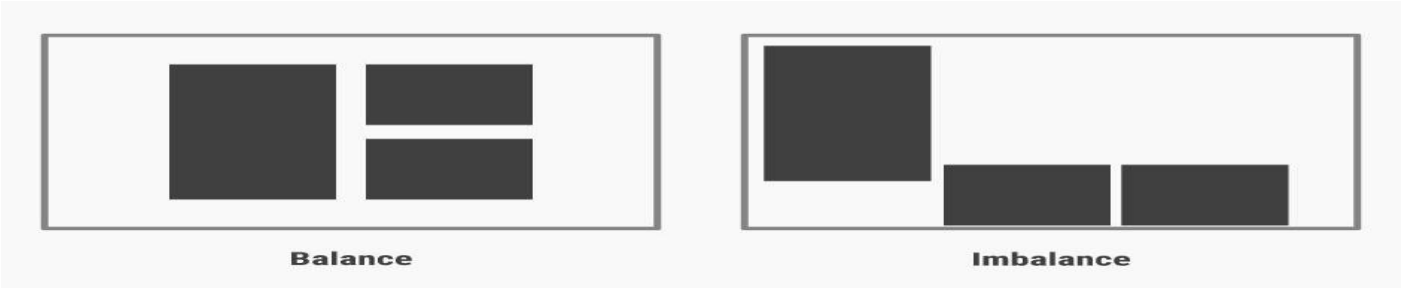
Hierarchy

Hierarchy shows the difference in importance of the elements in a design. Colour and size are the most common ways we can create hierarchy — for instance, by highlighting a primary button, or using larger fonts for headings. Items that appear at the top of a page or app also tend to be viewed as having a higher hierarchy than those appearing below.

Font size and style is one of the ways to establish hierarchy.

Balance

Balance is the principle governing how we distribute the elements of a design evenly. Balanced designs tend to appear calm, stable and natural, while imbalanced designs make us feel uneasy.



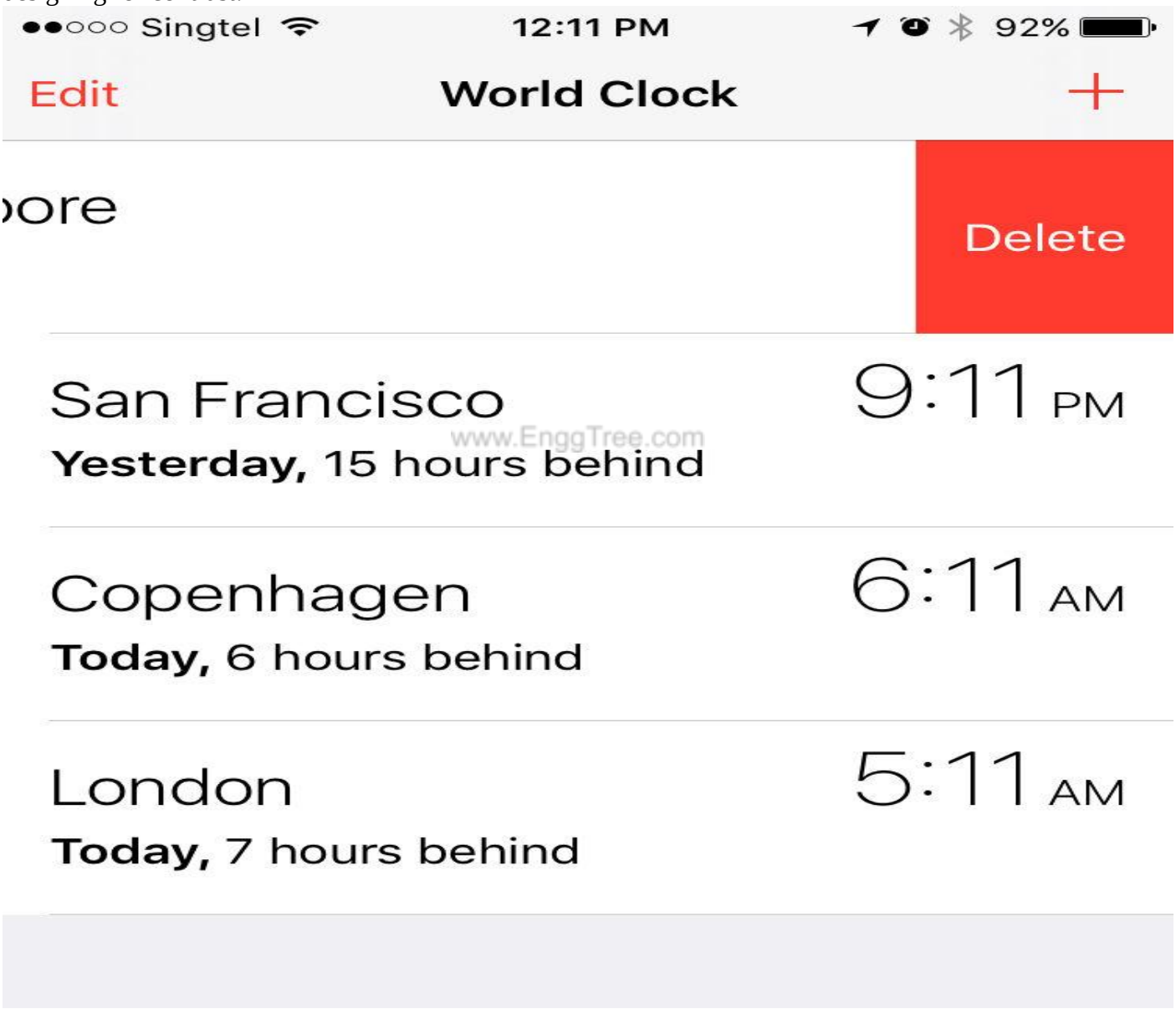
Balanced designs appear stable, while imbalanced designs seem unsustainable and unnatural.

Balance can be achieved by having symmetry in the design (for instance, having a webpage with centralised text and images).We achieve asymmetrical balance when we arrange differently sized elements in a way that results in unity.

Contrast

We use contrast to make an element stand out by manipulating differences in colour, value, size and other factors. We often use the colour red to make certain elements stand out. In iOS, red often appears in the "Delete" action to signify that an (often) irreversible action is about to occur.

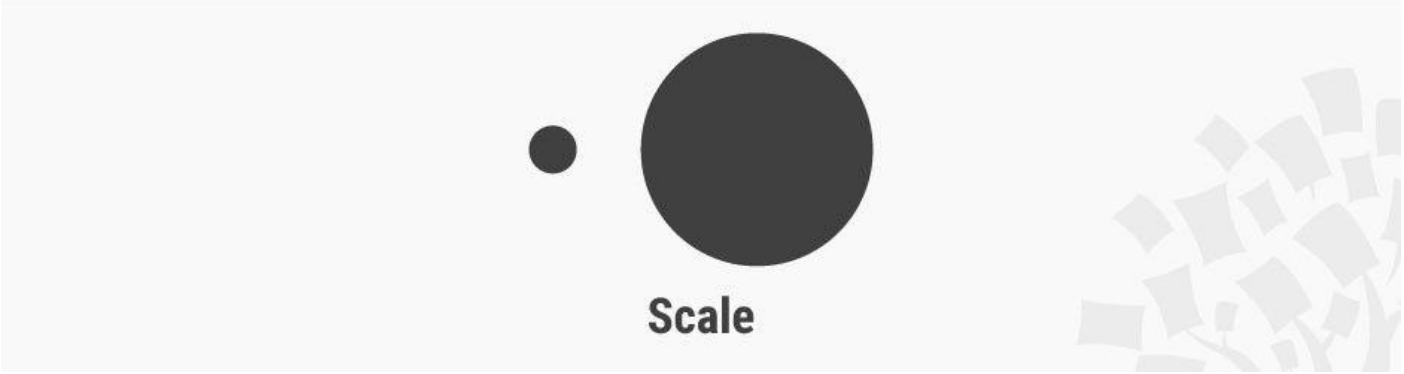
On the other hand, green is often something we use (at least in Western design) in positive actions such as "Go" and "Accept" — thus highlighting that we cannot ignore the cultural meaning of colours when designing for contrast.



Red, a colour with high contrast, is used widely in iOS for the "Delete" function.

Scale

Scale describes the relative sizes of the elements in a design. By using scale to make an element larger than others appearing with it, you can emphasise that element. Not only can you make an element stand out this way—you can also use scale to create a sense of depth .Exaggerated scales of images also add a certain level of interest and drama to them.



Scale can be used to create a hierarchy for and add emphasis to certain elements on a design.

Dominance

Dominance creates focus on a single element. We can use colour, shape, contrast, scale, and/or positioning to achieve this. For instance, most websites have a main "hero" image, which uses dominance to appeal to users, drawing them to it naturally.

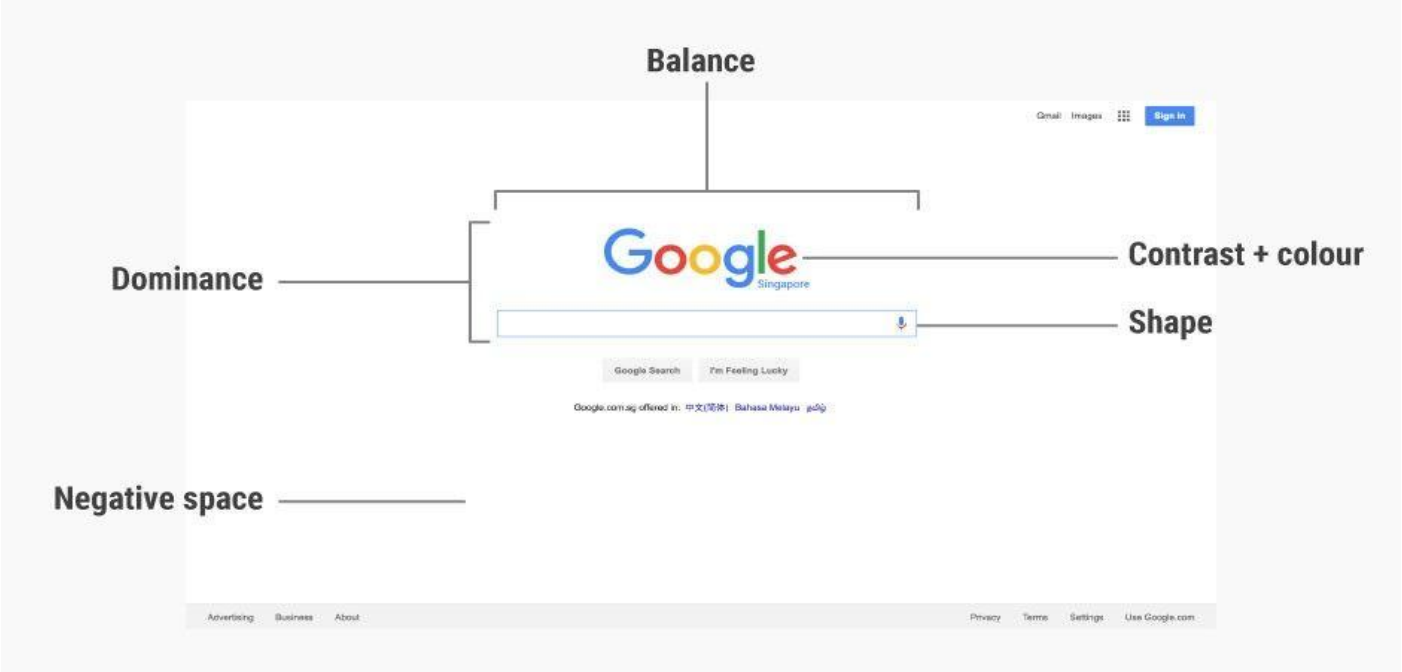
Dominance can be established by using positioning, shape and colour, among many other factors.

When working in visual design, we should ensure that we use dominance while still maintaining the unity and balance of websites — if not, the design would potentially produce a disorienting experience for users.

Examples of Visual Design Elements and Principles

Google's homepage

Google's homepage is one of the most visited webpages in the world. The raw simplicity of the page is partly why it is so well designed, but here are other factors that make this page work superbly:



Dominance: The large Google logo and search box gives it dominance, making it the core (and to most, sole) focus of the entire page.

Contrast (and colour): Google's logo uses bright (mostly primary) colours, and these mix well, forming a visually pleasing logo. The logo also has sufficient contrast against a white background, making it stand out on the page.

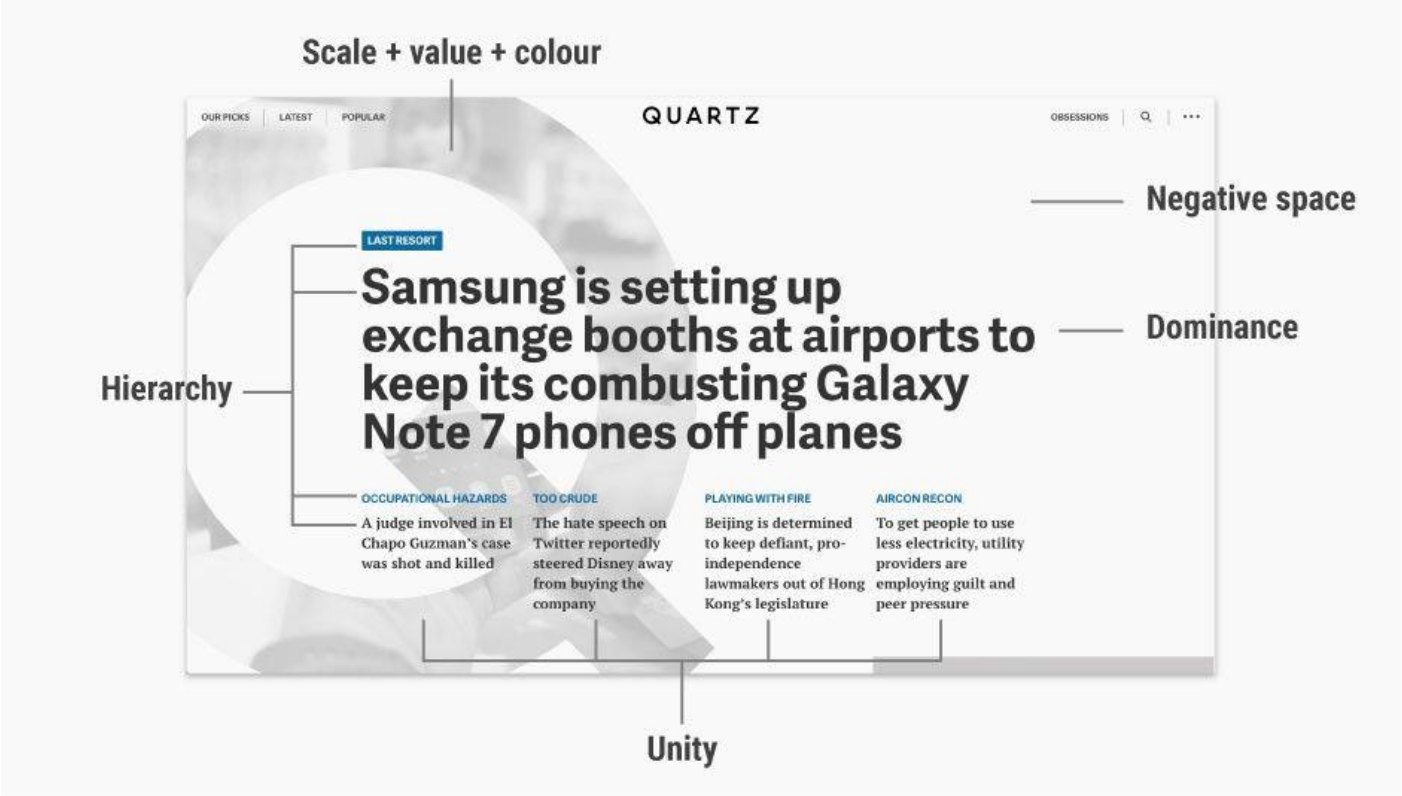
Shape: The search box uses a rectangular shape to delineate the search field, making it very usable**.**

Negative space: Google's homepage is predominantly made out of negative space, which makes the search box the centre of attention. The negative space also works well for the page, as it acts like a blank sheet of paper before users type in their search terms.

Balance: The page is almost vertically symmetrical, resulting in a sense of balance that is very pleasing and calm to look at.

Quartz's homepage

Quartz is a digital-first and mobile-first news agency with a global audience, launched in 2012 by Atlantic Media, which also publishes The Atlantic. It has a bold homepage that puts the featured news stories front and centre. Here's how the principles of design and design elements come together:



Dominance: The main news story immediately catches your eyes because its large, bold font makes it dominant on the homepage.

Hierarchy: The homepage uses a clear hierarchy to establish the relative importance of various elements. The main story, with the largest text and bolded weight, has the highest hierarchy. The next four stories, positioned below the main story, have smaller fonts to show their subordinate hierarchy under the main story.

Scale, value and colour: Quartz's homepage features a large (full page height) "Q", which is a mask of the hero image for the main story. The large "Q" quickly establishes the identity of the website (since "Q" stands for "Quartz") with the use of scale. However, the relative light value and greyscale colour of the "Q" makes it fade into the background, thus bringing the overall focus to the headline of the main story instead.

Negative space: Most of the homepage is negative space, which allows the content to shine through. When the mouse is brought over the main story headline, the "Q" mask disappears, filling the negative space with the featured image. This is an example of how a unique play of negative space can stimulate interest in a website's design.

Unity: Quartz uses a grid system in its website to create a sense of unity. For instance, the four stories have equal width and are uniformly spaced, creating a sense of orderliness and structure.

Careful Visual Design + Good Usability = Successful Design

A visual designer, you should strive to create content that is consistent and predictably organized, but at the same time impressively distinct. A visual designer wants to meet users' expectations so they win and keep their trust, and impress them with a unique brand presence.
Brand style guides typically define standards about color use, typography, etc.
As part of the design process you shouldn't forget accessibility when you judge how best to approach visual design regarding color, contrast, etc**.**

UI PRINCIPLES

User interface (UI)

"UI" is short for "User Interface." UI focuses on the screens, icons, buttons, visual elements and interfaces in a user experience.

User interface (UI) Design

User interface (UI) design is the process designers use to build interfaces in software or computerized devices, focusing on looks or style. Designers aim to create interfaces which users find easy to use and pleasurable. UI design refers to graphical user interfaces and other forms—e.g., voice-controlled interfaces.

Designing User Interfaces for Users

User interfaces are the access points where users interact with designs. They come in three formats:

Graphical user interfaces (GUIs)—Users interact with visual representations on digital control panels. A computer's desktop is a GUI.

Voice-controlled interfaces (VUIs)—Users interact with these through their voices. Most smart assistants—e.g., Siri on iPhone and Alexa on Amazon devices—are VUIs.

Gesture-based interfaces—Users engage with 3D design spaces through bodily motions: e.g., in virtual reality (VR) games.

Considerations To design best UIs

Users judge designs quickly and care about usability and likeability.

Users don't care about the design, but about getting their tasks done easily and with minimum effort.

The design should therefore be "invisible": Users shouldn't focus on design but on completing tasks: e.g., ordering pizza on Domino's Zero Click app.

So, understand the users' contexts and task flows to fine-tune the best, most intuitive UIs that deliver seamless experiences.

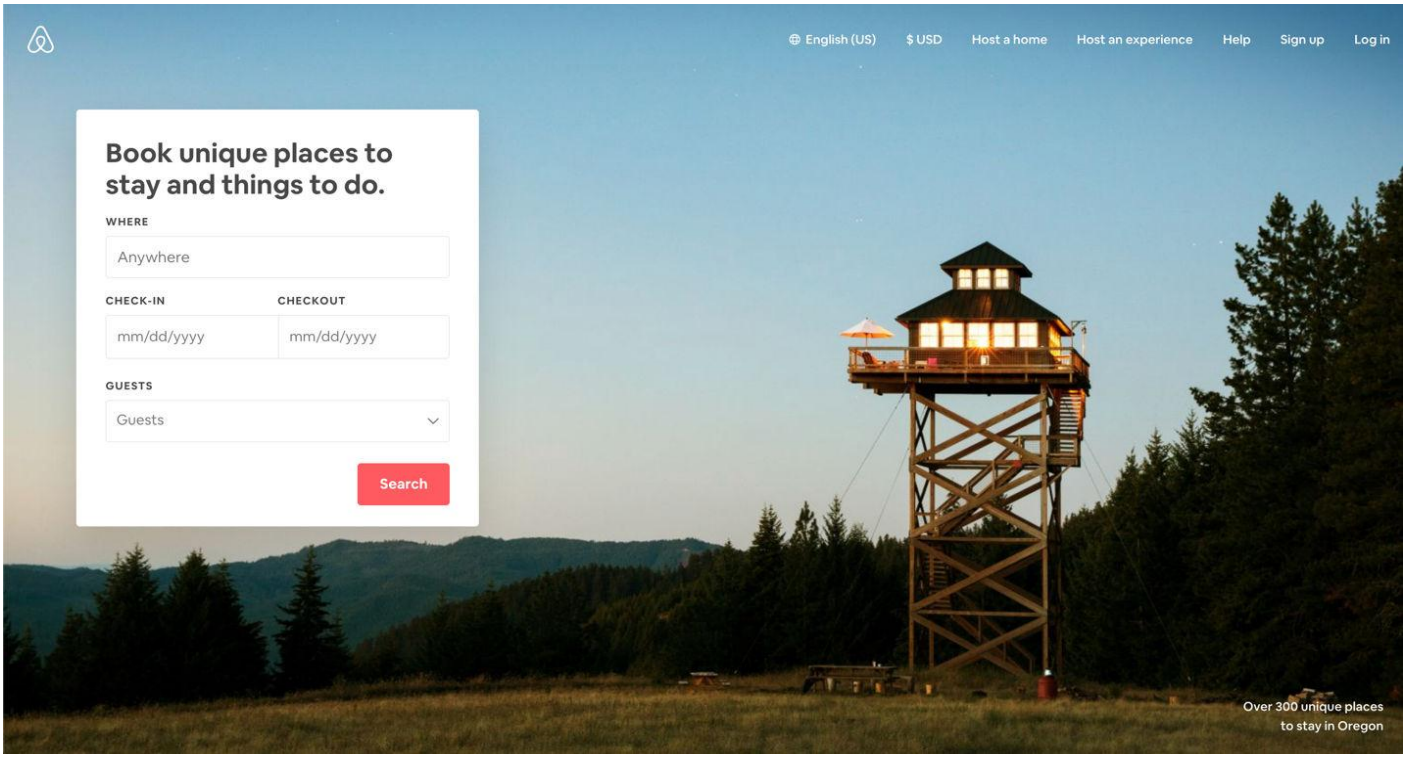
UIs should also be enjoyable (or at least satisfying and frustration-free).

When your design predicts users' needs, users can enjoy more personalized and immersive experiences. Delight them, and they'll keep returning.

Where appropriate, elements of gamification can make your design more fun.

UIs should communicate brand values and reinforce users' trust.

Good design is emotional design. Users associate good feelings with brands that speak to them at all levels and keep the magic of pleasurable, seamless experiences alive.



Airbnb's simple, inviting layout lets users satisfy their travel needs quickly, easily and enjoyably.

HOW TO MAKE GREAT UI's
BASIC PRINCIPLES OF UI DESIGN:

To deliver impressive GUIs, remember—users are humans, with needs such as comfort and a limit on their mental capacities.

1.Make buttons and other common elements perform predictably (including responses such as pinch-to-zoom) so users can unconsciously use them everywhere. Form should follow function.

2.Maintain high discoverability. Clearly label icons and include well-indicated affordances: e.g., shadows for buttons.

3.Keep interfaces simple (with only elements that help serve users' purposes) and create an "invisible" feel.

4.Respect the user's eye and attention regarding layout. Focus on hierarchy and readability:

a.Use proper alignment. Typically choose edge (over center) alignment.

b.Draw attention to key features using:

- Color, brightness and contrast. Avoid including colors or buttons excessively.
- Text via font sizes, bold type/weighting, italics, capitals and distance between letters. Users should pick up meanings just by scanning.

5.Minimize the number of actions for performing tasks but focus on one chief function per page. Guide users by indicating preferred actions. Ease complex tasks by using progressive disclosure.

6.Put controls near objects that users want to control. For example, a button to submit a form should be near the form.

7.Keep users informed regarding system responses/actions with feedback.

8.Use appropriate UI design patterns to help guide users and reduce burdens (e.g., pre-fill forms). Beware of using dark patterns, which include hard-to-see prefilled opt-in/opt-out checkboxes and sneaking items into users' carts.

9.Maintain brand consistency.

10.Always provide next steps which users can deduce naturally, whatever their context.

NIELSEN AND MOLICH'S 10 USER INTERFACE DESIGN GUIDELINES

Visibility of system status: Users should always be informed of system operations with easy to understand and highly visible status displayed on the screen within a reasonable amount of time.

Match between system and the real world: Designers should endeavor to mirror the language and concepts users would find in the real world based on who their target users are. Presenting information in logical order and piggybacking on user's expectations derived from their real-world experiences will reduce cognitive strain and make systems easier to use.

User control and freedom: Offer users a digital space where backward steps are possible, including undoing and redoing previous actions.

Consistency and standards: Interface designers should ensure that both the graphic elements and terminology are maintained across similar platforms. For example, an icon that represents one category or concept should not represent a different concept when used on a different screen.

Error prevention: Whenever possible, design systems so that potential errors are kept to a minimum. Users do not like being called upon to detect and remedy problems, which may on occasion be beyond their level of expertise. Eliminating or flagging actions that may result in errors are two possible means of achieving error prevention.

Recognition rather than recall: Minimize cognitive load by maintaining task-relevant information within the display while users explore the interface. Human attention is limited and we are only capable of maintaining around five items in our short-term memory at one time. Due to the limitations of short-term memory, designers should ensure users can simply employ recognition instead of recalling information across parts of the dialogue.

Flexibility and efficiency of use: With increased use comes the demand for less interactions that allow faster navigation. This can be achieved by using abbreviations, function keys, hidden commands and macro facilities. Users should be able to customize or tailor the interface to suit their needs so that frequent actions can be achieved through more convenient means.

Aesthetic and minimalist design: Keep clutter to a minimum. All unnecessary information competes for the user's limited attentional resources, which could inhibit user's memory retrieval of relevant information. Therefore, the display must be reduced to only the necessary components for the current tasks, while providing clearly visible and unambiguous means of navigating to other content.

Help users recognize, diagnose and recover from errors: Designers should assume users are unable to understand technical terminology, therefore, error messages should almost always be expressed in plain language to ensure nothing gets lost in translation.

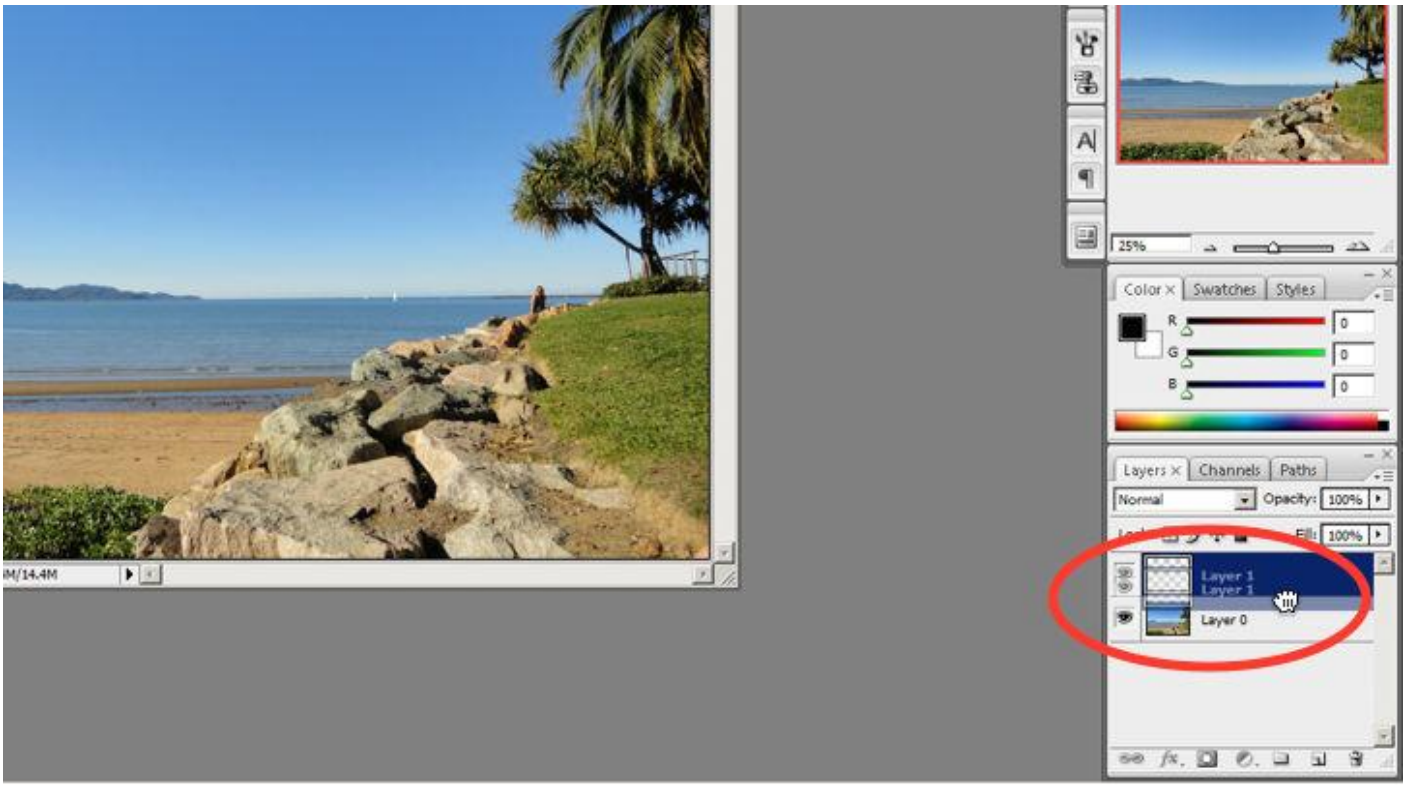
Help and documentation: Ideally, we want users to navigate the system without having to resort to documentation. However, depending on the type of solution, documentation may be necessary. When users require help, ensure it is easily located, specific to the task at hand and worded in a way that will guide them through the necessary steps towards a solution to the issue they are facing.

EXAMPLE TO LEARN HOW ADOBE INTEGRATES NIELSEN AND MOLICH'S TEN USER INTERFACE DESIGN GUIDELINES

Adobe Systems Incorporated, the large North American computer software company, is a great example of how designs reflecting Nielsen and Molich's ten user interface guidelines can lead to success for a company. Adobe Photoshop, which is a raster graphics editor exhibits the characteristics of a well designed user interface that reflects these guidelines.

1. Visibility of System Status

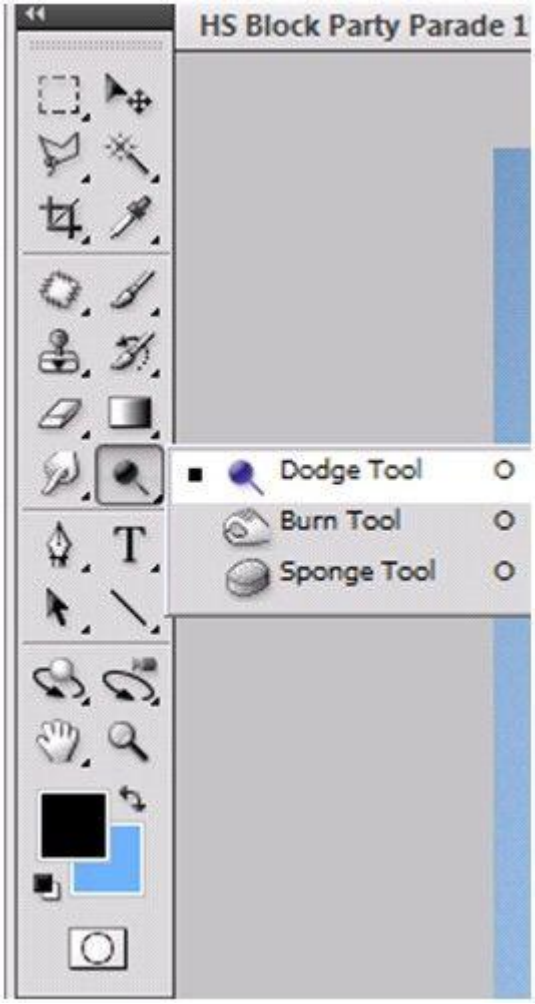
Photoshop does a great job of letting the user know what's happening with the program by visually showing the user what their actions have led to whenever possible. For example, when users move layers around in the Layers palette, they can visually see the layer being represented as physically dragged within the space.



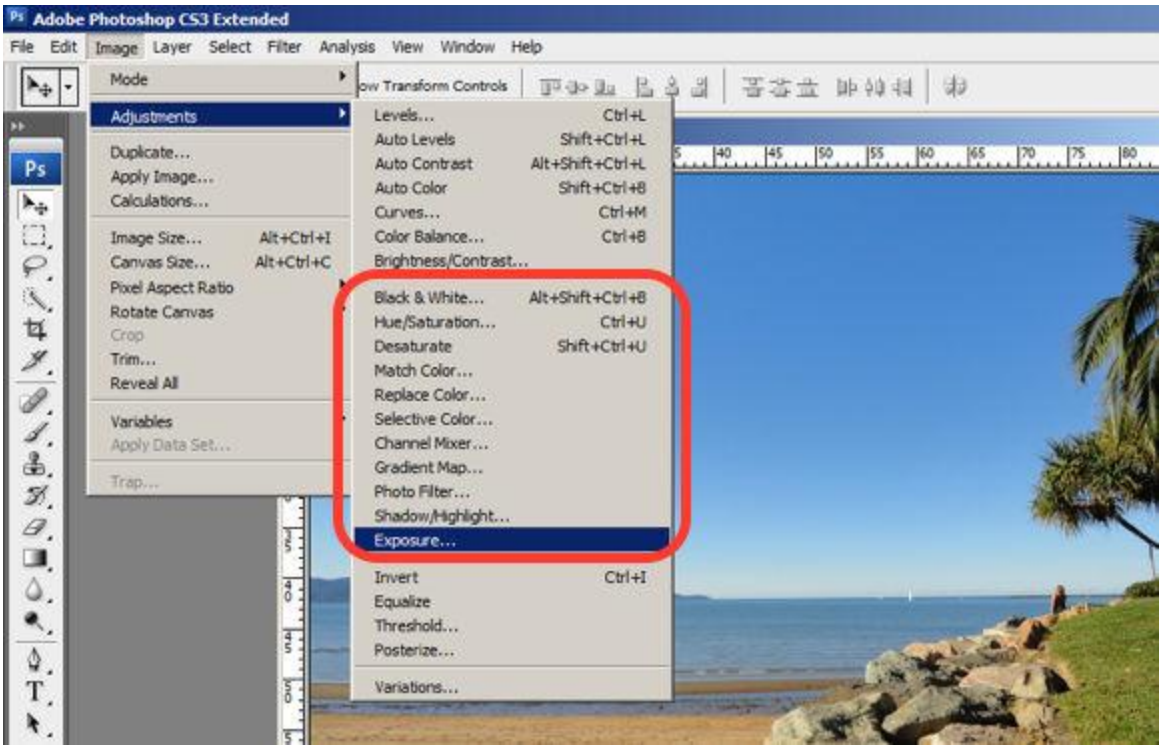
The cursor graphic goes from representing an open-hand to a gripped hand when the user drags a layer around within the Layers palette. This makes it easier to instantly understand the system status. Additionally, Adobe's choice of using a 'hand' is a great example of the second guideline where the system matches the real world.

2. System Match To The Real World

An example of Photoshop mimicking the real world in terms and representations that their target users would understand, is where they design the information structure and terminology to mirror the same wording we would use in the world of photography or print media. Familiar concepts and terms like RGB, Hue/Saturation/Brightness and CMYK are used to represent color, while various tools like the dodge tool and the burn tool mimics a traditional darkroom technique for photographs.



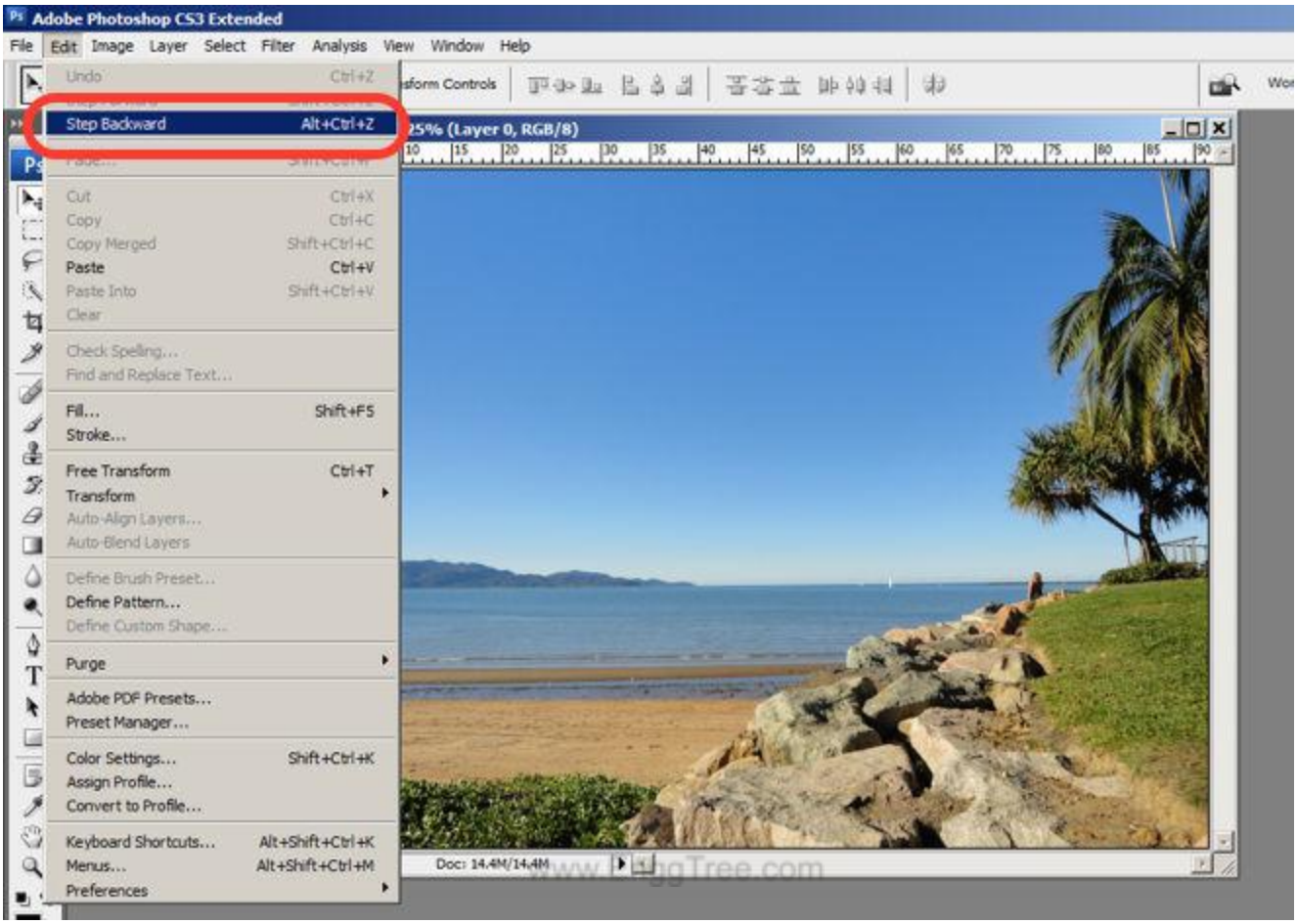
Photoshop's Dodge Tool and Burn Tool mimics a traditional darkroom technique for photographs



Photoshop utilizes the term, “Exposure”, as commonly used in the world of photography.

3. User Control and Freedom

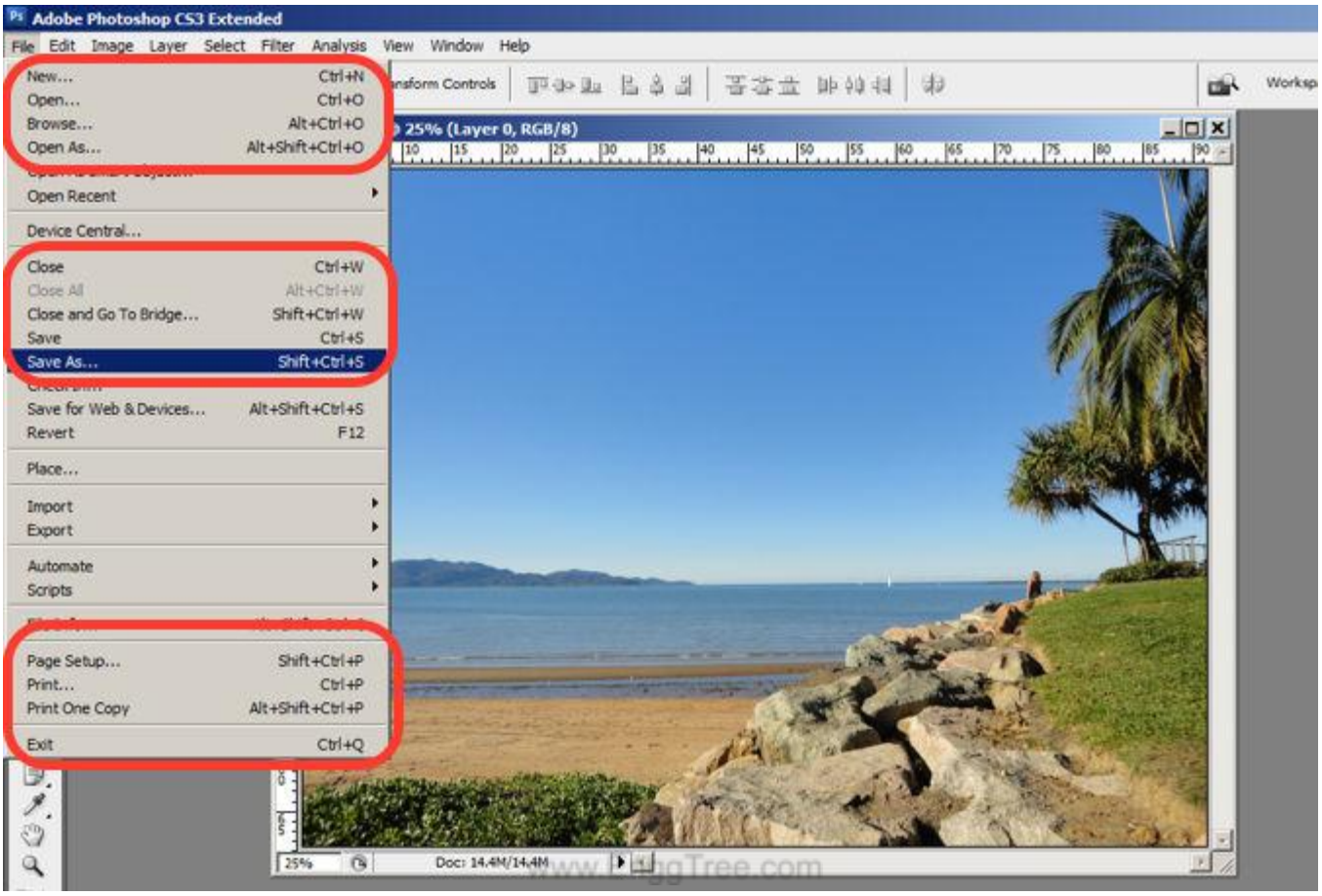
Photoshop is very good at providing users with control every step of the way. As the user makes changes to an image or adds various artistic effects, they are able to quickly and easily take a step backwards if they make an error, for instance.



The users are in control as they can take a Step Backward or Step Forward under the Edit menu, or alternatively they can use Photoshop's keyboard shortcuts like Alt+Ctrl+Z, for example.

4. Consistency and Standards

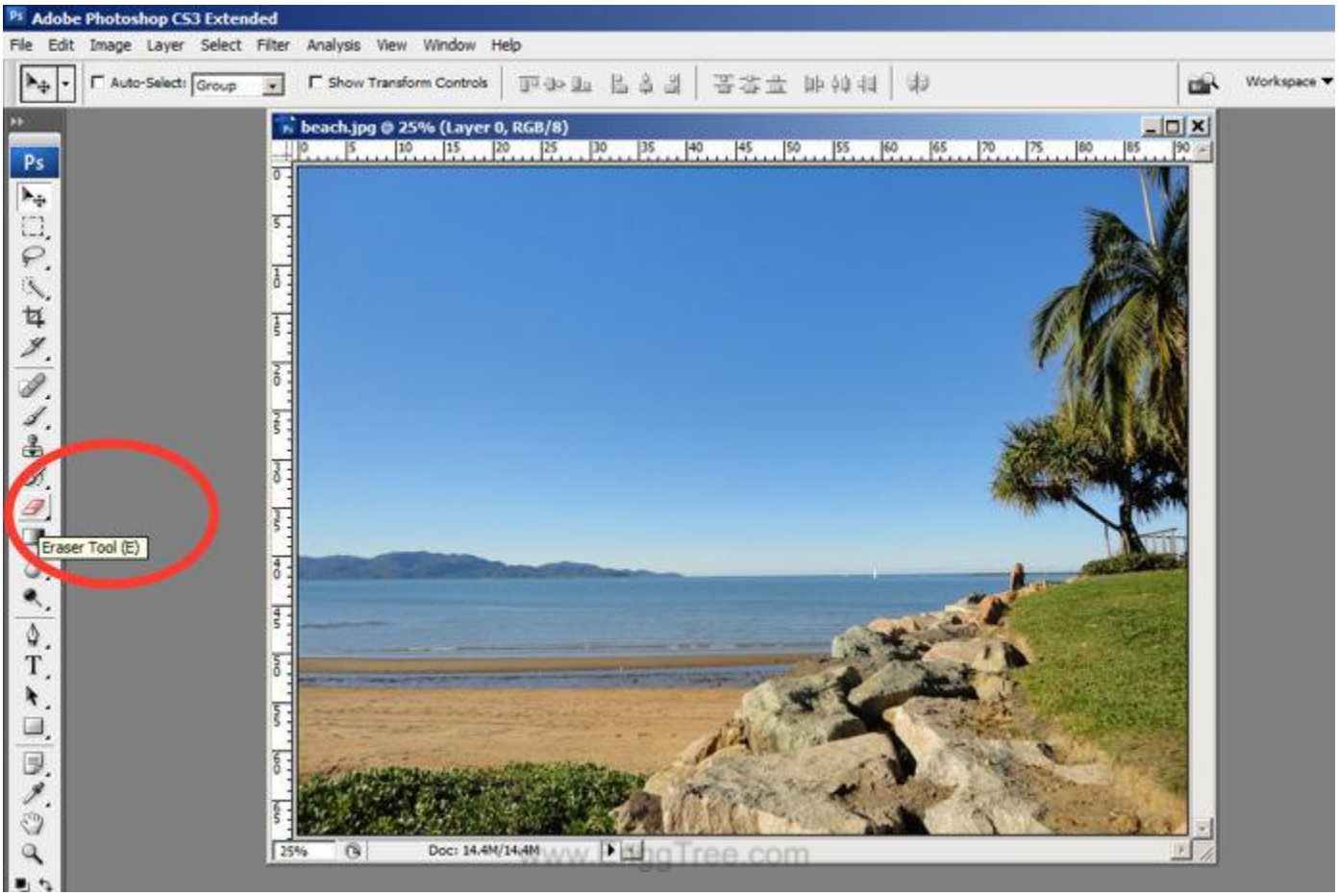
Photoshop maintains a standard layout and look and feel when it comes to the menu bar. They also utilize commonly known terminology such as "New…", "Open…", "Save As…", etc**.**



The File menu in Photoshop displays a variety of highly familiar options**.**

5. Error Prevention

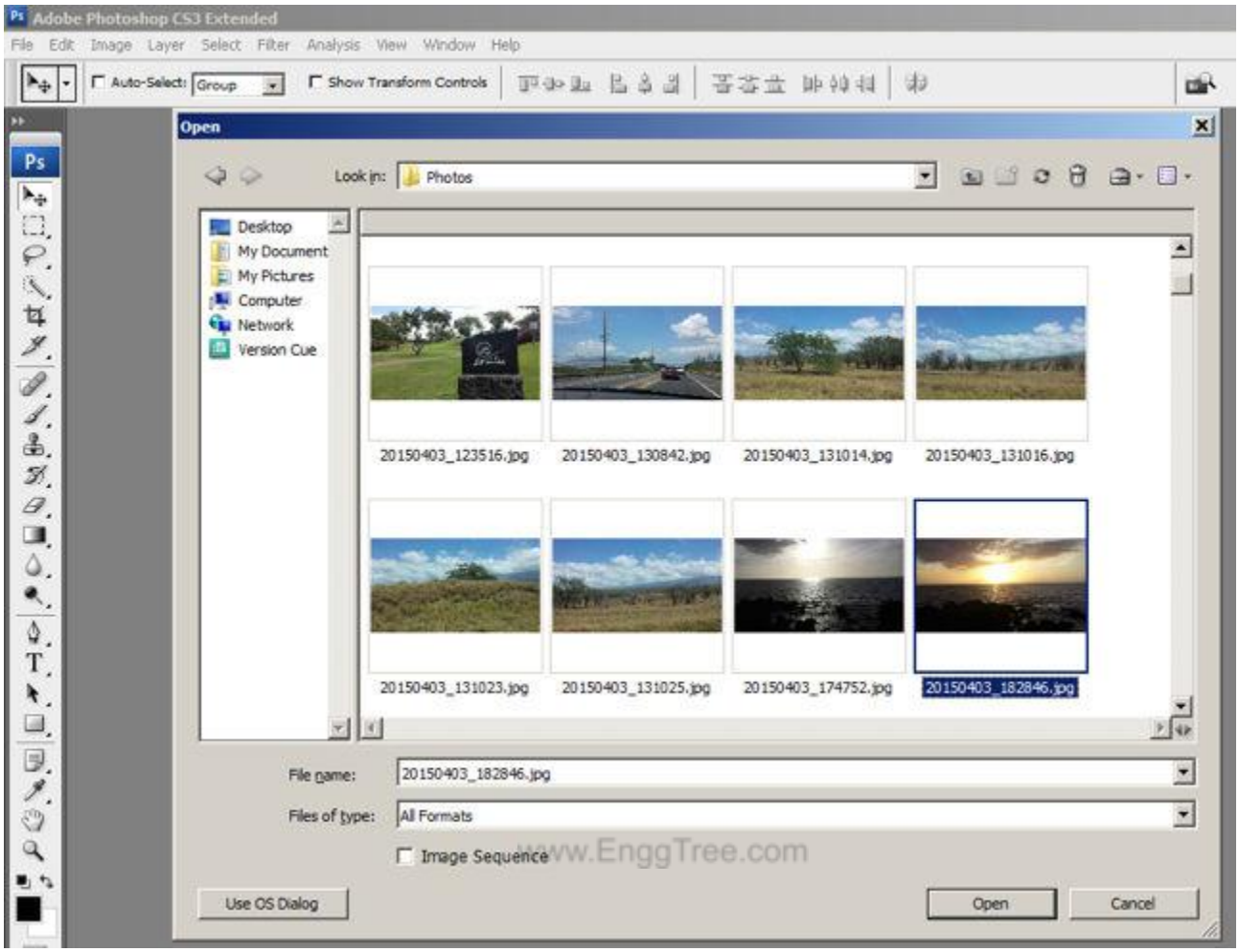
To prevent users from making errors, Photoshop provides a brief description or label of the tools when a user hovers over it to help make sure users are using the proper tool for the task at hand.



The user hovers over the eraser icon and Photoshop displays the "Eraser Tool" label.

6. Recognition rather than Recall

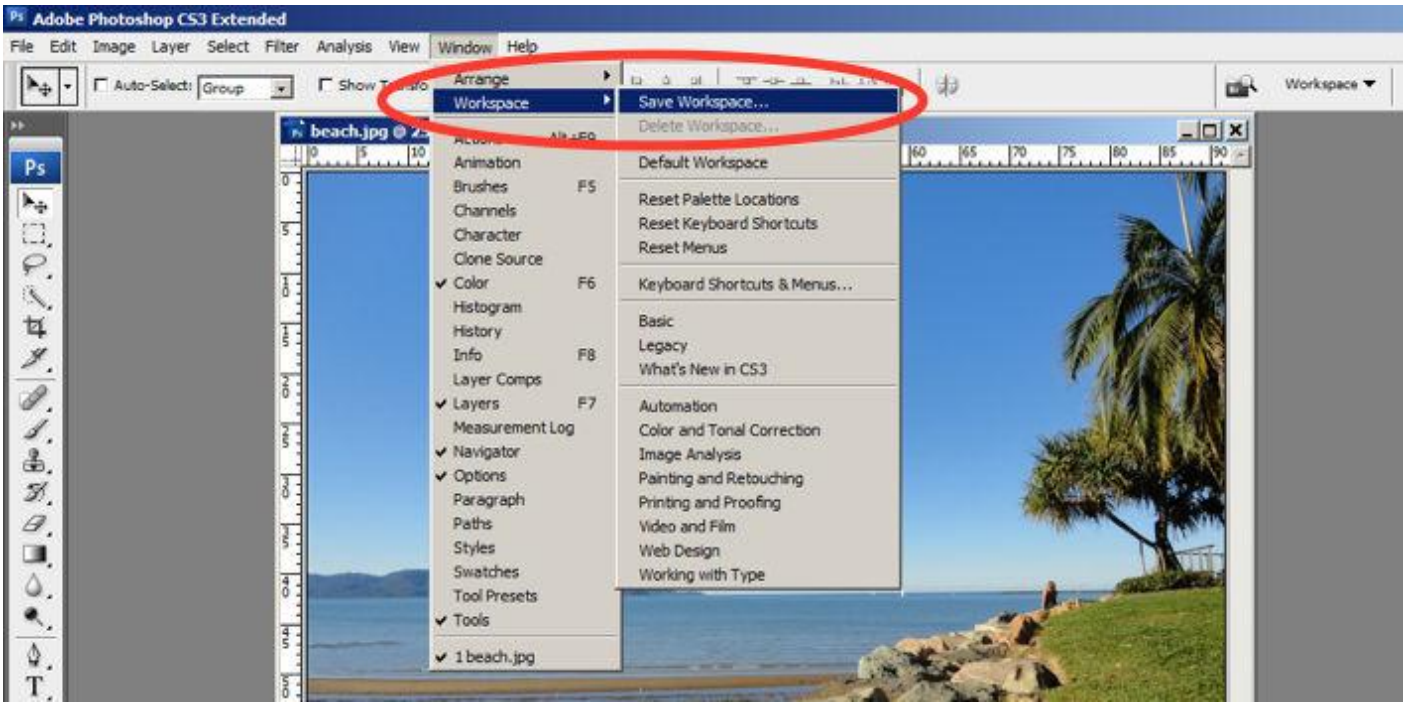
Whether it be making a selection from the artistic filters menu, or opening a new image file, Photoshop provides a sample view for users to make the right choice. This allows for the user to visually recognize what they're looking for instead of having to recall the name or typing it in to search for it. Perhaps you have encountered other photo editing programs which ask you to recall and type the name of the file you want to work on. This can indeed be really difficult to recall as it is often something to the effect of: 29412_09342.JPG.



The user is able to visually recognize the sunset image by its thumbnail and select it.

7. Flexibility and Efficiency of Use

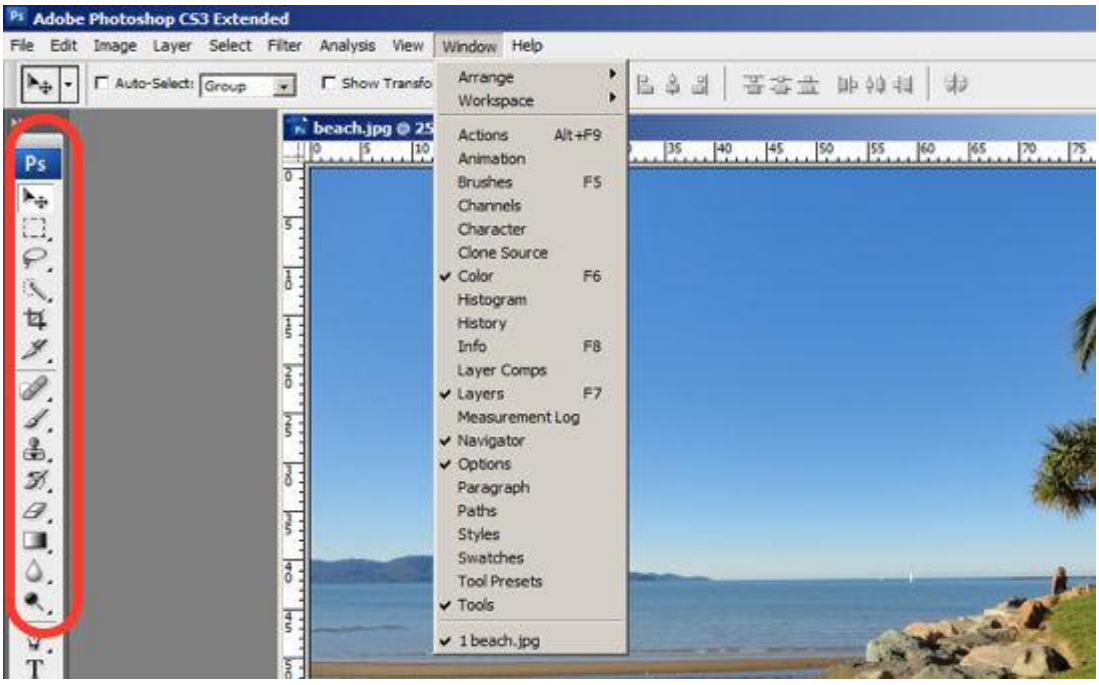
One of the many reasons for frequent users to love Photoshop is for its flexibility and efficiency. Users are able to utilize its flexibility by organizing and adding to their Workspace, as well as making things more efficient by saving it for future use.



Photoshop gives frequent users the ability to save their preferred workspace-setup.

8. Aesthetic And Minimalist Design

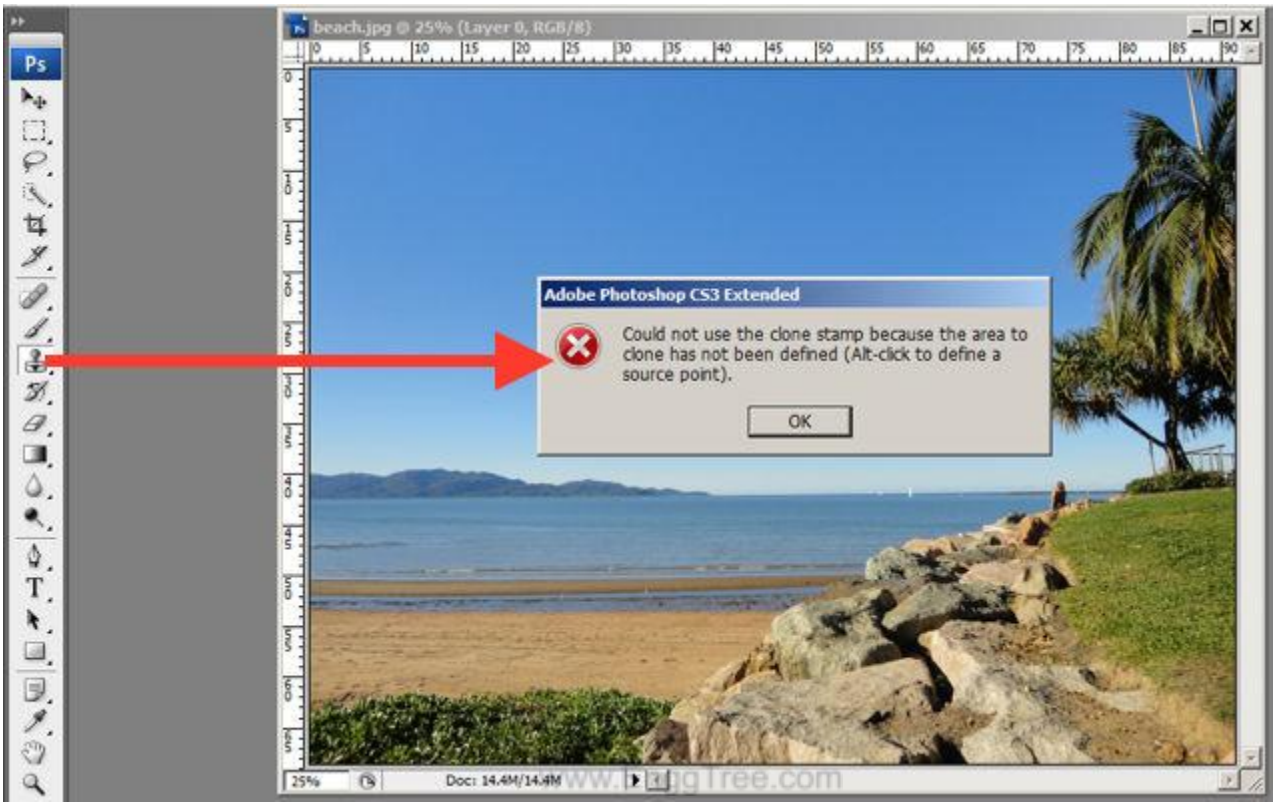
The toolbar in Photoshop only displays the icons and is neatly tucked to the side to help keep clutter to a minimum, and maintain a minimalist aesthetic.



The Photoshop toolbar is minimalist and avoids clutter by representing the tools with icons only.

9. Help Users Recognize, Diagnose and Recover from Errors

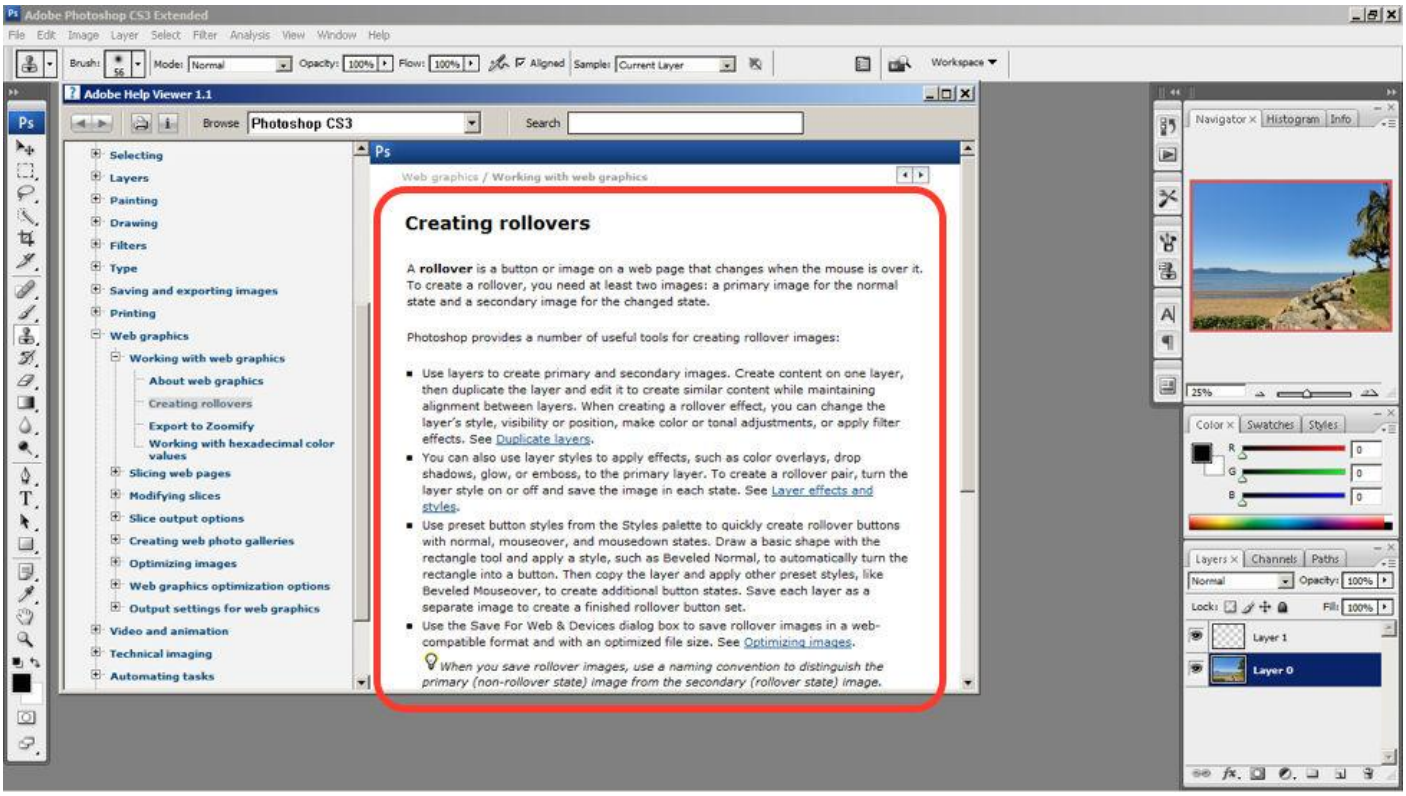
Whenever there is an error, Photoshop provides dialogue that lets the user know what went wrong and how to fix it.



In this error message for the user's misuse of the clone stamp, Photoshop explains what went wrong, the reason why and how the user should proceed from there.

10. Help and documentation

Help and documentation can be accessed easily via the main menu bar. From there, you can find a wide variety of help topics and tutorials on how to make full use of the program.



The window displays information on how to create rollovers in the context of web graphics. The user is also able to see a list of topics on the side menu.

UI ELEMENTS AND PATTERNS

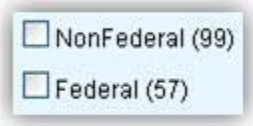
UI ELEMENTS:

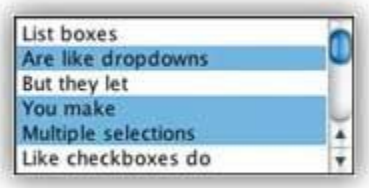
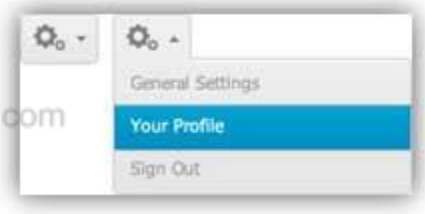
When designing your interface, try to be consistent and predictable in your choice of interface elements. Whether they are aware of it or not, users have become familiar with elements acting in a certain way, so choosing to adopt those elements when appropriate will help with task completion, efficiency, and satisfaction.

Interface elements include but are not limited to:

- **Input Controls**: checkboxes, radio buttons, dropdown lists, list boxes, buttons, toggles, text fields, date field
- **Navigational Components**: breadcrumb, slider, search field, pagination, slider, tags, icons
- **Informational Components**: tooltips, icons, progress bar, notifications, message boxes, modal windows
- **Containers**: accordion

Input Controls

Element	Description	Examples
Checkboxes	Checkboxes allow the user to select one or more options from a set. It is usually best to present checkboxes in a vertical list. More than one column is acceptable as well if the list is long enough that it might require scrolling or if comparison of terms might be necessary.	
Radio buttons	Radio buttons are used to allow users to select one item at a time.	
Dropdown lists	Dropdown lists allow users to select one item at a time, similarly to radio buttons, but are more compact allowing you to save space. Consider adding text to the field, such as 'Select one' to help the user recognize the necessary action.	

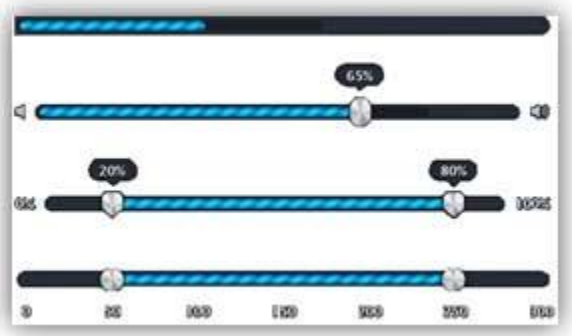
Element	Description	Examples
List boxes	List boxes, like checkboxes, allow users to select a multiple items at a time,but are more compact and can support a longer list of options if needed.	
Buttons	A button indicates an action upon touch and is typically labeled using text, an icon, or both.	
Dropdown Button	The dropdown button consists of a button that when clicked displays a drop-down list of mutually exclusive items.	
Toggles	A toggle button allows the user to change a setting between two states. They are most effective when the on/off states are visually distinct.	
Text fields	Text fields allow users to enter text. It can allow either a single line or multiple lines of text.	

Element	Description	Examples
Date and time pickers	A date picker allows users to select a date and/or time. By using the picker, the information is consistently formatted and input into the system.	

Navigational Components

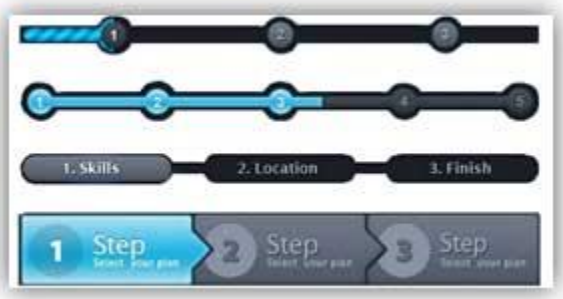
Element	Description	Examples
Search Field	A search box allows users to enter a keyword or phrase (query) and submit it to search the index with the intention of getting back the most relevant results. Typically search fields are single-line text boxes and are often accompanied by a search button.	

Element	Description	Examples
Breadcrumb	Breadcrumbs allow users to identify their current location within the system by providing a clickable trail of proceeding pages to navigate by.	
Pagination	Pagination divides content up between pages, and allows users to skip between pages or go in order through the content.	
Tags	Tags allow users to find content in the same category. Some tagging systems also allow users to apply their own tags to content by entering them into the system.	 

Element	Description	Examples
Sliders	A slider, also known as a track bar, allows users to set or adjust a value. When the user changes the value, it does not change the format of the interface or other info on the screen.	
Icons	An icon is a simplified image serving as an intuitive symbol that is used to help users to navigate the system. Typically, icons are hyperlinked.	
Image Carousel	Image carousels allow users to browse through a set of items and make a selection of one if they so choose. Typically, the images are	

Element	Description	Examples
	hyperlinked.	

Information Components

Element	Description	Examples
Notifications	A notification is an update message that announces something new for the user to see. Notifications are typically used to indicate items such as, the successful completion of a task, or an error or warning message.	
Progress Bars	A progress bar indicates where a user is as they advance through a series of steps in a process. Typically, progress bars are not clickable.	

Element	Description	Examples
Tool Tips	A tooltip allows a user to see hints when they hover over an item indicating the name or purpose of the item.	
Message Boxes	A message box is a small window that provides information to users and requires them to take an action before they can move forward.	
Modal Window (pop-up)	A modal window requires users to interact with it in some way before they can return to the system.	

Containers

Element	Description	Examples
Accordion	An accordion is a vertically stacked list of items that utilizes show/ hide functionality. When a label is clicked, it expands the section showing the content within. There can have one or more items showing at a time and may have default states that reveal one or more sections without the user clicking	

User Interface (UI) Design Patterns

User interface (UI) design patterns are reusable/recurring components which designers use to solve common problems in user interface design. For example, the breadcrumbs design pattern lets users retrace their steps. Designers can apply them to a broad range of cases, but must adapt each to the specific context of use.

Why Design Patterns are Such Powerful Design Aids

Websites and apps have a conventional look and feel because of design patterns such as global navigation and tab bars. In UI design, you can use design patterns as a quick way to build interfaces that solve a problem—for instance, a date picker design pattern to let users quickly pick a date in a form. So, UI design patterns serve as design blueprints that allow designers to choose the best and commonly used interfaces for the specific context the user faces.

Each pattern typically contains:

- A user's usability-related problem.
- The context/situation where that problem happens.
- The principle involved—e.g., error management.
- The proven solution for the designer to implement to address the core of the problem.
- Why—the reason for the pattern's existence and how it can affect usability.
- Examples—which show the pattern's successful real-life application (e.g., screenshots and descriptions).
- Implementation—some patterns include detailed instructions.

Common UI Design Patterns

Some of the most common UI design patterns are:

Breadcrumbs – Use linked labels to provide secondary navigation that shows the path from the front to the

current site page in the hierarchy.

Lazy Registration – Forms can put users off registration. So, use this sign-up pattern to let users sample what your site/app offers for free or familiarize themselves with it. Then, you show them a sign-up form. For example, Amazon allows unrestricted navigation and cart-loading before it prompts users to register for an account. Note:When content is accessible only to registered users or users must keep entering details, offer them simplified/low-effort sign-up forms. Minimize/Avoid optional information fields. Use the Required Field Markers pattern to guide users to enter needed data.

Forgiving Format – Let users enter data in various formats (e.g., city/town/village or zip code).

Clear Primary Actions – Make buttons stand out with color so users know what to do (e.g., "Submit"). You may have to decide which actions take priority.

Progressive Disclosure – Show users only features relevant for the task at hand, one per screen. If you break input demands into sections, you'll reduce cognitive load (e.g., "Show More").

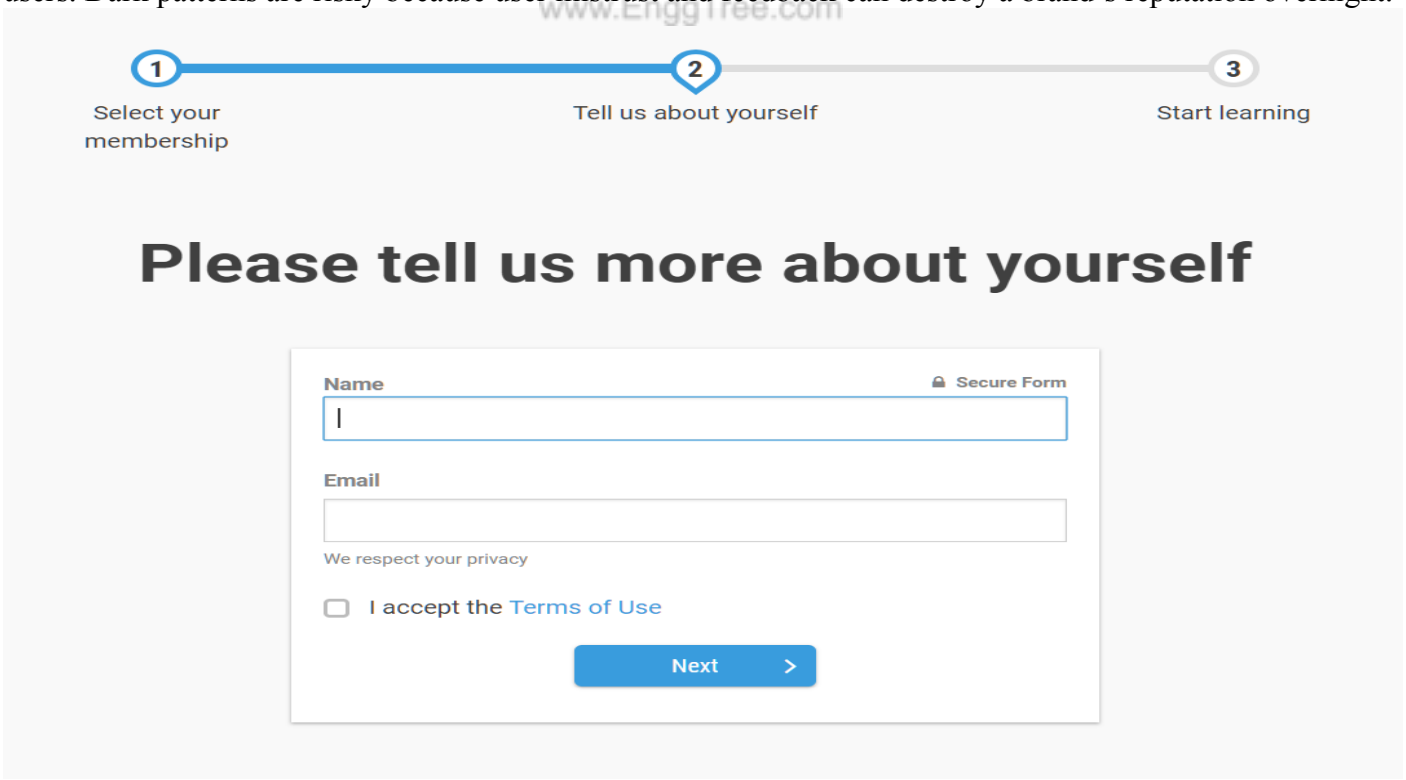
Hover Controls – Hide nonessential information on detailed pages to let users find relevant information more easily.

Steps Left – Designers typically combine this with a wizard pattern. It shows how many steps a user has to take to complete a task. You can use gamification (an incentivizing design pattern) here to enhance engagement.

Subscription Plans – Offer users an options menu (including "Sign-up" buttons) for joining at certain rates.

Leaderboard – You can boost engagement if you use this social media pattern.

Dark Patterns – Some designers use these to lead or trick users into performing certain actions, typically in e-commerce so they spend more or surrender personal information. Dark patterns range in harmfulness. Some designers leave an unchecked opt-out box as a default to secure customer information. Others slip items into shopping carts. To use dark patterns responsibly, you must be ethical and have empathy with your users. Dark patterns are risky because user mistrust and feedback can destroy a brand's reputation overnight.



This page uses the design patterns progress tracker, clear primary actions and progressive disclosure.

Taking Care with Design Patterns

Merits:

UI design patterns let you save time and money since you can copy and adapt them into your design—instead of reinventing the wheel for every new interface. They also facilitate faster prototyping and user familiarity.

Challenges

We should use Design patterns carefully. The wrong choices can prove costly – for example, if you:

Approach problems incorrectly because you're over-relying on patterns.

Don't fine-tune patterns to specific contexts.

Don't customize a distinct brand image (e.g., your website ultimately resembles Facebook).

Overlook management requirements. If you create your own patterns, you must clearly define how to use them and with what types of problems, version-control them, and store them for team access.

INTERACTION BEHAVIORS AND PRINCIPLES:

Interaction Design

Interaction Design (IxD) is the design of interactive products and services in which a designer's focus goes beyond the item in development to include the way users will interact with it. Thus, close scrutiny of users' needs, limitations and contexts, etc. empowers designers to customize output to suit precise demands

Interaction Design Dimensions

Designers' work in IxD involves five dimensions: words (1D), visual representations (2D), physical objects/space (3D), time (4D), and behavior (5D).

- Words (1D) encompass text, such as button labels, which help give users the right amount of information.
- Visual representations (2D) are graphical elements such as images, typography and icons that aid in user interaction.
- Physical objects/space (3D) refers to the medium through which users interact with the product or service—for instance, a laptop via a mouse, or a mobile phone via fingers.
- Time (4D) relates to media that changes with time, such as animations, videos and sounds.
- Behavior (5D) is concerned with how the previous four dimensions define the interactions a product affords—for instance, how users can perform actions on a website, or how users can operate a car. Behavior also refers to how the product reacts to the users' inputs and provides feedback.

Important questions interaction designers ask

- What can a user do with their mouse, finger, or stylus to directly interact with the interface? This helps us define the possible user interactions with the product.
- What about the appearance (colour, shape, size, etc.) gives the user a clue about how it may function? This helps us give users clues about what behaviours are possible.
- Do error messages provide a way for the user to correct the problem or explain why the error occurred? This lets us anticipate and mitigate errors.
- What feedback does a user get once an action is performed? This allows us to ensure that the system provides feedback in a reasonable time after user actions.
- Are the interface elements a reasonable size to interact with? Questions like this helps us think strategically about each element used in the product.
- Are familiar or standard formats used? Standard elements and formats are used to simplify and enhance the learnability of a product.

What do interaction designers do?

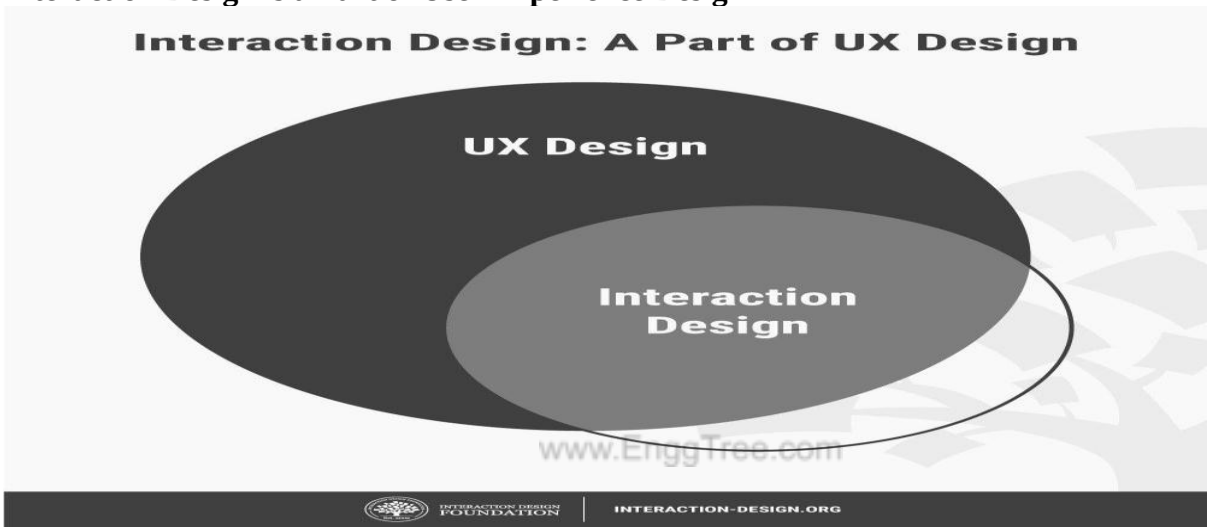
Design strategy

This is concerned with what the goal(s) of a user are, and in turn what interactions are necessary to achieve these goals. Depending on the company, interaction designers might have to conduct user research to find out what the goals of the users are before creating a strategy that translates that into interactions.

Wireframes and prototypes

This again depends on the job description of the company, but most interaction designers are tasked to create wireframes that lay out the interactions in the product. Sometimes, interaction designers might also create interactive prototypes and/or high-fidelity prototypes that look exactly like the actual app or website.

Interaction Design is a Part of User Experience Design



The term "interaction design" is sometimes used interchangeably with "user experience design". That's understandable, considering interaction design is an essential part of UX design. Indeed, UX design entails shaping the experience of using a product, and a big part of that experience involves the needed interaction between the user and the product.

Five major characteristics of interaction design

1.1.1 Design involves changing situations by shaping and deploying artifacts

For changing a situation by devising and implementing, say, a new political initiative could certainly be viewed as a design act but not an act of interaction design.

1.1.2 Design is about exploring possible futures

Exploring possible futures in interaction design often involves inviting the future users in various forms of participation.

1.1.3 Design entails framing the "problem" in parallel with creating possible "solutions"

Exploring possible futures implies not only different "design solutions" but also different "problems."

1.1.4 Design involves thinking through sketching and other tangible representations

When sketching snapshots or aspects of possible futures (such as a not-yet-existing product), the designer is not merely copying images from her inner eye.

1.1.5 Design addresses instrumental, technical, aesthetical and ethical aspects throughout

Technical decisions influence the aesthetic qualities of the resulting interaction, instrumental choices on

features to offer have ethical repercussions, and so on.

What is Interaction Design Process?

The interaction design (IxD) process is what designers use to create solutions centered on users' needs, aims and behavior when interacting with products. The IxD process involves 5 stages: discovering what users need/want, analyzing that, designing a potential solution, prototyping it and implementing and deploying it.

1. **Find the users' needs/wants**—It's easy to assume you know what users want/need and their relevant contexts. Discover their *real* requirements:

a. **Observe people.**

b. **Interview people.**

c. **Examine existing solutions**—while remembering it's hard to envisage future needs, technologies, etc.

2. **Do analysis to sort and order your findings so they make sense**. This may be through a:

. Narrative/story of how someone uses a system.

a. Task analysis, breaking down a user's steps/sub-steps.

3. **Design a potential solution according to design guidelines and fundamental design principles** (e.g., giving appropriate feedback for users' actions). Use the best techniques to match how users will interact with it in terms of, for example, navigation.

4. **Start prototyping—**Give users an idea of what the product will look like and let them test it, and/or give it to experts to evaluate its effectiveness using heuristics.

5. **Implement and deploy what you have buil**t.

The IxD process is iterative—nobody designs anything right the first time, especially regarding more innovative solutions.

Interaction Design Principles

Aesthetics
Principle: Aesthetic design should be left to those schooled and skilled in its application: Graphic/visual designers
Principle: Fashion should never trump usability
Principle: User test the visual design as thoroughly as the behavioral design
Anticipation
Principle: Bring to the user all the information and tools needed for each step of the process
Autonomy
Principle: The computer, interface, and task environment all "belong" to the user, but user-autonomy doesn't mean we abandon rules
Principle: Enable users to make their own decisions, even ones aesthetically poor or behaviorally less efficient
Principle: Exercise responsible control
Principle: Use status mechanisms to keep users aware and informed
Principle: Keep status information up to date and within easy view
Principle: Ensure status information is accurate
Color
Color blindness
Principle: Any time you use color to convey information in the interface, you should also use clear, secondary cues to

convey the information to those who cannot see the colors presented.
Principle: Test your site to see what color-blind individuals see
Color as a vital interface element
Principle: Do not avoid color in the interface just because not every user can see every color.
Principle: Do not strip away or overwhelm color cues in the interface because of a passing graphic-design fad.
Consistency
1) Levels of Consistency
Principle: The importance of maintaining strict consistency varies by level.
1. Top level consistency

• Platform consistency: Be generally consistent with de jureAs dictated by guidelines and standards & de factoThe unwritten rules to which the community adheres. standards

• In-house consistency: Maintain a general look & feel across your products/services

Communicates brand and makes adoption of your other products and services easier and faster

2. Consistency across a suite of products, e. g., Microsoft Office

General look & feel communicates family

3. The overall look & feel of a single app, application or service–splash screens, design elements, etc.
4. Small visible structures, such as icons, symbols, buttons, scroll bars, etc.
5. Invisible structures
6. Interpretation of user behavior
2) Induced Inconsistency
Principle: It is just important to be visually inconsistent when things act differently as it is to be visually consistent when things act the same
3) Continuity
Principle: Over time, strive for continuity, not consistency
4) Consistency with User Expectation
Principle: "The most important consistency is consistency with user expectations"
Defaults
Principle: Defaults within fields should be easy to "blow away
Principle: Defaults should be "intelligent" and responsive
Principle: Replace the word "default" with a more meaningful and responsive term
Principle: Both your vocabulary and visual design must communicate the scope of a reversion
Discoverability
Principle: Any attempt to hide complexity will serve to increase it
Principle: If you choose to hide complexity, do so in the showroom only
Principle: If the user cannot find it, it does not exist
Use Active Discovery to guide people to more advanced features

Principle: Controls and other objects necessary for the successful use of software should be visibly accessible at all times
Principle: There is no "elegance" exception to discoverability
Principle: With the exception of small mobile devices, controls do not belong in the middle of the content area
Principle: Communicate your gestural vocabulary with visual diagrams
Principle: Strive for Balance
Principle: User-test for discoverability

Efficiency of the User
Principle: Look at the user's productivity, not the computer's
Principle: Keep the user occupied
Principle: To maximize the efficiency of a business or other organization you must maximize everyone's efficiency, not just the efficiency of the IT department or a similar group
Principle: The great efficiency breakthroughs in software are to be found in the fundamental architecture of the system, not in the surface design of the interface
Principle: Error messages should actually help
Explorable Interfaces
Principle: Give users well-marked roads and landmarks, then let them shift into four-wheel drive
Principle: Sometimes you do have to provide deep ruts
Principle: Offer users stable perceptual cues for a sense of "home"
Principle: Make Actions reversible
Principle: Always allow "Undo"
Principle: Always allow a way out
Principle: Make it easy and attractive to stay in

Fitts's Law
Principle: The time to acquire a target is a function of the distance to and size of the target
Multiple Fitts: The time to acquire multiple targets is the sum of the time to acquire each
Principle: Fitts's Law is in effect regardless of the kind of pointing device or the nature of the target
Principle: Fitts's Law requires a stop watch test
Human Interface Objects
Principle: Human-interface objects can be seen, heard, felt, or otherwise perceived
Principle: Human-interface objects have a standard way of being manipulated
Principle: Human-interface objects have standard resulting behaviors
Principle: Human-interface objects should be understandable, self-consistent, and stable
Principle: Use a new object when you want a user to interact with it in a different way or when it will result in different behavior
Latency Reduction
Wherever possible, use multi-threading to push latency into the background
Principle: Reduce the user's experience of latency
Acknowledge all button clicks by visual or aural feedback within 50 milliseconds
Trap multiple clicks of the same button or object.
Principle: Keep users informed when they face delay
Principle: Make it faster to begin with
Learnability
Principle: Limit the Trade-Offs
Principle: Avoid only testing for learnability
Metaphors, Use of
Principle: Choose metaphors that will enable users to instantly grasp the finest details of the conceptual model
Principle: Bring metaphors "alive" by appealing to people's perceptions–sight, sound, touch, and proprioception/kinesthesia–as well as triggering their memories
Principle: Expand beyond literal interpretation of real-world counterparts
Principle: If a metaphor is holding you back, abandon it
Protect Users' Work
Principle: Ensure that users never lose their work
Readability
Principle: Text that must be read should have high contrast
Principle: Use font sizes that are large enough to be readable on standard displays

Principle: Favor particularly large characters for the actual data you intend to display, as opposed to labels and instructions.
Principle: Menu and button labels should have the key word(s) first, forming unique labels
Principle: Test all designs on your oldest expected user population
Principle: There's often an inverse relationship between the "prettiness" of a font and its readability.
Simplicity
Principle: Balance ease of installation vs. ease of use
Principle: Avoid the "Illusion of Simplicity"
Principle: Use Progressive Revelation to flatten the learning curve
Principle: Do not simplify by eliminating necessary capabilities
State
Principle: Because many of our browser-based products exist in a stateless environment, we have the responsibility to track state as needed
Principle: State information should be stored in encrypted form on the server when they log off
Principle: Make clear what you will store & protect the user's information
Visible Navigation
Principle: Make navigation visible
Principle: Limit screen counts by using overlays

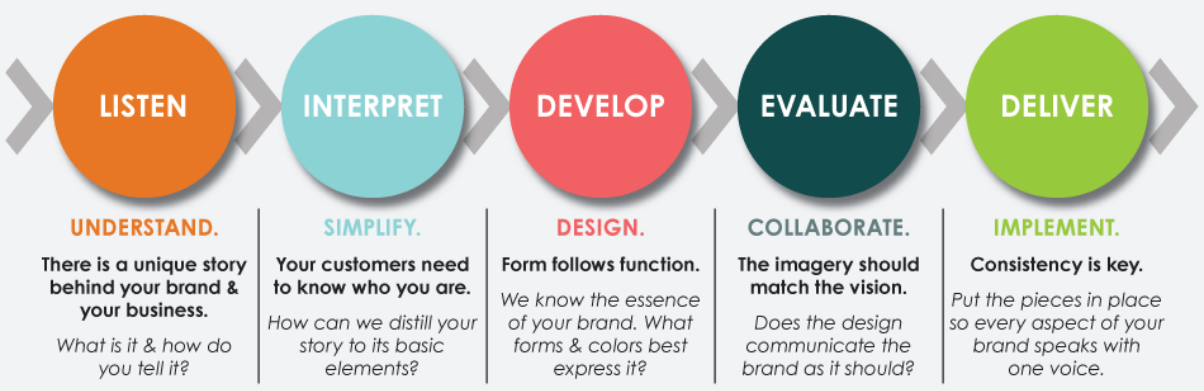
BRANDING:

Need for Branding

- Companies and businesses attach names, logos, slogans, and specific design elements to their products to distinguish them from their competitors'
- Branding: Making Positive Associations
  Branding attempts to ensure the package they are offering or purporting to offer, bears positive qualities, rather than negative ones.
- The brand of a company or specific product is essentially the idea or image they are trying to project, so consumers connect or identify with the whole group or one product in particular. Branding is meant to help make products instantly recognisable to consumers, and to ensure they help to maintain a positive image or reputation
- Branding is of particular importance to e-Commerce, as this aspect helps the company extend beyond the original products and/or services they provide, and to add value to their business not only from the products/services themselves.
- The branding loses its significance and power when there are different styles, logos, fonts, etc. across the various pages of a site, pieces of promotional material, and any other place where consumers see your product.

Consistency in Branding

Coordinating all of the components of a brand and all instances where the product appears is a difficult job, but settling on specific styles, and focussing on core aspects of your business or company can also help focus the branding. If you achieve this consistency, and the branding is associated with positive attributes, such as honesty, quality, longevity, strength, and dependability, this builds a good reputation.



Branding and Brand:

Branding has the capacity to elevate a business beyond the products and services it is offering; this is why so much money is spent on advertising, endorsements, and the design of the non-usable parts of products and services.

A brand is the representation of the product: something that identifies it in a recognizable way. This could be a name, a logo, colors, writing style, or other media forms such as sound marks.

A brand is the product's reputation, which creates certain customer expectations about the product.

While "branding" products with an identifying mark (definition #1) has been around since people first began trading and selling goods, the use of brands to differentiate products — to truly attempt to influence consumers' perceptions and choices within a market

Features of brand:

Brands adapted to the new age and followed consumers online, building digital experiences and blurring the line between "representation" and "reputation."

People began to gain more access to information and to the brands themselves. The range of available choices grew.

The strengthening of consumer voices through social-media platforms ensured that end users of products had just as much control in shaping brands as companies did.

Defining Brand in the Age of Digital Experience

Definition: Brand is a subjective perception of value based on the sum of a person's experiences with a product or company that ultimately influences that person's sentiment and decisions in the marketplace.

Brand is a tool for influencing choice. Brand is not made of visuals or words alone — it's not a logo or a slogan. Nor is it a figurehead

Components of Brand: Visuals, Tone, and Actions

Brand can be expressed) through three areas: visuals, tone, and behavior.

Visuals:

Visuals comprise the graphic elements used to communicate the brand, including the logo, typeface, images, and other elements of a common style guide.

Tone:

Tone is the style of communication the brand uses, from the text on a website to the messaging developed and used in targeted advertisements and to the manner in which staff speak to customers.

Behavior:

Behavior represents how the company acts in certain situations. Does the company reflect the morals and values of their customers? Do they actively express those values through their actions?

Example:

Southwest's new exterior design put the heart logo on the belly of the plane, to visually reinforce "love of People" as a core brand message.

Components of Brand in the Real World: Southwest Airlines

Consider Southwest Airlines. This airline is recognized for its consistent and differentiated brand, which claims to put customers at the center of its business model. Southwest showcases this core brand message and its "love of People" through the brand visuals, tone and behavior.

For example, last year, Southwest launched a new look for the exterior of its planes, calling it a "bold new look that puts our heart front and center for everyone to see." It extended its brand **visuals** to even the plane itself, putting the heart logo that represents its love for its customers on the belly of the plane.

The **tone** of the campaign is authentic and suggests honesty in Southwest's treatment of its customers and communication of fees. The campaign tone is straightforward and a little playful, matching its overall brand message.

Finally, Southwest is known for coaching employees to treat customers in a way that reflects its core brand message. "People are our most powerful fuel," says a slogan. Brand **behavior** matches this promise.

The Relationship Between Brand and Digital User Experience

In digital systems, customers interact with the representation of the brand in the form of websites and other interactive services, making behavior a crucial attribute of brand. The granularity of behavior as a brand attribute can and does vary and can be expressed holistically at the level of entire processes and interactions on a site, but also at a finer level, in the specific qualities of those interactions (e.g., transitions, animations).

UX Is a Brand Differentiator

Brands that choose to address an unmet user need at the core of their business are regularly disrupting industries by focusing on UX and, specifically, on unmet user needs as brand differentiators—and succeeding in oversaturated markets by doing so.

Branding can be critically important when consumers decide whether to interact with organizations — make a purchase, use a service, apply for employment, or even sign up for a newsletter. While the perception of a brand cannot be strictly controlled, it can certainly be influenced.

The Impact of Interaction Design on Brand Perception

Almost every aspect of a digital interface can influence the portrayal of an organization's brand identity or 'personality,' including:

Visual design: how the UI looks

Content design: how the UI sounds

Interaction design: how the UI feels

Finding the Links Between Interaction and Brand

The interactivity attributes

Responsiveness: How quickly an element responds to a user action
Direct or indirect manipulation: Whether a user can manipulate an element directly by interacting with the element itself (for example, by clicking on it) or indirectly (for example, by using a tool like slider)
Precision: How precise a user can be when interacting with the element (for example, being able to select specific parts of an element, or just the whole)
Pliability: How easy or difficult it is for a user to effect a change on an element (for example, clicking twice to expand an element, or simply hovering over the element to expand it)
Continuous or discrete behavior: How continuous or discrete (with stops or separate steps) the transitions between states are
Clear labels or no labels: How well the system communicates available actions and the consequences of those actions (Tolstrup and Heyer call this attribute "Feedback")
Expected or unexpected behavior: Whether an element's behavior conforms with a user's expectations
Consistent or inconsistent behavior: Whether an element's behavior conforms with established patterns (either internal or external to the system)

Relationships between interactivity attributes and the brand and emotional attributes.

Brand attributes:

- Sincerity
- Excitement
- Competence
- Sophistication
- Ruggedness

Emotional attributes:

- Surprise
- Anger
- Anxiety
- Disgust
- Sadness
- Joy

Applying These Findings to Your Designs

- Take an inventory of your interaction-design attributes

- Consider how these interaction-design attributes might support or detract from your stated brand values.
- Pay special attention to inconsistent or unexpected interactive elements.
- Conduct a brand/emotion evaluation of your interaction

What is a Style Guide?

Definition:

Front-end style guides are a modular collection of all the elements in your product's user interface, together with code snippets for developers to copy and paste as needed to implement those elements**.** They include common UI components like buttons, form-input elements, navigation menus, modal overlays, and icons.

Features of Front-End Style Guide

- A front-end style guide is both a deliverable created by the UX team and a tool used by the entire team for maintaining consistent, nimble product design in a modular format.
- Front-end style guides are distinct from design pattern libraries, which are a long-standing tool used by UX practitioners to define broad design ideas, rather than specific implementation details.
- The most important feature that separates front-end style guides from other types of style guides is that front-end style guides are rarely static, but are living collections of UI- elements' descriptions and corresponding code snippets.
- Front-end style guides take the form of a web page or other interactive digital asset, rather than a PDF.
- We can typically interact with all the components in a front-end style guide, and many development teams choose to implement them so that any change made to components in a style guide will automatically update the product's design as well.

Example:

Salesforce's Lightning Design System shows a UI element, Button Group Base, along with an example of how to implement it, guidelines for how it should function, and when an alternative variant (such as Button Group Disabled) should be used. The example is a live element that is interactive and exhibits the same behaviors as in the final product.

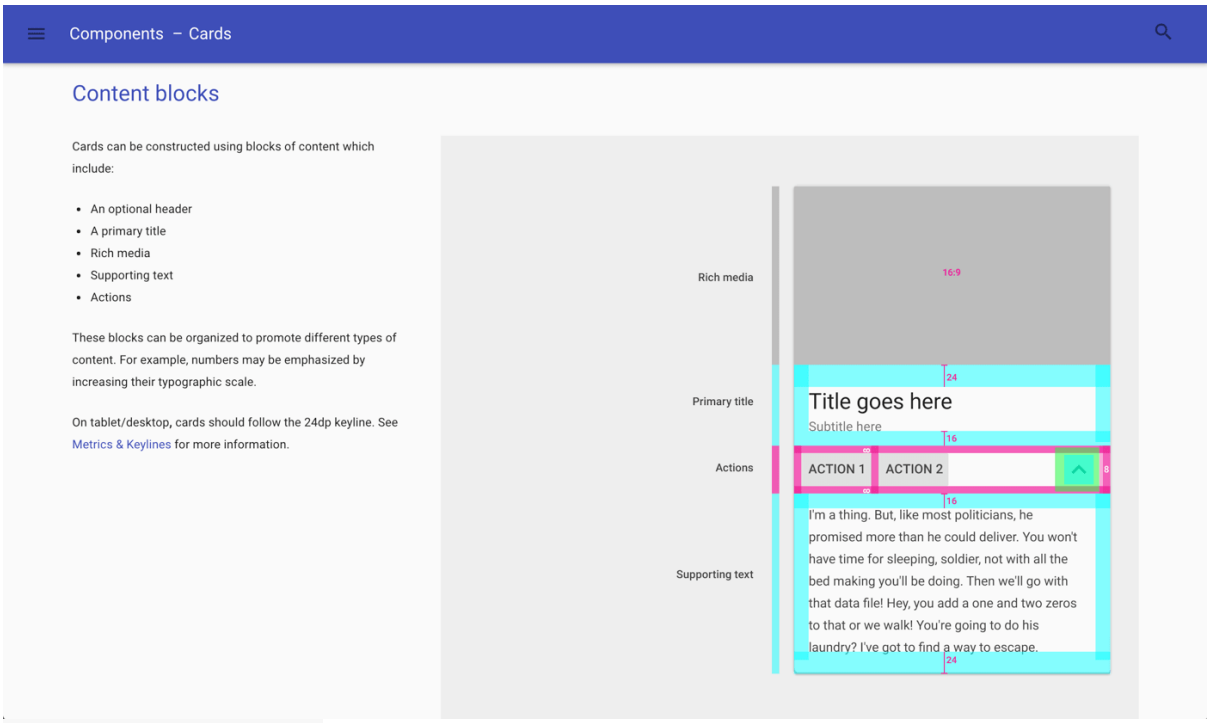
Benefits of style guides:

The purpose of a style guide is to collect all product-interface elements in a modular library. It benefits the UX team in two ways:
(1) prototyping ideas and implementing new designs becomes more efficient, and
(2) A consistent visual design can be easily enforced throughout the product.

Front-End Style Guides Include Responsive Design Patterns

In responsive designs, the front-end style guide should not only define the interface components, but also describe how their styling and usage will differ across different screen sizes. Here are some pieces of information that are useful:

- Layout grids indicating how various components should be used in various screen-size contexts
- Spacing around common elements when used on different screen sizes
- Guidelines for where in the interface specific components should be placed



Google's Material Design ***style guide includes representations of how to use the responsive grid system, and where various parts of the interface should be consistently placed.***

8 Main Requirements for a Front-End Style Guide

When creating a style guide, make sure to include the following 8 key features:

1. Table of contents that splits components into easily-findable categories
2. Responsive layout or grid systems used to place common UI elements
3. Color palette of the product (in appropriate format, e.g. HEX for the Web, UIColor for an iOS app)
4. Typeface styles (e.g. H1 Title, Body text, Photo caption text), which should include typeface name and foundry, sizes, weights, leading/line height, tracking/kerning, and the appropriate contexts of use for that text style

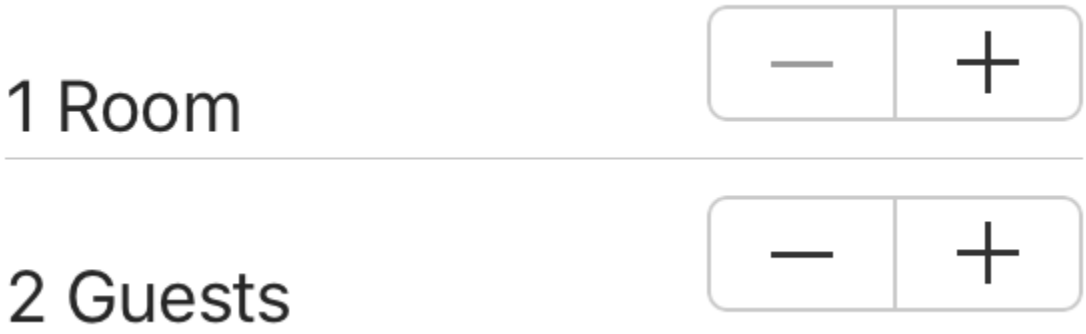
Then, for each of the specific UI elements in your product include the following information:

5. Description of the appropriate context of use: When does it make sense to use one particular component versus a similar one?
6. Code snippets, often hidden in an accordion feature
7. Specs for implementation, including positioning and spacing information
8. Dos and don'ts for that element.

25 Common UI Components Included in Front-End Style Guides

- Buttons
- Button groups
- Breadcrumbs
- Cards
- Tables
- Dialogs
- Grid lists of content, media, or photos
- Vertical lists
- Navigational menus (and subnavigation)
- Date and time pickers
- Progress and loading indicators
- Checkboxes
- Radio buttons
- Drop-down menus
- Sliders
- On-off switches
- Numeric-input steppers/incrementers
- Form fields (include variations with maximum character-count indicators, and indicators for when the field is required)
- Tabs
- Toolbars
- Tooltips
- Alert modals
- Icons
- Animations
- Tokens, also known as chips (e.g. email-address field)

Start with this list and pick from it only the components that are present in the product . If the design have additional unique elements, include them in the style guide



Kayak's iOS app features numeric-input steppers for the number of rooms and guests. If you feature this input component in your product, it should be included in the style guide.

PANIMALAR INSTITUTE OF TECHNOLOGY

DEPARTMENT OF CSE

R-2021

ACADEMIC YEAR :2022-2023

BATCH :2021-2025

YEAR/SEM :III/V

SUBJECTCODE/TITLE :CCS370/UI AND UX DESIGN

UNIT-3

UNIT III FOUNDATIONS OF UX DESIGN

Introduction to User Experience - Why You Should Care about User Experience - Understanding User Experience - Defining the UX Design Process and its Methodology - Research in User Experience Design - Tools and Method used for Research - User Needs and its Goals - Know about Business Goals

INTRODUCTION TO USER EXPERIENCE:

What is user experience?

The user experience (UX) is what a user of a particular product experiences when using that product. User experience encompasses all aspects of the end-user's interaction with the company, its services, and its products.

Requirements of user experience:

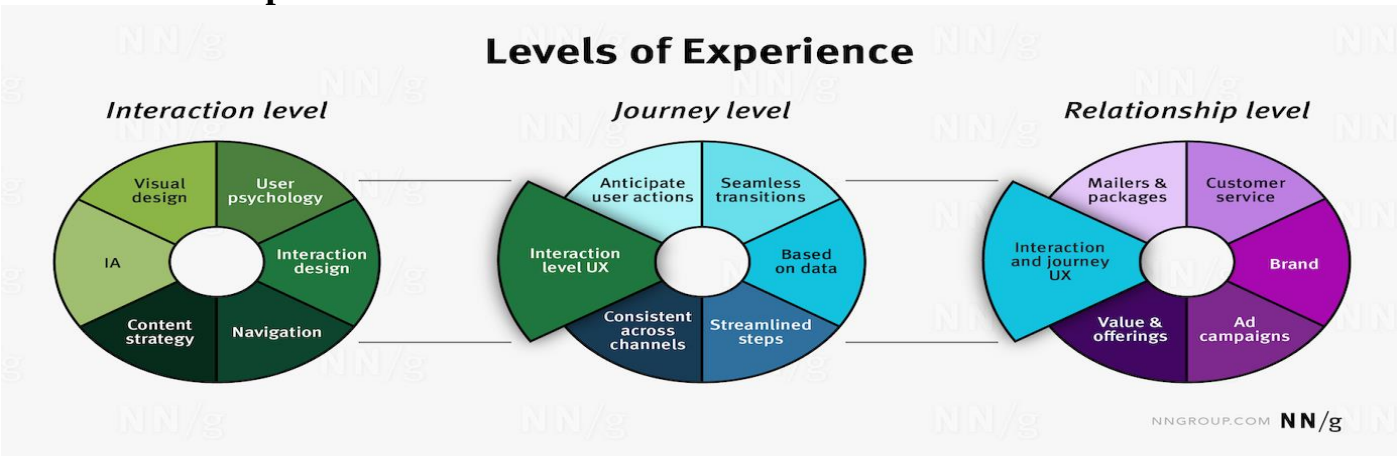
- The first requirement for an user experience is to meet the exact needs of the customer, without fuss or bother.
- Simplicity and elegance that produce products that are a joy to own, a joy to use.
- In order to achieve high-quality user experience in a company's offerings there must be a seamless merging of the services of multiple disciplines, including engineering, marketing, graphical and industrial design, and interface design.

Difference between user experience and customer experience:

User experience encompasses all aspects of the end-user's interaction with the company, its services, and its products.

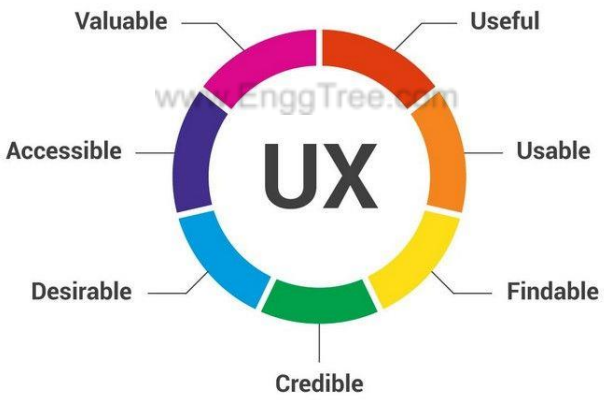
The term customer experience (CX) has been used to describe the totality of the interactions that a user has with an organization over time.

Levels of user experience:



The 7 factors that influence user experience

User Experience (UX) is critical to the success or failure of a product in the market. There are 7 factors that describe user experience, according to Peter Morville a pioneer in the UX field



Useful

If a product isn't useful to someone why would you want to bring it to market? If it has no purpose, it is unlikely to be able to compete for attention alongside a market full of purposeful and useful products**.**

Usable

Usability is concerned with enabling users to effectively and efficiently achieve their end objective with a product

Findable

Findable refers to the idea that the product must be easy to find and in the instance of digital and information products; the content within them must be easy to find too.

Credible

Credibility relates to the ability of the user to trust in the product that you've provided. Not just that it does the job that it is supposed to do but that it will last for a reasonable amount of time and that the information provided with it is accurate and fit-for-purpose.

Desirable

Desirability is conveyed in design through branding, image, identity, aesthetics and emotional design. The more desirable a product is – the more likely it is that the user who has it will brag about it and create desire in other users.

Accessible

Accessibility is about providing an experience which can be accessed by users of a full range of abilities – this includes those who are disabled in some respect such as hearing loss, impaired vision, motion impaired or learning impaired.

Valuable

the product must deliver value. It must deliver value to the business which creates it and to the user who buys or uses it. Without value it is likely that any initial success of a product will eventually be undermined.

The Five Main Ingredients of UX

- Psychology
- Usability
- Design
- Copywriting
- Analysis

1. Psychology

A user's mind is complex. You should know; you have one, (I assume). UXers work with subjective thoughts and feelings a lot; they can make or break your results. And the designer must ignore their own psychology sometimes, too, and that's hard!

Ask yourself:

- What is the user's motivation to be here in the first place?
- How does this make them feel?
- How much work does the user have to do to get what they want?
- What habits are created if they do this over and over?
- What do they expect when they click this?

2. Usability

If user psychology is mostly subconscious, usability is mostly conscious. You know when something is confusing. There are cases where it is more fun if something is hard—like a game—but for everything else, we want it to be so easy.

Ask yourself:

- Could you get the job done with less input from the user?
- Are there any user mistakes you could prevent? (Hint: Yes, there are.)
- Are you being clear and direct, or is this a little too clever?
- Is it easy to find (good), hard to miss (better), or subconsciously expected (best)?
- Are you working with the user's assumptions or against them?

3. Design

As the UX designer, your definition of "design" will be much less artistic than a lot of designers. Whether you "like it" is irrelevant. In UX, design is how it works, and it's something you can prove; it's not a matter of style.

Ask yourself:

- Do users think it looks good? Do they trust it immediately?
- Does it communicate the purpose and function without words?
- Does it represent the brand? Does it all feel like the same site?
- Does the design lead the user's eyes to the right places? How do you know?

4. Copywriting

There is a huge difference between writing brand copy (text) and writing UX copy. Brand copy supports the image and values of the company. UX copy gets shit done as directly and simply as possible.

Ask yourself:

- Does it sound confident and tell the user what to do?
- Does it motivate the user to complete their goal? Is that what we want?
- Is the biggest text the most important text? Why not?
- Does it inform the user or does it assume that they already understand?

5. Analysis

In my opinion, most designers' weak spot is analysis. But we can fix that! Analysis is the main thing that separates UX from other types of design, and it makes you extremely valuable. It literally pays to be good at it.

So, ask yourself:

- Are you using data to prove that you are right, or to learn the truth?
- Are you looking for subjective opinions or objective facts?
- Have you collected information that can give you those types of answers?
- Do you know why users do that, or are you interpreting their behavior?

- Are you looking at absolute numbers, or relative improvements?

What Is User Experience (UX) Design?

User experience (UX) design is the process design teams use to create products that provide meaningful and relevant experiences to users. UX design involves the design of the entire process of acquiring and integrating the product, including aspects of branding, design, usability and function.

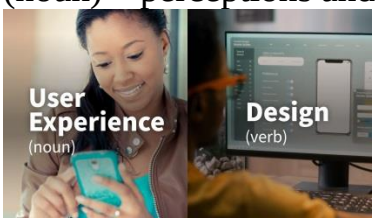
UX Design—A Formal Definition

The International Organization for Standardization (ISO) defines user experience as:
"A person's perceptions and responses that result from the use or anticipated use of a product, system or service."
We can break this definition into two parts:

- A person's perceptions and responses.
- The use of a product, system or service.

In user experience, designers do not have much control over a person's perceptions and responses—the first part of the definition. For example, they cannot control how someone feels, moves their fingers or controls their eyes as they use a product. However, designers can control how the product, system or service behaves and looks—the second part of the definition.

The simplest way to think about user experience design is as a verb and a noun. A UX designer designs (verb)—ideates, plans, changes—the things that affect the user experience (noun)—perceptions and responses to a system or service.

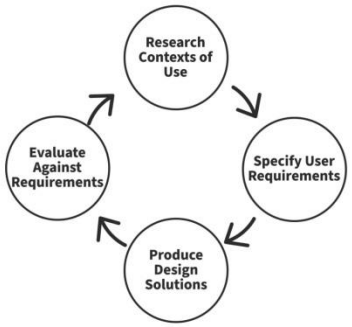


UX Designers Consider the Who, Why, What, and How of Product Use

The Why involves the users' motivations for adopting a product, whether they relate to a task they wish to perform with it or to values and views that users associate with the ownership and use of the product. The What addresses the things people can do with a product—its functionality. Finally, the How relates to the design of functionality in an accessible and aesthetically pleasant way

UX Design is User-Centered

User-centered design is an iterative process where you take an understanding of the users and their context as a starting point for all design and development.



Why is UX design important?

UX design is important because it focuses on fulfilling user needs. This ultimately benefits businesses as it improves brand reputation and loyalty. A good user experience provides a competitive edge and reduces the risk of product failure

What does a UX designer do?

- A UX designer's role in a project depends on the team size and project type. In small projects and teams, you can expect to conduct several tasks, including user research, creating user flows, wireframes, and prototypes, conducting usability tests, producing visual elements such as icons, and even defining the brand identity.
- In larger organizations and complex products, you may have more specialist roles such as researcher, interface designer and UX writer.

UX designers tend to be concerned with, as you can see from the image below, 3 primary factors: the look of a product, the feel of that product and the usability of that product.

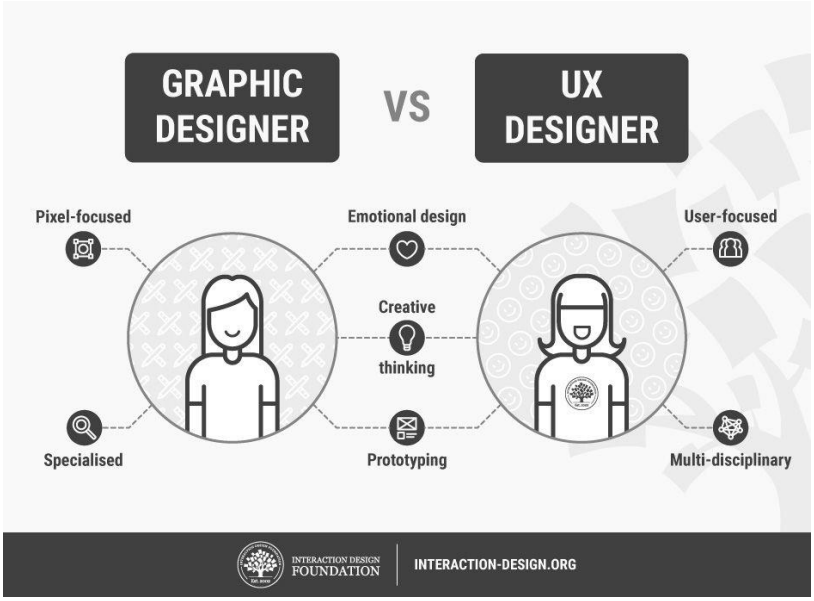
- The look of a product is all about creating a product that has visual appeal and which, in particular, harmonizes with a user's values and captures the spirit of what they expect in that product

- The feel, which is really about developing products that are "a joy to use". That is, whether you're interacting with them or reacting to them
- Usability is the cornerstone of user experience. If a product isn't usable, the experience of using it can never be good

Skills for UX designer

- Leadership
- communication
- project management
- presenting

What Do Graphic Design and UX Design Have in Common?



Emotional Design

Graphic design is about emotional communication through typography, color and images; serif fonts and dark, duller colors evoke seriousness, while san-serif fonts and bright colors tend to bring out a sense of joy or excitement.

Graphic designers are hence very often emotional designers who elicit specific reactions in a user. UX design is also concerned with shaping the emotions of the user

Creative thinking

Graphic designers and UX designers are both equally skilled at creative thinking. For graphic designers, creating visuals that adhere to conventions. UX designers have to create products that solve users' problems

Prototyping

Graphic designers often create mockups and wireframes of their designs prior to delivering a finished design.

UX designers create mockups and prototypes too, but these tend to be less focused on the "look" of the product and more on the "feel" of it.

The Differences between Graphic Design and UX Design

User-focused vs pixel-focused

Graphic designers tend to pursue pixel perfection in their designs. Ensuring that texts have perfect kerning and colors conform to brand guidelines. UX designers, however, are primarily focused on users. They study the interface between users and the product, finding ways to ensure that the product answers to the user's key needs

Iterative problem solving

UX design is very much an iterative problem solving process, and it can be very different from what you're used to doing as a graphic designer.

Multi-disciplinary vs specialized

Graphic design is a specialized discipline, and there is a certain level of craftsmanship and set of specialized skills (such as typography and color theory) required to produce great visuals. UX design, on the other hand, is much more multi-disciplinary and involves many schools of knowledge. UX designers have to constantly learn about human psychology, interaction design, information architecture and user research techniques

What are the Five Elements of UX Design?

The 5 elements that we've selected that need to be examined in a UX context are:

- Usefulness of the Website

- Adherence to Functionality
- Usability
- Influence
- Visual Design

Usefulness of the Website

The most fundamental question asked of each website by its users; "How is this useful to me?"
One of the reasons that we define our users before we develop a website is because we need to be able to show usefulness to an audience. By defining an audience clearly, the developer of the cars and maintenance site can safely ignore people like me when considering their user experience

Adherence to Functionality
Adherence to functionality means – "does it work?". Dead links, for example, are a case of broken functionality. Failure for a site to display properly on a particular screen or in a particular browser is a case of broken functionality. It stands to reason that a user's experience will be less than perfect if they find that your website is a buggy mess that doesn't deliver on the promise of that site

Usability
Some people tend to see usability as the whole of UX design. Usability is a part of UX design. Usability is quite simply a measure of how simple it is for a user to learn the site and how easy it is to use the site in the long-term.

Influence
Most websites are designed to serve a commercial purpose. To sell products, services, subscriptions, etc. A critical component of user experience is the ability to influence your

users to do what you want them to do. The key metric of influence is usually the conversion rate.

Visual Design

Different audiences react differently to different elements of design. Visual design plays a critical role in the user experience and once again, the users will know what they respond to and what they don't respond to.

WHY YOU SHOULD CARE ABOUT USER EXPERIENCE:

•UX tries to fulfil the user's needs and builds a better customer satisfaction–conversion–retention journey.
•UX aims to provide positive experiences to the user that keeps them loyal to the product or brand.
•UX defines customer journeys on your product and establishes a two-way relationship between the maker and the user.
•UX reduces costs for development/bug fixing/marketing and so on.
•UX provides improved return on investment (ROI)
•Sometimes the product doesn't need to be innovative. It simply takes the usual idea and represents it differently. The user-focused design makes the product stand out.
•UX helps provide intuitive experience, coherence & continuity and platform-specific designs.
•Providing a good user experience foundation for your product or service ensures that people use your products because they genuinely enjoy using them, not just because it gets the job done
•It also helps to reduce development-waste. Research has shown that companies who invest in UX reduce development cycles by 33 to 50%.
•People are willing to pay up to 25% more for a reliable product or service

Increased Customer Satisfaction

A good UI/UX is therefore essential if you want a website that is easy to navigate and that customers will look forward to buying products or services from.

Establishing Brand Name

When people want to know more about a brand, they look up its website. What they see in the first few seconds is crucial as that marks the first impression they ever have of your brand. So it is important to help develop a good first impression with a website that is aesthetically pleasing, interactive, and not only simply opens with one click.

Encourages Conversions

Given the increase in competition in every type of industry, many websites are selling similar products. One way to make sure that visitors of your site turn into customers is by giving

them a great experience on your website.

Conserves Time and Money

If you spend on an effective UI/UX design, there is very little chance that your customers will discover any trouble or difficulty using your product. A flawless product will not require frequent updates and thus, help you in saving time and money.

10 Reasons Why UX is Vital to Success

1.Efficiency and Productivity:

•A good user experience (UX) ensures that users can navigate, find what they need, and accomplish their goals quickly and efficiently.

•This is achieved through a combination of user research, usability testing, and design thinking.

•A UX designer will work to understand the needs and behaviors of users, create user-centered interfaces that are easy to use and navigate, and continuously test and refine the design to improve the overall experience.

2.Loyalty and Retention:

•When users find a website or application easy and enjoyable to use, they are more likely to return to it.

•UX design not only improves the usability and accessibility of a digital product but also focuses on the emotional design aspect, which helps create positive emotions and feelings for users when they interact with the product.

3.Accessibility:

•Accessibility is important not only from a user's point of view, but it also has legal and ethical considerations.

•Accessibility in digital products refers to the ability of a website or application to be easily used by people with disabilities, such as visual, auditory, motor, and cognitive impairments.

•It ensures that everyone, regardless of their abilities, has equal access to the information and functionality of the digital product.

4.Increase user engagement:

•When users find a website or application easy and enjoyable to use, they are more likely to spend more time on it, which can lead to improved conversion rates, sales, and other key metrics.

•User engagement is a measure of how much time users spend interacting with a website or application, how many pages they view, and how frequently they return.

•When users are engaged, they are more likely to make a purchase, sign up for a service, or take other actions that drive business goals.

•A good UX also helps increase user retention and loyalty, which will lead to more repeat customers and more word-of-mouth advertising, ultimately driving success.

5.Brand reputation and trust:

•Positive word-of-mouth advertising is one of the most powerful forms of marketing and can have a significant impact on a brand's reputation.

•A well-designed digital product with an intuitive flow can help create a positive user experience, which can lead to more positive word-of-mouth advertising.

6.Boost search engine optimization (SEO):

•Search engines, such as Google, favour websites and applications that provide a positive user experience, as they want to provide their users with the best possible results.

•A well-designed digital product that is easy to navigate, has a clean and organized structure, and can help improve the website's or application's ranking in search engine results pages (SERPs).

•A good UX can also lead to increased user engagement, which can help improve the website's or application's SEO by lowering the bounce rate, increasing the average time on site, and increasing the number of pages viewed per session.

7.Decreases the need for customer service and support:

•When a website or application is well-designed, it is easier for users to find what they are looking for and complete their tasks quickly and efficiently.

•This can result in a lower rate of frustration and confusion among users, which can lead to fewer errors and less need for customer service and support.

•The correlation between a decrease in customer support calls and higher renewals suggests that a well-designed product with a good UX has fewer issues and overall satisfaction with the end user.

8.Stay Competitive:

•Competition is fierce, and businesses must find ways to differentiate themselves from their competitors.

•A good UX can help a business by providing a positive and memorable experience to users. In today's digital age, people have come to expect a seamless and enjoyable experience when using websites and applications, and a positive UX can help meet those expectations

9. Improved conversion rates and sales:

•When a website or application is well-designed, it is easier for users to find what they are looking for, complete their tasks quickly and efficiently, and ultimately make a purchase or take the desired action.

•A positive UX can also increase user engagement, leading to more time spent on the website or application, which can further improve conversion rates and sales.

10.Reduced development and maintenance costs:

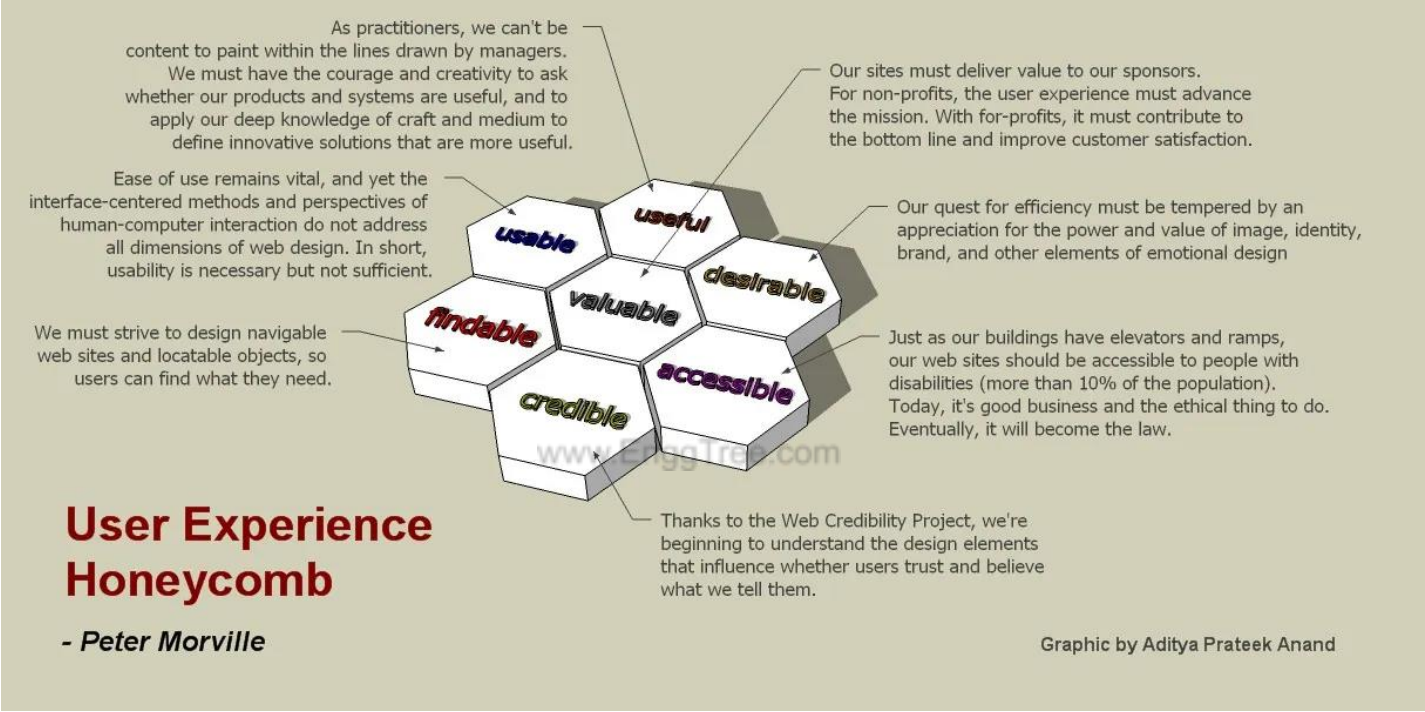
•By designing a website or application that is intuitive, straightforward, and easy to use, businesses can minimize the need for ongoing technical support and maintenance.

•A well-designed digital product can reduce frustration and errors from users, which decreases the need for customer service and support, freeing up resources that can be used to

develop and maintain the product.

UNDERSTANDING USER EXPERIENCE:

•The user experience is product (or service) specific. It is the experience that a user (or customer) has when they interact with that product.
•We can measure the results of the user experience to some extent too.
•We can look at satisfaction reports, the level of customer care enquiries following an interaction, the time it takes to get something done with our product, etc.



DEFINING THE UX DESIGN PROCESS AND ITS METHODOLOGY:

There isn't any standard UX design process. However, most teams tend to follow a variation of the 5-step design thinking process. UX design is a highly collaborative and iterative process. Designers plug back their findings from research and testing to improve the end user's experience.

What is a UX Design Process?

A UX design process is an iterative step-by-step methodology UX design teams use to complete projects. It is derivative from a design thinking process. As in design thinking process, UX designers spend time empathizing with the user, learning about the business, context, defining problem scope.

UX Design Process vs. Design Thinking Process

The design thinking process is a five-step process for developing user-centered solutions to human problems. A UX design process is a multi-stage, end-to-end methodology that incorporates design thinking for delivering UX projects.

Importance of a UX Design Process

Here are some reasons why companies standardize a UX design process:

Ensures projects meet quality and consistency standards

- Ensures designers design solutions without bias and assumptions
- Enables designers to test and iterate on many ideas to find the best solution
- Promotes collaboration between teams and departments
- Reduces the risk of rework by following set protocols
- Allows stakeholders to track a project's progress
- Identifies hidden risks and opportunities

Steps of UX Design Process

A typical UX design process has 8 UX design process steps, from defining the product's goal to design handoff and making sure everything works as intended

Step 1: Define project & scope

The first step of a UX design process defines the project's goal and scope with team members and stakeholders from multiple departments–usually consisting of representatives from:

Business – explains business requirements and goals for the project.
Design – communicate what they need to do prior to design and manage expectations.
Product – shares context, help plan the timeline and resources needed for design.
Technical – define feasibility and technical constraints of a UX design.

Step 2: Run research

Next, designers research the problem to find possible solutions. During the research phase, UX designers conduct several types of research, including:

User research: Studies the target user to understand who they are, what they need, and what context they operate; the outcome of this research are user personas, journey maps, and so on.

Market research: Analyzes the market to determine market segmentation and product differentiation.

Competitive research: A competitive analysis to understand how competitors solve similar problems and identify opportunities.

Product research: Analyzing insights and analytics from an existing product to understand

user behavior.

Step 3: Create rough draft of a solution

With a clear understanding of their users, market, and competitive landscape, designers can create a rough draft of what a solution would look like, which is often referred to as the ideation phase. Designers use paper and pen during early ideation to iterate on many ideas fast.

Some of these low-fidelity techniques include:

- Sketching: Hand-drawn sketches of user interfaces
- Paper prototyping: Paper versions of a prototype
- Wireframing: Digital versions of paper prototypes featuring basic lines and shapes
- Low-fidelity prototypes: Digital prototypes using wireframes to test user flows and information architecture

The team might also use a design sprint to solve a specific problem fast.

Step 4: Design high-fidelity mockups and prototypes

Next, the UI design team converts wireframes into mockups to build high-fidelity prototypes that look and function like the final product. If the company has a design system, designers will use the UI component library to build interactive prototypes.

Step 5: Conduct usability testing

The primary purpose of high-fidelity prototypes is usability testing. UX designers test these prototypes with real users to:

- Validate ideas
- Identify usability issues
- Test accessibility

Steps 2 to 5 are iterable. Using test results, designers return to stage two or three to iterate on ideas until they find a solution that meets desirability, viability, and feasibility criteria.

Step 6: Perform design Handoff

The second to last stage of the UX design process is the design handoff, where the design team hands over prototypes and documentation to the development team to start the engineering process.

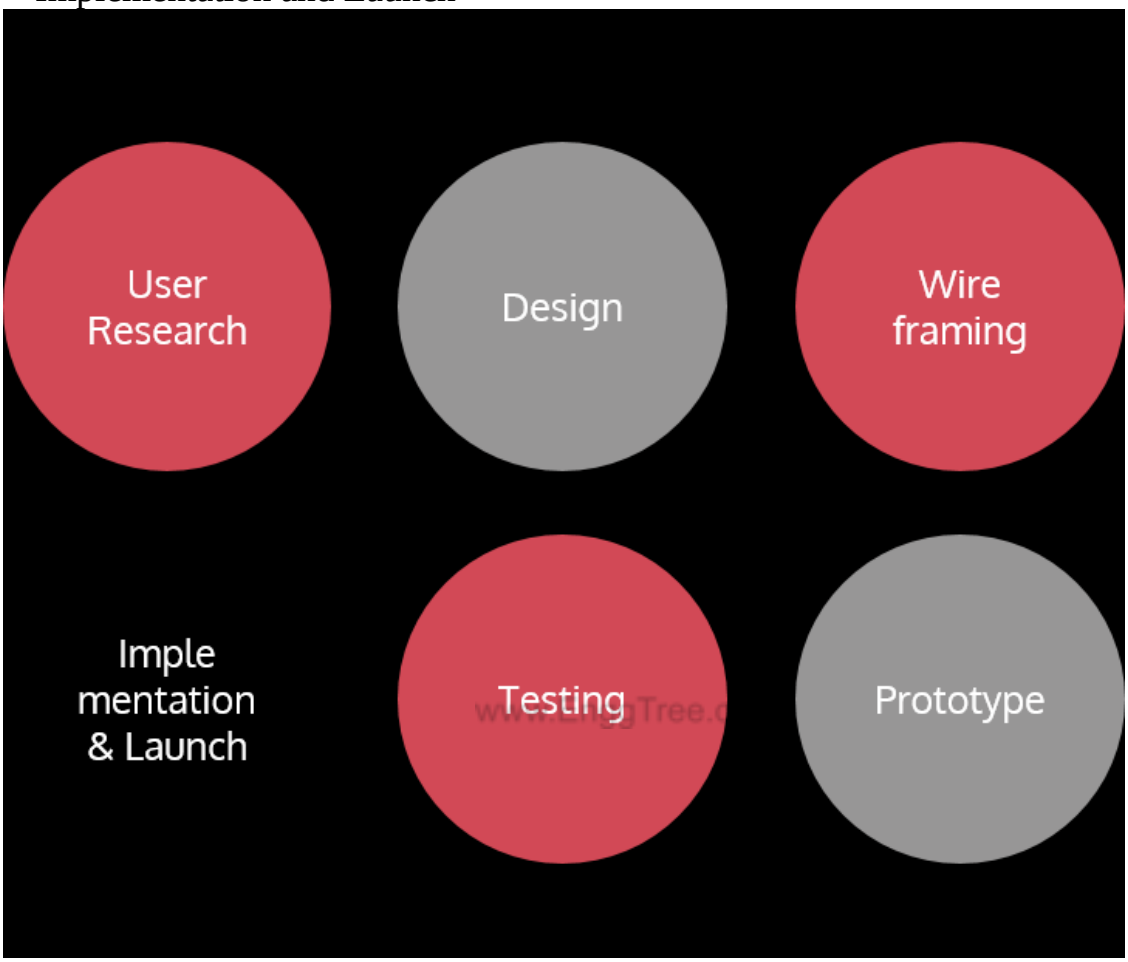
Step 7: Launch your product

The final stage of the UX design process is a launch and a clear inspection of the new release. It's time to ensure that the new release meets the project's business goals, user experience, and accessibility requirements.

User Experience (UX) Process and Methodology

- User Research
- Design

- Wireframing
- Prototype
- Testing
- Implementation and Launch



1. Always start with User Research

If you ask an experienced UX researcher what is the best UX for your website, product or service, most likely you will not get an answer. A UX researcher should always be mindful of the differences in opinions and perceptions toward a good user experience.

2. Start Designing with User Inputs

Users may think of the appearance of a website or product when we talk about design. They will describe it as pretty or not pretty.

Personas

Persona is a fictional character created to describe a specific end user. Example persona is a frequent backpacker with name, age, job details, education, location, income level, family members and friends, familiarity with technology, hobbies, goals, characters etc explained

and elaborated in details.

Example Persona: Alex, a 24 yo backpacker

During a meeting, you can say "Alex would not like this feature" and everyone will immediately know that you are referring to a young backpacker instead of a elderly.

User Journey Map

A user journey map is an illustration of the interaction between a user with a company, product or service at every stage of engagement from researching, making the decision, purchasing to post-purchase. It includes the personas, time frame, and actions for each stage, touch points and sales channels, emotions, and experience.

Storyboards

A storyboard is a comic strip used to capture a user's interaction with a product or service. It allows researchers and stakeholders alike to visualize and brainstorm.

3. Wireframing

If you haven't employed wireframing as part of your process, you should probably start doing so. A wireframe is a visual guide with the framework of your product. It allows you to define the information architecture, navigation design, and interface design.

4. Prototype

A prototype is the version 1.0 of your website or product. It resembles the closet version of your final outcome.

A prototype allows the UX researchers to examine and identify any flaws, errors or inconsistencies in overall design and experience before it is converted to the actual version by the development team.

5. Testing

With prototypes, user testing can be conducted with users to validate the design flow and user experience. In some e-commerce companies, testing usually makes up a big bulk of daily routine of UX researchers. It allows them to continuously improve the product.

6. Implementation and Launch

After user testing, the validated prototype can finally be converted into actual product for UAT Testing before an official launch.

RESEARCH IN USER EXPERIENCE DESIGN:

What is UX Research?

- UX (user experience) research is the systematic study of target users and their requirements, to add realistic contexts and insights to design processes.

- UX researchers adopt various methods to uncover problems and design opportunities

UX Research is about Finding Insights to Guide Successful Designs

- When UX research is done , it is able to give users the best solutions—because it can discover exactly what they need.
- The UX research can be applied at any stage of the design process.
- UX researchers often begin with qualitative measures, to determine users' motivations and needs. They might use quantitative measures to test their results.
- To do UX research well, a structured approach is taken when data is gathered from users.
- It's vital to use methods that

  1) are right for the purpose of your research and

  2) Will give you the clearest information. Then, interpret the findings so it can build valuable insights into the design

What is the UX research process?

Every research project will vary. However, there are some common steps in conducting research, no matter which method or tool you decide to use:

- Define the research question
- Select the appropriate research method
- Recruit participants
- Conduct the research
- Analyze the data
- Present the findings

Why is UX research important?

- User research is very important in designing products people will want and use. It helps us avoid designing based on what we think instead of what users actually want.
- UX research helps designers understand their users' needs, behaviors, attitudes and how they interact with a product or service.

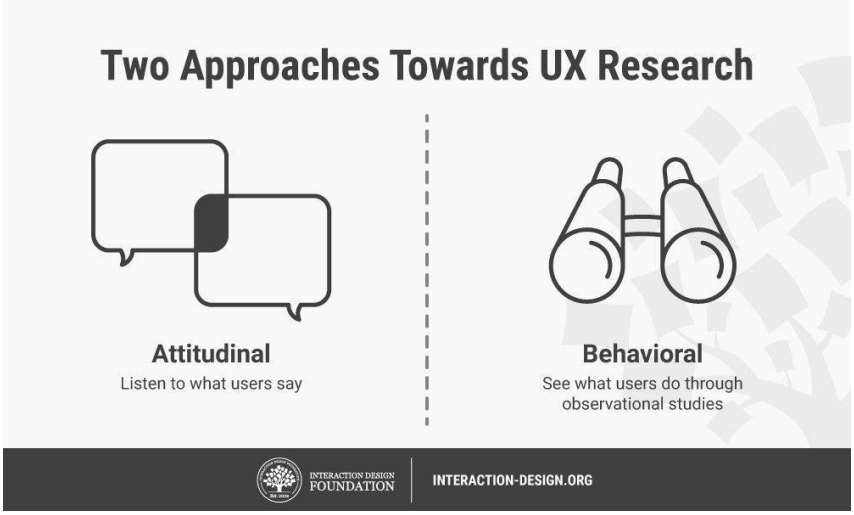
Subsets of UX research

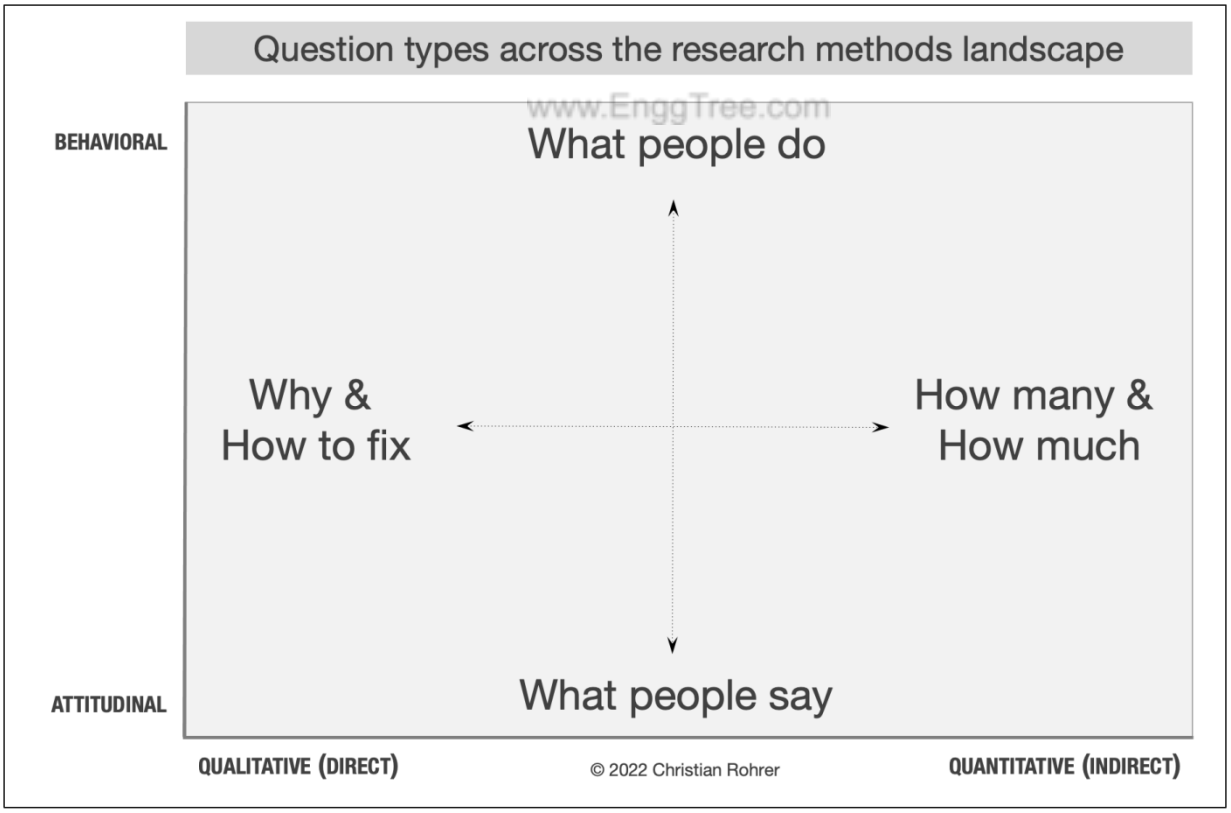
We can divide UX research into two subsets:

Qualitative research – Using methods such as interviews and ethnographic field studies, you work to get an in-depth understanding of why users do what they do (e.g., why they missed a call to action, why they feel how they do about a website).

Quantitative research – Using more-structured methods (e.g., surveys, analytics), you gather measurable data about what users do and test assumptions you drew from qualitative research. With this data, you can discover patterns among a large user group.

We can additionally divide UX research into two approaches:
Attitudinal – you listen to what users say—e.g., in interviews.
Behavioral – you see what users do through observational studies.





Use UX Research Methods throughout Development

15 Guiding Principles for UX Researchers

1. Mix It Up
2. It's Easier To Find "You Got it Wrong"
3. You Can't Standardize Sample Sizes For All Your Research
4. Testing With Just One User is Not Pointless
5. Increase Sample Sizes for Better Accuracy
6. Randomizing Can Overcome Research Design Flaws
7. Research Results Belong to No-One
8. Scale Ratings In Questions Aren't That Important
9. Participants Need to Reflect Personas
10. What They Say vs. What They Do
11. Keep Growing Your Toolkit
12. Usability – A Polite Fiction?
13. Keep Reports Short
14. Be Aware that Observers Observe Differently
15. Cults of Personality Suck

Tools and Method used for Research

Tools used for Research

- The Choice of tools depends on your research question, how you're researching, the size of your organization, and your project. For instance:
- Survey tools such as Typeform and Google Forms.
- Card sorting tools such as Maze and UXtweak.
- Heatmap tools such as HotJar and CrazyEgg
- Usability testing (through first-click testing and tree-testing) tools such as Optimal Workshop and Loop 11
- Diagramming applications such as Miro and Whimsical to analyze qualitative data through affinity diagramming.
- Spreadsheet tools such as Google Sheets and Microsoft Excel for quantitative data

analysis

- Interface design and prototyping tools like Figma, Adobe XD, Sketch and Marvel to conduct usability testing.

- Presentation tools such as Keynote, Google Slides and Microsoft PowerPoint.

Method used for Research

Use UX Research Methods throughout Development

Discover

- The discovery stage is when you try to illuminate what you don't know and better understand what people need.
- Good things to do during discovery:
- Conduct field studies and interview users: Go where the users are, watch, ask, and listen. Observe people in context interacting with the system or solving the problems you're trying to provide solutions for.
- Run diary studies to understand your users' information needs and behaviors.
- Interview stakeholders to gather and understand business requirements and constraints.

Explore

- Exploration methods are for understanding the problem space and design scope and addressing user needs appropriately.
- Compare features against competitors.
- Do design reviews.
- Use research to build user personas and write user stories.

Test

- Testing and validation methods are for checking designs during development and beyond, to make sure systems work well for the people who use them.
- Do qualitative usability testing. Test early and often with a diverse range of people, alone and in groups. Conduct an accessibility evaluation to ensure universal access.
- Ask people to self-report their interactions and any interesting incidents while using the system over time, for example with diary studies.

Listen

- Listen throughout the research and design cycle to help understand existing problems and to look for new issues. Analyze gathered data and monitor incoming information for patterns and trends.
- Survey customers and prospective users.

- Monitor analytics and metrics to discover trends and anomalies and to gauge your progress.
- Analyze search queries: What do people look for and what do they call it? Search logs are often overlooked, but they contain important information.

Top UX Research Methods	
Discover	• Field study • Diary study • User interview • Stakeholder interview • Requirements & constraints gathering
Explore	• Competitive analysis • Design review • Persona building • Task analysis • Journey mapping • Prototype feedback & testing (clickable or paper prototypes) • Write user stories • Card sorting
Test	• Qualitative usability testing (in-person or remote) • Benchmark testing • Accessibility evaluation
Listen	• Survey • Analytics review • Search-log analysis • Usability-bug review • Frequently-asked-questions (FAQ) review

20 UX Methods in Brief

1. **Usability testing** (aka usability-lab studies): Participants are brought into a lab, one-on-one with a researcher, and given a set of scenarios that lead to tasks and usage of specific interest within a product or service.
2. **Field studies**: Researchers study participants in their own environment (work or home), where they would most likely encounter the product or service being used in the most realistic or natural environment.
3. **Contextual inquiry**: Researchers and participants collaborate together in the participants own environment to inquire about and observe the nature of the tasks and work at hand. This method is very similar to a field study and was developed to study complex systems and in-depth processes.
4. **Participatory design**: Participants are given design elements or creative materials in

order to construct their ideal experience in a concrete way that expresses what matters to them most and why.

5. **Focus groups**: Groups of 3–12 participants are led through a discussion about a set of topics, giving verbal and written feedback through discussion and exercises.
6. **Interviews**: a researcher meets with participants one-on-one to discuss in depth what the participant thinks about the topic in question.
7. **Eyetracking**: an eyetracking device is configured to precisely measure where participants look as they perform tasks or interact naturally with websites, applications, physical products, or environments.
8. **Usability benchmarking**: tightly scripted usability studies are performed with larger numbers of participants, using precise and predetermined measures of performance, usually with the goal of tracking usability improvements of a product over time or comparing with competitors.
9. **Remote moderated testing**: Usability studies are conducted remotely, with the use of tools such as video conferencing, screen-sharing software, and remote-control capabilities.
10. **Unmoderated testing:** An automated method that can be used in both quantitative and qualitative studies and that uses a specialized research tool to capture participant behaviors and attitudes, usually by giving participants goals or scenarios to accomplish with a site, app, or prototype. The tool can record a video stream of each user session, and can gather usability metrics such as success rate, task time, and perceived ease of use.
11. **Concept testing**: A researcher shares an approximation of a product or service that captures the key essence (the value proposition) of a new concept or product in order to determine if it meets the needs of the target audience. It can be done one-on-one or with larger numbers of participants, and either in person or online.
12. **Diary studies**: Participants are using a mechanism (e.g., paper or digital diary, camera, smartphone app) to record and describe aspects of their lives that are relevant to a product or service or simply core to the target audience. Diary studies are typically longitudinal and can be done only for data that is easily recorded by participants.
13. **Customer feedback**: Open-ended and/or close-ended information is provided by a self-selected sample of users, often through a feedback link, button, form, or email.
14. **Desirability studies**: Participants are offered different visual-design alternatives and are expected to associate each alternative with a set of attributes selected from a closed list. These studies can be both qualitative and quantitative.
15. **Card sorting**: A quantitative or qualitative method that asks users to organize items into groups and assign categories to each group. This method helps create or refine the information architecture of a site by exposing users' mental models.
16. **Tree testing**: A quantitative method of testing an information architecture to determine how easy it is to find items in the hierarchy. This method can be conducted

on an existing information architecture to benchmark it and then again, after the information architecture is improved with card sorting, to demonstrate improvement.

17. **Analytics**: Analyzing data collected from user behavior like clicks, form filling, and other recorded interactions. It requires the site or application to be instrumented properly in advance.
18. **Clickstream analytics:** A particular type of analytics that involves analyzing the sequence of pages that users visit as they use a site or software application.
19. **A/B testing** (aka multivariate testing, live testing, or bucket testing): A method of scientifically testing different designs on a site by randomly assigning groups of users to interact with each of the different designs and measuring the effect of these assignments on user behavior.
20. **Surveys**: A quantitative measure of attitudes through a series of questions, typically more closed-ended than open-ended. A survey that is triggered during the use of a site or application is an intercept survey, often triggered by user behavior. More typically, participants are recruited from an email message or reached through some other channel such as social media.

7 Great, Tried and Tested UX Research Techniques

Technique Number 1 – Card Sorting

Card sorting was originally a technique used in psychological research long before UX research was a "thing". It's a simple concept, you write words or phrases on cards, then you ask the user to categorize them. You might also ask them to label the categories. It's a great way to determine whether your Information Architecture (IA) is heading in the right direction or to examine IA for new products.

Why is card sorting a good technique?

- It's a very cheap form of research – particularly face-to-face, online tools may be more expensive.
- It's a very easy technique for users to understand and for clients to understand too.
- It's a very easy method to get user input (or even to get user validation) for ideas early on in a UX project.

Technique Number 2 – The Expert Review

Expert reviews involve a single "expert" walking through a product via the User Interface (UI) and looking for issues with the design, accessibility, and usability of the product. There's no fixed process to follow and the expert review can vary from professional-to-professional as well from product-to-product. The more expertise the reviewer has in usability and UX design – the more valuable their input (in most cases).

Why is an Expert Review a Good Technique?

- It's quick, easy and cheap. This is doubly so when you compare it to more formal usability testing methods.
- It only takes a single professional to conduct an expert review.
- It is a great way to inform further UX research and caution should be used in taking an expert review at face value without further user testing.

Technique Number 3 – Eye Movement Tracking

It can be really useful to know where your users are looking when they're using your system. It helps with UI design and it helps with knowing how to prioritize certain kinds of content. This technique was developed for academic research and has been used extensively in medical research and has now become popular and cost-effective enough to be deployed by the UX team too.

Why is Eye Movement Tracking a Good Technique?

- Now that technology is advanced enough, eye movement tracking systems are no longer bulky and invasive and they do not interfere with the results of usability tests.
- The technology is reasonably affordable now. It won't suit every project budget but it often won't break the bank either.

Technique Number 4 – Field Studies

This is actually a number of techniques under a broad heading. It's all about going out and observing users "in the wild" so that behaviour can be measured in the context where a product will actually be used. It includes; ethnographic research, interviews and observations, plus contextual enquiry.

Why are Field Studies a Good Technique?

- There's no stronger form of research than observing users behaving as they will when

they use your product. Researchers love these techniques and are often passionate about persuading their clients to take them on board.

- When conducted well, the outputs of field studies provide the deepest insights into user issues and how they might be solved.

Technique Number 5 – Usability Testing

A firm favourite that has a long and prestigious history in UX research. Usability testing is the observation of users trying to carry out tasks with a product. They can focus on a single process or be much more wide ranging.

Why is Usability Testing a Good Technique?

- Usability tests produce specific results that lead to specific action. Better still, it's very hard for people to contradict decisions based on these tests; it's nearly impossible to refute evidence of user behaviour.
- You can bring clients into usability testing easily as observers. This increases their enthusiasm for such testing and shows clearly why such testing adds value.

Technique Number 6 – Remote Usability Testing

This is usability testing but without the need to drag users into your laboratory environment. It was once complex and expensive but technology has moved on and now it's fairly simple to set up and reasonable value for money too.

Why is Remote Usability Testing a Good Technique?

- It often saves time and money when compared to lab testing and it allows for a wider range of participants when you don't have to get them in the lab.
- It is closer to field testing in some respects in that the tests are conducted in the user's environment and not an artificial lab environment. This delivers better results in many cases than a lab environment.

Technique Number 7 – User Personas

User personas are a fictional representation of the ideal user. They focus on the goals of the user, the characteristics that they have and the attitudes that they display. They also examine what the user expects from the product.

User personas are created from other forms of user research and thus offer an in-depth real-life vivid portrait that is easy for the whole team to keep in mind when designing products. User personas have a name and a backstory. They inspire the imagination and keep focus on the user.

Why are User Personas a Good Technique?

- They are a step above the old user profile and give a more in depth and specific look at a user.
- They are easy for people to relate to and become part of the team as they are constantly spoken about during a project.

USER NEEDS AND ITS GOALS

- Designers must consider the types of needs they are targeting with their products so as to grab the customer's/user's attention and accentuate the positive aspects of both owning and using them.

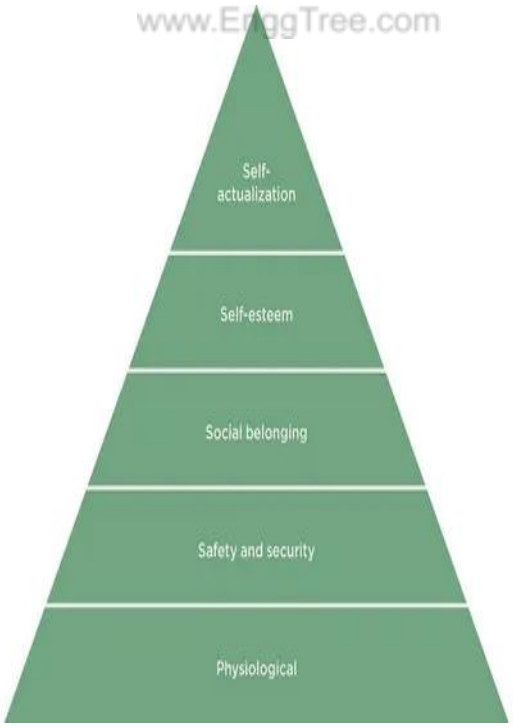
- An understanding of how users think and how they behave in response to sensory information is essential to design

Maslow's Hierarchy of Needs

Abraham Maslow has provided one of the most prominent accounts of human motivation with the 'Hierarchy of Needs', representing his most well-known contribution to psychology.

The Levels of Maslow's Hierarchy of Needs

- The most basic human needs are shown at the bottom of the hierarchy, and these are the physiological drives that ensure survival, including the need for air, food, water, and sleep



Physiological Needs – The most basic needs of all are those that are needed to sustain us as

individuals and as a species. They include food, drink, shelter, breathing, and sleep.

Safety Needs – The next level of needs to be met are those that offer us some guarantee of being able to satisfy our physiological needs in the long-term. These include fiscal and personal security, health, protection from the elements, etc.

Social Needs – The human animal is a social one and there is a deep-seated requirement for company in life. Social needs include friends, lovers, intimacy, families, communities, relationships and a sense of belonging.

Esteem Needs – Basic social needs become more complex for people and there is a need for our efforts to be recognized by others. Esteem needs may be fulfilled by social status, achievements, mastery, prestige, etc.

Self-Actualized Needs – The final, top layer of the hierarchy is associated with our ability to grow as an individual. These needs include peace, contentment, self-growth, maximum experiences, etc.

The Hierarchy of Needs in Design Terms

The Design Hierarchy from Bottom to Top

- As with Maslow's hierarchy it is essential for a design to meet the lowest need on the pyramid before progressing to meet further needs.

- Functionality – for a design to meet any need it must work and it must meet the basic needs of the user. However, if this is all it does; it may well be seen as having little value if any to the user in the short to long-term.

- Reliability – the next step is for your design to function in a reliable manner and present a consistent experience. This may increase the user's perception of the value of

your product from a purely functional one but it does not add large amounts of value either.

- Usability – then a design should be simple to use and relatively forgiving of user error. When you meet this need the product is likely to be considered of middling value by the user.

- Proficiency – a design which helps a user to do more or achieve more is one which is likely to be desired as a high-level of value and fulfil user needs more effectively.

- Creativity – the final step in the design pyramid is to create products which fulfil all other needs and are beautiful not just in form but also in interaction and function. This is where the highest user value is placed

Flow Design Processes - Focusing on the Users' Needs:

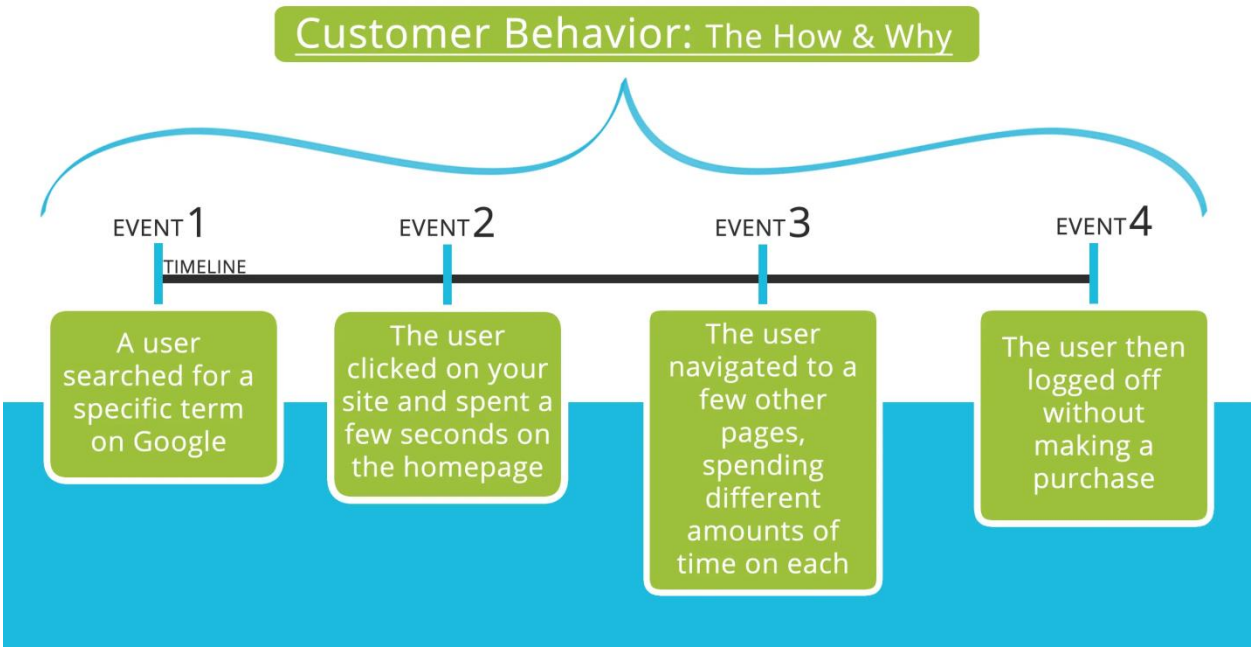
- To create great user experiences – designers must focus on the user's needs and that means developing an understanding of how to create the best task flow for that user.
- The better you facilitate the user moving from start to finish on a particular process – the easier the product is to work with and the more likely that you are to deliver an awesome user experience.
- UX designers are concerned with user flows.

Example User flow:

A retail website might include:

- User wants to buy a new product
- User wants to research alternative products
- User wants to return a product

By mapping out all the possible objectives and comparing them to business objectives – it becomes easy to create user flows. Flows are simply the process steps from the user arriving on a website to completing their task or tasks.



User Goals and How They Influence Information Design Decisions

- Understanding user goals and using this understanding to influence design decisions is essential
- It involves understanding the information users need for performing their tasks and how they want to feel as they undertake them.

User Goals in Each Step of the Design Process

Taking user goals into account will impact decisions along all steps of designing an information visualisation**.**

- Define the problem.
- Define the data to be represented.
- Define the dimensions required to represent the data.
- Define the structures of the data.
- Define the interaction required from the visualisation.

Step 1 – The Main Step of Defining the Problem

When designing information visualisations, understanding the information people need to perform their tasks is the starting point. It requires some user research

Steps 2 to 5 – The Remaining Steps of Designing the Information

Once you understand the user needs and the context in which they will be using the information design, you can proceed to step 2 and start selecting the data necessary for providing them with the insights they need.

Determine the right dimensions and structures so as to translate this data into relevant information. That is what you do in steps 3 and 4.

Finally, in step 5, you need to define the interaction required from the visualisation.

KNOW ABOUT BUSINESS GOALS:

- UX/UI is a bridge between business and clients. Its purpose is to help the business achieve its goals.
- UX/UI helps your business grow by creating a memorable and recognizable brand, expanding your audience, increasing conversion rates, improving user retention and loyalty, and helping you collect and analyze data.

1. Imbalance toward users

User goals are important, but they are secondary. Without achieving the goals of your users, you cannot achieve the goals of your company. Designers typically put all effort into satisfying users, inadvertently putting business goals on the backburner. It's no surprise that designers are often called "users' advocates."

2. Imbalance toward business

This is the other extreme. When a businessman has a good grasp of what UX/UI is capable of, he is often tempted to use this knowledge unethically. User interactions with the product morph into data collection, manipulative product pushing, and fostering a dependency that is closer to drug addiction than to healthy business practices. The users are exploited as an audience that disseminates certain information. This approach is typical of the companies that value their business above all else.

3. Perfect balance

Data collection, advertising on social media platforms, or creating engaging products is a common practice. No business can avoid them. But to establish effective interaction, business goals and user goals need to be balanced.

Client-oriented design is considered the optimum solution for small companies, up-and-coming startups, consumer goods, or novel and unusual products.

Business-oriented design, in its turn, does not imply that the company only cares about profits. It's design that works toward the brand's image, making it more respectable and trustworthy in the eyes of both partners and clients.

4. Data collection

To solve any problem, you need input data. Digital products often turn out to be ineffective just because their creators were not provided all the necessary information by their clients.

Here are some common reasons for that:

- The client only has a vague vision of his business prospects and has no clearly established goals and strategies.

- The client does not know what marketing data are required to design a digital product.
- The client fails to provide complete information and sets arbitrary requirements with no basis in marketing research.
- The client provides only a minimum of information because he is hesitant to share it.
- USP is the central bridge support
- UX/UI needs another, central support. The unique selling proposition is between the business and the clients. This is what the user comes for. On the one hand, the USP characterizes your business, and on the other, it affects the consumer.

5. Action goals

- If a goal does not encourage action, then it's either poorly defined or not a goal at all. A goal must excite the imagination and galvanize into action.
- This applies to both business goals and user goals.
- If everything is done right, then every time the user accomplishes their goals, the business wins as well
- Action goals:
  - have a motivational core;
  - imply a solution to problems;
  - are emotionally exciting.

6. Maintaining the supports

In reality, maintaining all business supports equally is hard. The balance can shift from time to time. You have to be aware which support needs attending to at the moment.

How to accomplish business goals and user goals

- Set business goals and user goals.
- Make these goals clear to project designers.
- Remember the "perfect bridge" and all its supports. Devote as much work to the company's image as to the product and user interests.
- Maintain a balance between business goals, user goals, and product goals so that the bridge does not become crooked at any point.
- Work with designers who understand the importance of all goals and are willing to seek a compromise solution.

•User experience (UX) design is often seen as a balancing act between satisfying user needs and meeting business objectives.

•Designers must navigate the tension between these two priorities to create successful digital products.

•Designing for user needs is critical to creating products that are user-friendly and meet the expectations of the intended audience.

•UX designers must understand the users they are designing for, including their needs, goals,

and pain points.

•This understanding enables designers to create products that are intuitive and easy to use, resulting in a positive user experience.

How to balance user needs and business goals

It is essential for designers to find a balance that satisfies both user needs.

•One way to do this is to involve stakeholders from both sides early in the design process. By doing so, designers can ensure that the business goals are aligned with user needs and that the product they create is valuable to the company and the user.

•Another way to balance user needs and business goals is to prioritize the most critical user needs and business objectives. Designers should identify the core needs of their target audience and focus on designing a product that meets those needs while contributing to the business's objectives.

PANIMALAR INSTITUTE OF TECHNOLOGY

DEPARTMENT OF CSE

R-2021

ACADEMIC YEAR :2022-2023

BATCH :2021-2025

YEAR/SEM :III/V

SUBJECTCODE/TITLE :CCS370/UI AND UX DESIGN

UNIT-4

WIREFRAMING, PROTOTYPING AND TESTING

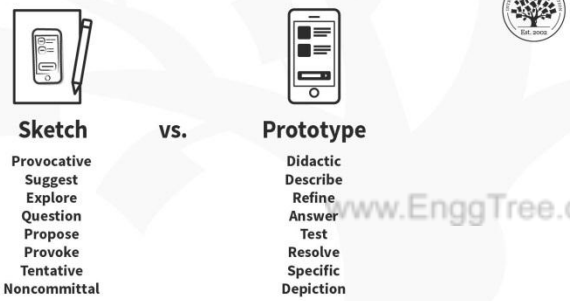
UNIT IV WIREFRAMING, PROTOTYPING AND TESTING

Sketching Principles - Sketching Red Routes - Responsive Design – Wireframing - Creating Wireflows - Building a Prototype - Building High-Fidelity Mockups - Designing Efficiently with Tools - Interaction Patterns - Conducting Usability Tests - Other Evaluative User Research Methods - Synthesizing Test Findings - Prototype Iteration

SKETCHING PRINCIPLES

Sketching:

- Sketching is a distinctive form of drawing which designers use to propose, explore, refine and communicate ideas.
- Sketches are easy, fast, and cheap to create, iterate, and if needed, even discard without much effort. Unlike written or verbal communication, sketches sidestep rules of grammar and help clearly communicate ideas, all but eliminating misunderstandings.



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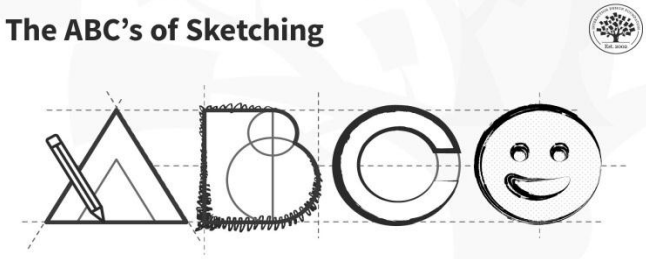
The Five Elements of Drawing:



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Features of Sketch:

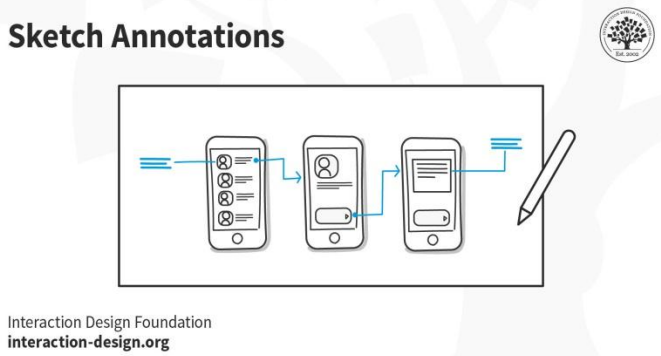
Sketches are:

Quick: Don't invest a long period producing them.

Timely: Produce them when and as the need arises.

Disposable: Rely on their usefulness to explore a concept and not on their production costs.
Plentiful: Produce sketches as a collection that explores different aspects of interaction over time.
Minimalist: Use sketches to clarify one concept at a time.

Enhancing Sketches — Annotations, Arrows and Notes



Annotations, arrows and notes increase the communicative power of your sketches.

Annotations – These are names, labels and explanations located next to different parts of a sketch to expand and clarify the meaning of any element depicted. Tie annotations to different elements in your sketch using arrows, braces, numbering and spatial proximity. Write your annotations using a different color that contrasts with the sketch proper.

Arrows – Apart from pointing to specific elements in a sketch, use arrows to illustrate interaction flow, a sequence of events, movement and direction.

Notes – Any text, long or short, that provides additional insight into your sketch is a note. Use notes to do the following:

- Provide detailed explanation of the action or sequence illustrated.
- Describe an idea derived from an illustration.
- List unresolved issues.
- Explore design elements not depicted in the sketch.
- Clarify the purpose of each element you present, especially non-static ones.
- Keep a record of your thought process when you first draw a sketch.

Types of Sketching:

1. Scribble Sketching

The idea behind this technique is to capture, as fast as possible and with the broadest of strokes, the essence of the object, design or action you are trying to preserve. Leave out non-

important details, decorations, text and other non-essential elements.

2. Sampling with Cameras

The goal of this technique is to use still photos and video to capture some features of the world. Capture objects, designs and actions that delight, inspire and irritate you.

Pros and Cons of Sketches

Pros of sketches

- They are extremely cheap and fast to create. As such, you can sketch out a large number of ideas in a short amount of time.
- You can do it anywhere: with pen and paper or digitally on your smartphone, tablet or desktop computer.
- They are disposable, so you won't get attached to sketches that turn out to be bad ideas.

Cons of sketches

- Sketches lack detail and are ambiguous by design. As such, you cannot use sketches to convey complex interactions of an app, for example.
- Sketches are almost never of high enough fidelity to be useful with people outside of the team, since they rarely have the context to understand what the sketch is meant to convey.
- Sketches are not very helpful in convergent processes where you want to select a few best ideas—other forms of prototypes, such as paper prototypes or wireframes, are more helpful.

When to Use Sketches

Use sketches in early, divergent stages of your design process.

Sketch out your rough ideas so you can discuss them with team-mates.

Sketching Principles:

Best Practices and Tips for Sketching

- Always sketch out your ideas, rather than store them in your head! Design thinking emphasizes a bias towards action. Whenever you have an idea, sketch it out, no matter how silly it seems—you will be able to evaluate it much better when it's on paper rather than in your head.
- Use the right amount of detail: remember that a sketch should be rough and quick. Don't spend extra time adding details which are not required for your quick sketch.
- Draw diagrams to map out complex ideas or use cases, where many factors and players affect one another. Journey maps, behavior maps, system flow diagrams and a range of other mapping methods are at your service to help you scope out complex situations.
- Invite other team-mates to join in your sketching sessions, when appropriate. Because sketches are so easy to create, they are great opportunities for you to involve other stakeholders in the design process.

The best way to gain confidence in sketching is to practice.

Create a Record of Failed Design Efforts

Keep a record of failed design efforts. Gather objects and situations that annoy you. Write down the reasons behind this negative effect.

Create a Record of Successful Design

keep a record of successful design. This will help you draw inspiration from multiple domains to ground your design work on features other than those of the digital realm.

How to Perform a Sketch Test

The procedure is simple:

1. Print a copy of the deliverable
2. Recruit a sketch-test participant from your target audience. For example, if you're preparing a wireframe for developers, recruit a front-end developer.
3. Give the sketch-test participant the printed copy of the deliverable. Place a blank pad of paper and a pen or pencil right next to the person.
4. Invite the participant to write directly on the deliverable, but also make scratch paper available. Explain that the printed version of the deliverable is just a scratch copy, and that you welcome any comments.
5. Ask the participant to explain the concepts in the deliverable.
    - Explain that the current version of the deliverable is a work in progress, and that you are still developing the format of the document. While content suggestions can be welcome, at this point do not ask for them explicitly — keep the focus on making the

deliverable clear and direct.

- Note that you want to make this document easier to understand.
- Give the participant time to read the deliverable. Ask your participant to use the think-aloud protocol during the initial reading of the document.
- Ask the participant to pretend that she is presenting this document, and have her explain the deliverable to you.

6. Watch and listen as your participant explains the concepts in your deliverable.
7. Ask your participant open-ended follow-up questions
8. At the end of the session, explain the intended "correct" meaning of the document to your participant, to avoid having him leave with an erroneous understanding of your work.

Feedback to Look for During a Sketch Test

The sketch test can help surface two types of problems with deliverables: (1) content that is not easily perceptible in the document (e.g. using blue text to annotate a screenshot made it difficult to notice against a similar background), and (2) content that is not comprehensible

During a sketch test, notice if your participant exhibits any of the following behaviors,

- Circling or underlining elements
- Drawing something to represent content that your deliverable presents in text, or employing a different visual metaphor than you currently use for data visualization or infographics
- Making notes or edits on your sketch, or suggesting terminology or wording for concepts other than those shown in the deliverable
- Reading the same passages or studying the same images several times
- Struggling to explain something to you
- Explaining something incorrectly to you

Improving the Deliverable Based on the Sketch Test

If your participant struggles to explain your deliverable easily, you will likely need to revise it before sharing it with your colleagues**.**

Feedback About the Content of the Deliverable

During a sketch test, you may receive feedback not only about the format of your deliverable, but also about its content.

SKETCHING RED ROUTES

Dr. David Travis of User focus identified that the analogy of the red route. By identifying the core paths users will take on a website should be identified as the red routes.
•Red Routes are majorly derived from "Important roads in London".
•Transport for London do everything in their power to make sure passenger journeys on these routes are completed as smoothly and quickly as possible
•London's Red Routes as a metaphor for frictionless user journeys.

How does Red route help in Designs ?
"When applied to design, these red routes are the critical and frequent paths that users take to complete their tasks"

Red Route principle
Define red routes for your product and you'll be able to identify, prioritise and eliminate any usability obstacles on key user journeys.

Identifying Red Routes
Critical
End-to-end tasks with multiple steps or actions
Frequently utilised

Built for scale
Key value drivers
Objectively successful
Tied to critical product metrics

Red route usability
"Focusing on your product's red routes provides the key constraint you need to ship a high value product from version 1"

Red routes improve speed and effectiveness:
We can ruthlessly eradicate any usability obstacles on the key user journeys.

Red routes describe frequent and critical activities :
We need to map out the red routes for our site it's important to consider both the frequency and critical nature of the activity

Red routes should reflect key business objectives :
These red routes are clearly important from the perspective of the organisation: you need to make sure these routes are trouble-free to make money

Red routes should reflect key customer objectives :

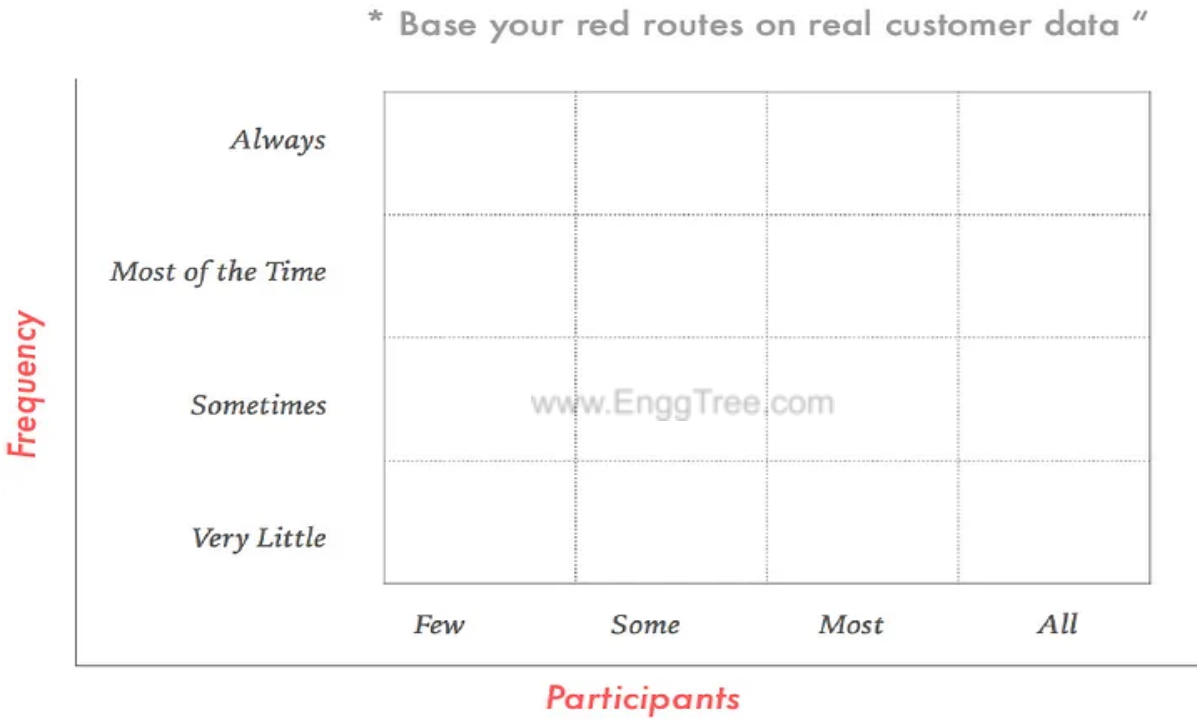
Visitors to your site will have their own goals that your site needs to support. there will be others that may not seem that important to your organisation but that are critical if customers are going to do business with you

Red route Analysis

"Red routes are the key tasks that users want to carry out with the product "

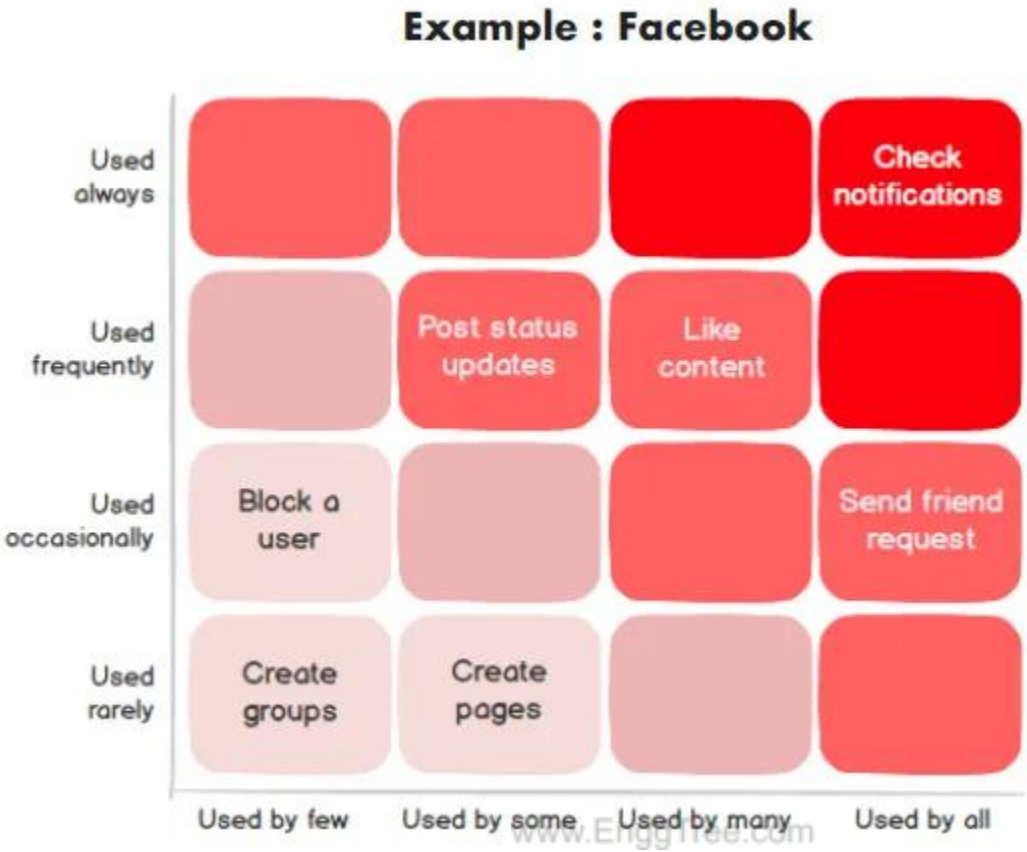
We can decide if one of the product backlog items lies on a red route by asking two simple questions :

- How many users need this function?
- How often do users need this function?



By identifying what the top tasks of your users are it allows you to:

- Anticipate user needs
- Guide usability testing
- Target essential website pages
- Design website with user needs in mind
- Identify your website's mission



Benefits of Identifying Red Routes :

"Defining crisp red routes for your users is like allowing them to travel from Point A to Point B without any obstacles"

- Identifying red routes helps your team prioritise user needs and facilitate alignment amongst your stakeholders.
- It also helps avoid scope creep and the introduction of extraneous/ancillary features.
- Most importantly, it helps your team build and optimise product features that deliver the most value to your customers and drive your key metrics.

Route Type	Customer objective	Business objective
Uber - Red route	Requesting a ride	Accepting a ride
Uber - Normal route	Adding a payment method	Changing profile settings
Red bus - Red route	Booking a bus	Managing reservations
Red bus - Normal route	Leaving a review	Updating trip details

RESPONSIVE DESIGN

Responsive web design (RWD) is a web development approach that creates dynamic changes to the appearance of a website, depending on the screen size and orientation of the device being used to view it. RWD is one approach to the problem of designing for the multitude of devices available to customers, ranging from tiny phones to huge desktop monitors.

RWD uses so-called breakpoints to determine how the layout of a site will appear: one design is used above a breakpoint and another design is applied below that breakpoint. The breakpoints are commonly based on the width of the browser.

Definition:

Responsive design is an approach to web design in which the interface adapts to the device's layout, facilitating usability, navigation and information seeking.

Benefits of Responsive design:

- Reach a larger audience: nowadays, more users access the web through mobile devices.
- Save time and development efforts since designers and developers only focus on one design version.
- Improve SEO, as search engines reward mobile-friendly websites with better search positions.
- Ensure brand and design consistency across devices, as there is no chance to modify guidelines to fit different design boxes.

Why Responsive Design is so Popular?

More users were starting to access web material on handheld devices than on desktops. There were two main design approaches to deal with designing across devices:

- Designers could craft several versions of a design optimized for different devices and make each have fixed dimensions (adaptive design approach).
- They could work on a single, flexible design that would stretch or shrink to fit the screen (responsive design approach).

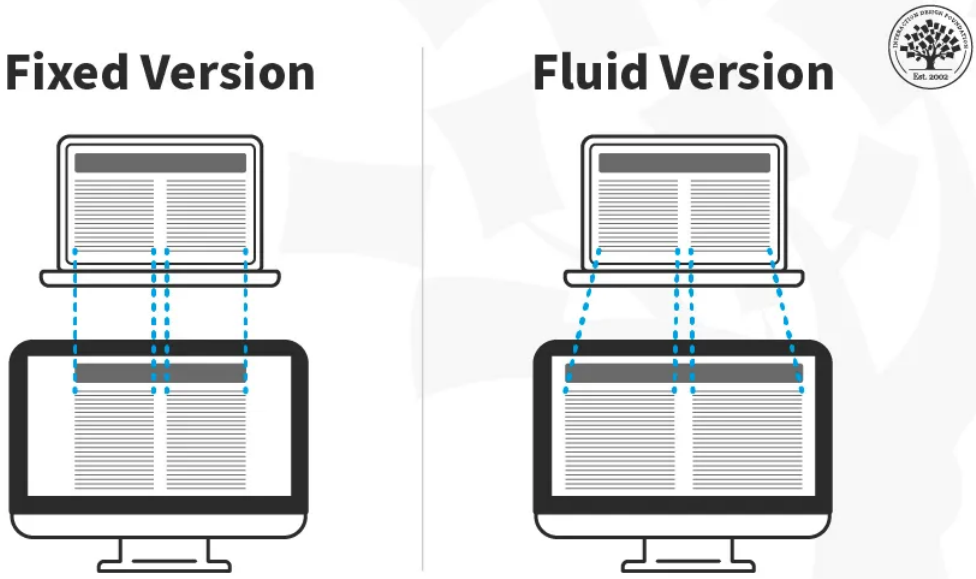
Understanding the Language of Responsive Design

Responsive design has three core principles:

Fluid Grid System

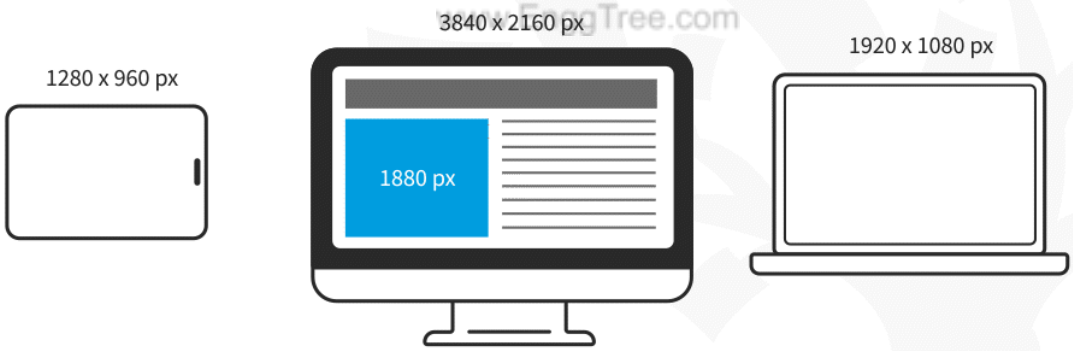
Grid systems are aids designers use to build, design, arrange information and make consistent user experiences. In interaction design, multi-column, hierarchical and modular are the most widely-used types of grids.

The principle of a grid is simple: every element occupies the same percentage of space, however large or small the screen becomes, which means that the components can be scaled up and down as the user switches devices.



In this image, you can see that the fixed version of the content has the same width regardless of the device whereas in the fluid version the content fills the available space depending on the device size.

Fluid Images



- In responsive design, fluid images are images that scale to fit their container, meaning that when the browser reaches a breakpoint, the image will scale up or down to the current window size.
- For non-photographic images, such as icons, you can use SVG files—these file formats are lightweight, and you can scale them to any resolution without losing quality.

Media Queries and Breakpoints

- Media queries are filters that detect the browsing device's dimensions and make your design appear appropriate regardless of the screen size. To aid media queries, you have

breakpoints: these are the values where the content of your website will be rearranged to provide the user with the best possible experience.

- Media queries and breakpoints go hand in hand, and both can be defined in your CSS style sheets. For designers, a breakpoint is a boundary where the design will change to accommodate the features to the new size.

Best Practices & Considerations for Responsive Design

With responsive design, you design for flexibility in every aspect—images, text and layouts. So, you should:

1.Assume a "mobile-first" mentality: Whether you start designing from the smallest screen or the desktop version, assuming a mobile-first mentality helps you practice the mobile-first approach, a design principle with simplicity at its core. A mobile-first mentality means prioritizing content, leaving complex graphs and images for the desktop version

2.Use Scalable Vector Graphics (SVGs). These are an XML-based file format for 2D graphics, which supports interactivity and animations.

3.Include three or more breakpoints (i.e., design for 3+ devices).

4.Prioritize and hide content to suit users' contexts. Check your visual hierarchy and use progressive disclosure and navigation drawers to give users needed items first. Keep nonessential items (nice-to-haves) secondary.

5.Aim for minimalism.

6.Apply design patterns to maximize ease of use for users in their contexts and quicken their familiarity: e.g., the column drop pattern fits content to many screen types.

7.Aim for accessibility with font sizes/styles. Use contrast and background effectively.

Demerits of Responsive design:

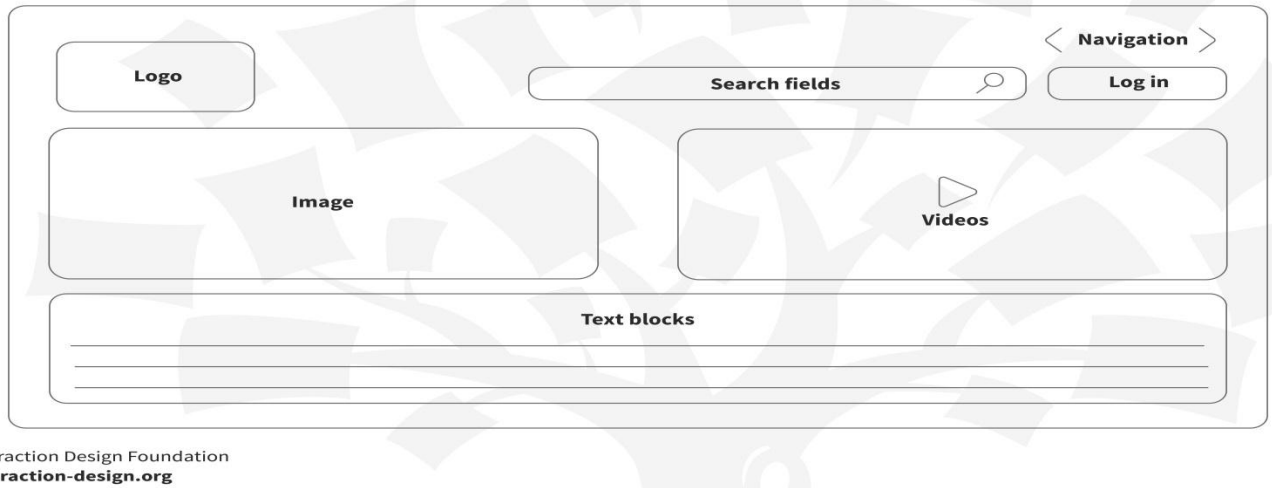
Responsive design can still run into difficulties if you use it without caution. For example, it can restrict your control over the design's screen sizes

WIREFRAMING

Definition:

Wireframing is a visual representation of the workflow of a website or mobile application. This preliminary design step illustrates the page's structure, layout, and functionality. It helps in planning the user experience without distractions from color, graphics, or content.

The Elements of a Wireframe



1. The logo signifies brand identity. It usually sits at the top corner of a page and anchors the brand's presence.

2. Navigation helps users explore different parts of the site or app. Commonly seen as a menu bar or sidebar, it directs users to primary sections or features.

3. Search fields allow users to find specific content or features. It's especially useful for content-heavy sites.

4. Text blocks on a wireframe represent the content placement. It can be headlines, paragraphs, or bullet points.

5. Buttons prompt users to take actions like "Submit," "Read More," or "Buy Now."

6. Image placeholders show where you will place your visuals. They help in understanding the content-to-visual balance on a page.

7. Videos mark the areas on the wireframe where multimedia content, such as videos or animations, will appear.

Different Types of Wireframes

1. Low-fidelity Wireframes

Low-fidelity wireframes are the first you create. They provide the basic visuals of the design, but lack scale, grid, or pixel accuracy. The main aim is to strip away distractions.

These wireframes ease discussions, help in setting navigation, and outline user paths.

2. Mid-fidelity Wireframes

Mid-fidelity wireframes are the most prevalent. They offer a clearer layout view, though they still omit visuals like images or specific typography.

3. High-fidelity Wireframes

High-fidelity wireframes are detailed. They provide pixel-specific layout views. Unlike the low-fidelity version, which might use placeholder text and symbols, these wireframes present actual images and relevant content.

When to Use Wireframes?

Wireframes play a role throughout a project. They're essential for clarity, feedback, planning, and testing. But they serve a specific purpose. Here are the scenarios where creating wireframes can help.

- Explore the initial idea: At the start of a project, wireframes help visualize rough ideas. They bring abstract concepts to life.

- Collect meaningful feedback: Before you get into the details of a design, wireframes help you gather initial feedback. Stakeholders, members of the design team, and potential users can provide valuable insights before you move on to the next step.

- Plan functionality: Wireframes map out where you will place functional elements like buttons or interactive features. It helps you understand how to create an interaction design for usability.

- Structure content: Wireframes help plan where content will appear. For instance, positioning text, images, or multimedia is easier.

- Customer journey mapping: Wireframes are tools to plot user journeys. They enable designers to envision how users will navigate a site or app.

- Usability testing: Before final designs, wireframes can undergo usability tests. It helps identify and rectify usability issues early.

Choosing the Right Wireframing Tools

Benefits of Digital Wireframing

- Precision: Digital tools offer accurate measurements. This ensures elements align and match the intended design.
- Efficiency: Speed up the wireframing process. Features like copy, paste, and templates save time.
- Collaboration: Many digital tools have built-in collaboration features. Teams can review, comment, and iterate together in real time.
- Version control: Digital wireframing can help you track changes. Most tools offer version history and allow designers to revert or compare versions.
- Easy sharing: You can share digital wireframes with a link. It eases the process of gathering feedback.
- Interactivity: Some tools enable clickable wireframes. This simulates user interactions by offering a dynamic preview.
- Scalability: Adjusting wireframe sizes for various devices is straightforward. It ensures designs are responsive.
- Integration: Many tools integrate with other design software. This streamlines the transition from wireframing to high-fidelity designs.
- Asset management: It's easy to organize and store assets. Icons, components, and UI elements remain at your fingertips.
- Professional presentation: Digital wireframes look polished. Presenting them to stakeholders or clients gives a professional impression.

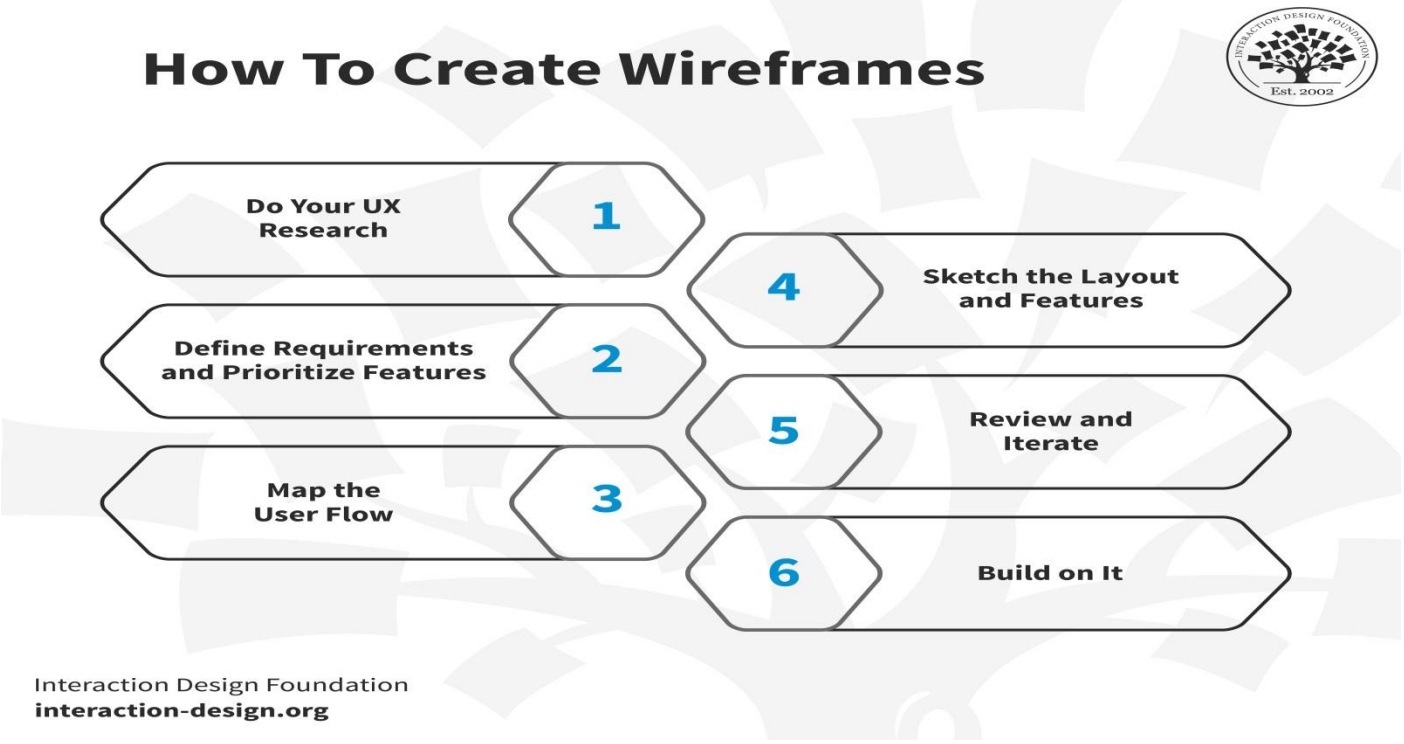
Wireframing tools and software

Wireframing tools help you map out the user experience, layout, and overall flow. It streamlines the design process and ensures everyone is on the same page.

1. Figma
2. Mockflow
3. Lucidchart

4. Miro

How to Create Wireframes: A Step-by-Step Guide



Step 1: Do Your UX Research

Before sketching, you need to have a good understanding of your audience and business. Start your UX research from the perspective of your target audience.

What motivates them?

What holds them back?

Which products resonate with them?

Utilizing tools like user personas or the jobs-to-be-done (JTBD) framework can be invaluable here.

Step 2: Define Requirements and Prioritize Features

After you complete your UX research, the next step is narrowing down what to build. At this stage, involve stakeholders or the product owner. They will help translate broad user needs into specific features.

For example, if your e-commerce site aims to improve user engagement, it may require a 'Recommended Products' section. Stakeholders can provide insights on what features align with both user needs and business goals.

Step 3: Map the User Flow

User flow is the blueprint of a user's journey on your platform. Taking an e-commerce site as an example, a user's path might start from the homepage, leading to a product search, then product selection, payment, and finally, order confirmation.

Recognizing these steps will highlight the necessary features and inform your design decisions.

Step 4: Sketch the Layout and Features

With the user research and project requirements in hand, sketch your wireframe. Select an appropriate canvas size and start positioning elements.

- Information architecture: Focus on how you organize the content and prioritize information based on its significance.
- Interactive elements: Highlight buttons, links, and other clickable items.

- Static elements: Remember foundational parts like headers, footers, or menus.
- Fidelity choice: Decide on the detail level. Early stages might use low-fidelity sketches, while detailed projects lean towards high-fidelity designs. In between, you find medium-fidelity designs.

Step 5: Review and Iterate

- Share your wireframes. Gather input from stakeholders, including business professionals and developers. Consider guerrilla usability tests, which involve testing the wireframe with users to gather insights.
- When you collect feedback, frame your questions to include broad insights and specific details.

Step 6: Build on It

Upon reaching a mutual agreement on the wireframe design, progress to the next stages. Create detailed mockups and interactive prototypes and transform them into minimum viable products

What is Wireframing in UX?

Wireframing in UX refers to creating a skeletal layout for a digital product. It's the blueprint or foundation upon which you create the design

Different platforms have specific wireframe sizes. These are:

- Smartphone screen: 1080 px x 1920 px
- 8” Tablet screen: 800 px x 1280 px
- 10” Tablet screen: 1200 px x 1920 px
- Desktop screen: 768 px x 1366 px

The Necessity of Wireframing

- Clarity: Wireframing interprets abstract ideas to convert them into a visual format.
- Feedback: Early-stage wireframes gather valuable feedback from stakeholders and users.
- Cost-efficient: It's easier and cheaper to make changes to a wireframe than to a fully designed product.
- Focus on Functionality: Without distractions like color or graphics, the core user journey and functionality remain at the forefront.

Approaches to Wireframing

- Hand-drawn: Quick sketches on paper or a whiteboard. Ideal for brainstorming.
- Low fidelity: Basic visual design that focuses on structure and layout.
- High fidelity: Detailed, closer to the final design. They showcase interactions and more precise placements.

Wireframing Principles

- Simplicity: Keep it straightforward. Focus on structure and functionality.
- User-centered: Prioritize user needs and the intended user journeys.
- Clarity: Every element should have a clear purpose.
- Feedback loop: Constantly gather feedback and iterate.
- Consistency: Maintain a uniform structure and design language.

Wireframing for User Testing

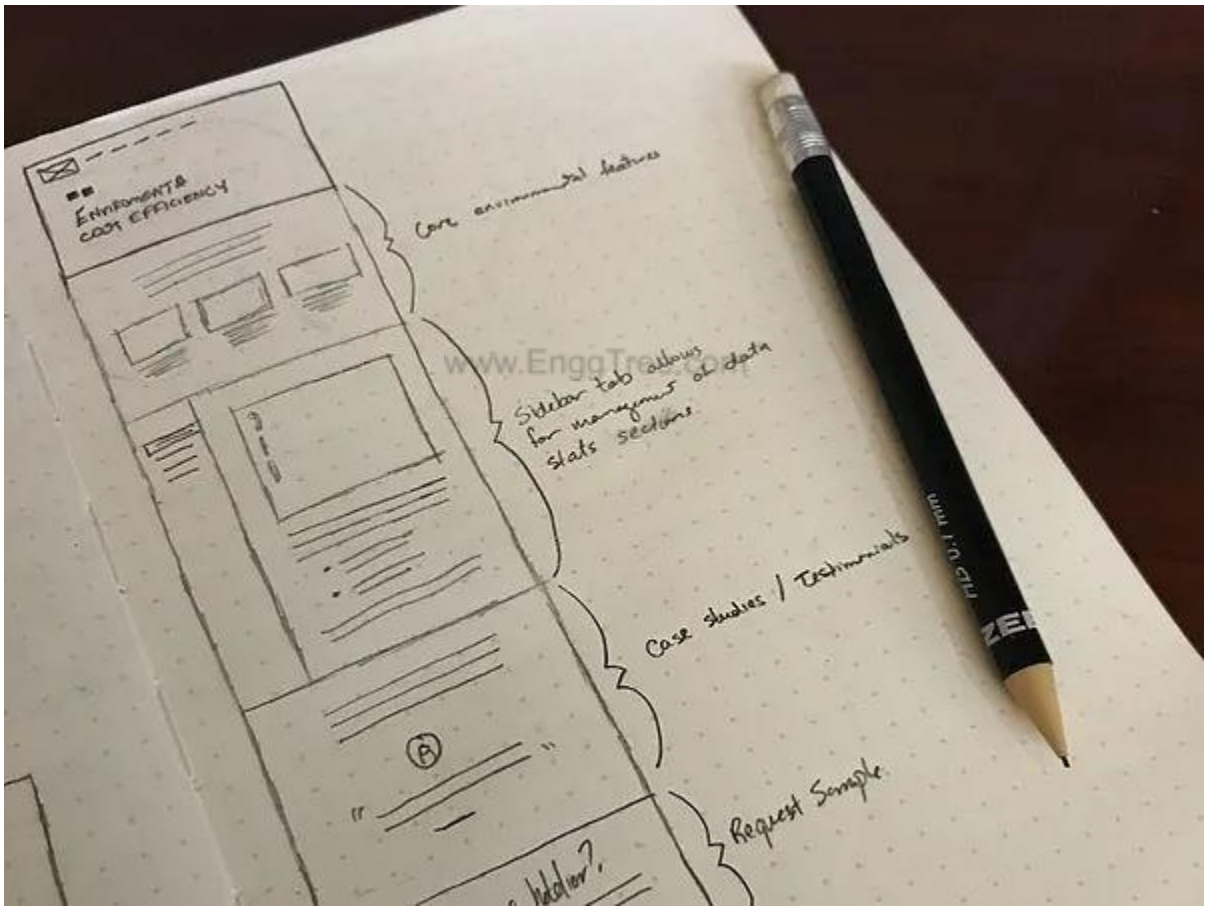
Testing with wireframes is invaluable. Before getting deep into design or development, wireframes provide a tangible product for users to interact with. This early-stage testing identifies potential usability issues, layout problems, or unclear navigation paths.

Wireframe Page Layout: Structuring Content

- Header: The topmost section, usually containing the logo, navigation links, or contact details.
- Main content area: The primary section where the core content resides. It's the focal point of the user's attention.
- Sidebars: Secondary content areas, often containing links, ads, or additional information.
- Footer: The bottom section displays copyright information, additional links, or contact details.

UX and UI Wireframe Examples

1. **Website Wireframe Sketch**



A basic homepage wireframe sketch. It outlines sections and highlights essential details.

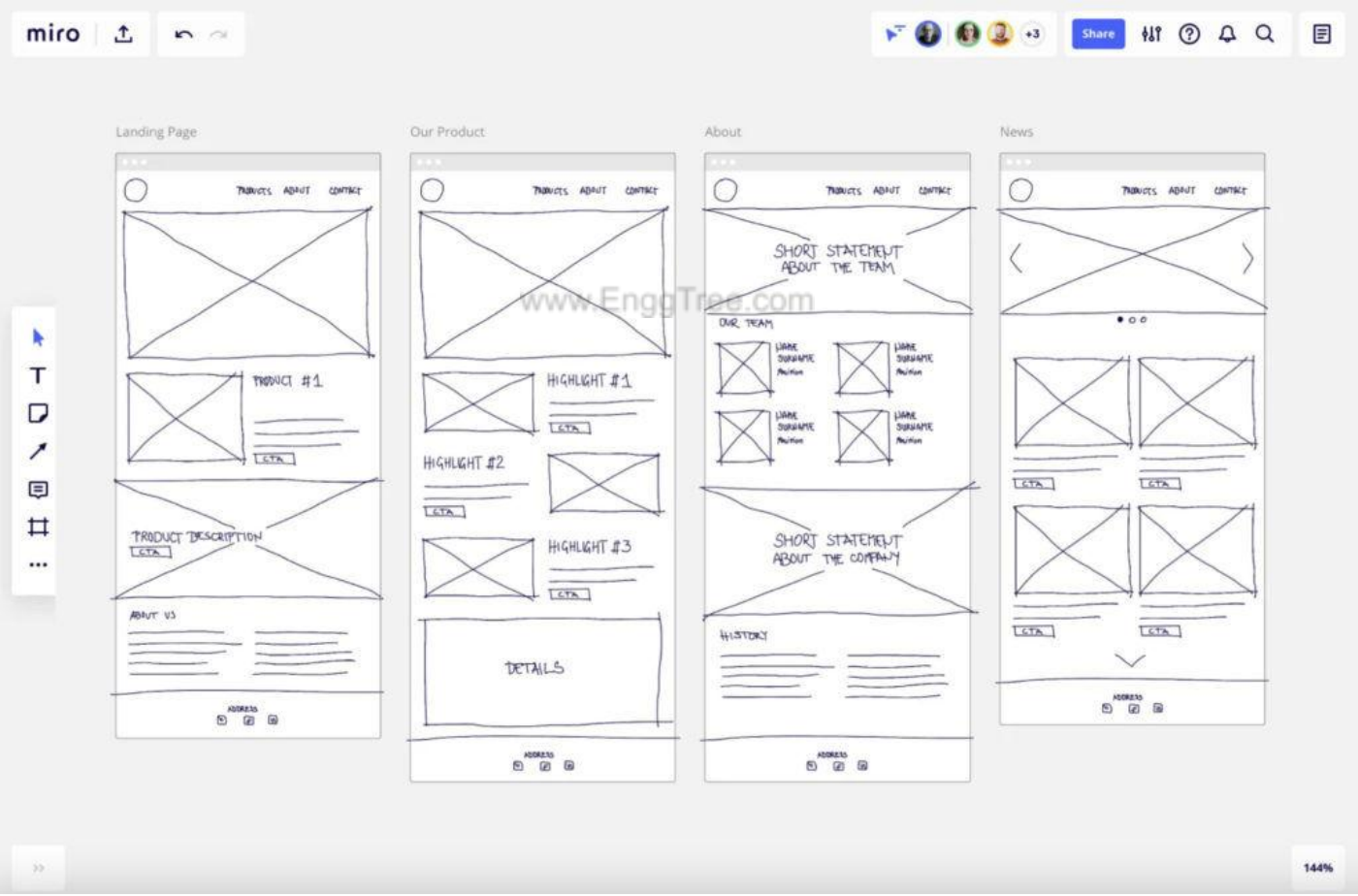
Strengths

- Allows for quick ideation without tool constraints.
- Encourages collaboration; anyone with a pen can contribute.
- Sparks creativity and is less restrictive than digital tools.

Weaknesses

- Not as precise or scalable as digital versions.
- Difficult to share and edit in remote settings.
- Lacks interactivity features present in digital tools.

eCommerce Mobile Wireframe Sketch



The digital sketch shows the main parts of a mobile eCommerce site

Strengths

- Allows designers to quickly visualize product listings, calls to action, and user journeys.
- Encourages a focus on essential eCommerce elements like product images, pricing, and checkout flow.
- Great for brainstorming promotional placements or special features.

Weaknesses

- Doesn't capture the detailed intricacies of product variations or filters.
- Limited in representing interactive elements like dropdowns or sliders.
- Often lacks detailed space allocation for promotional content or ads.

Creating Wireflows

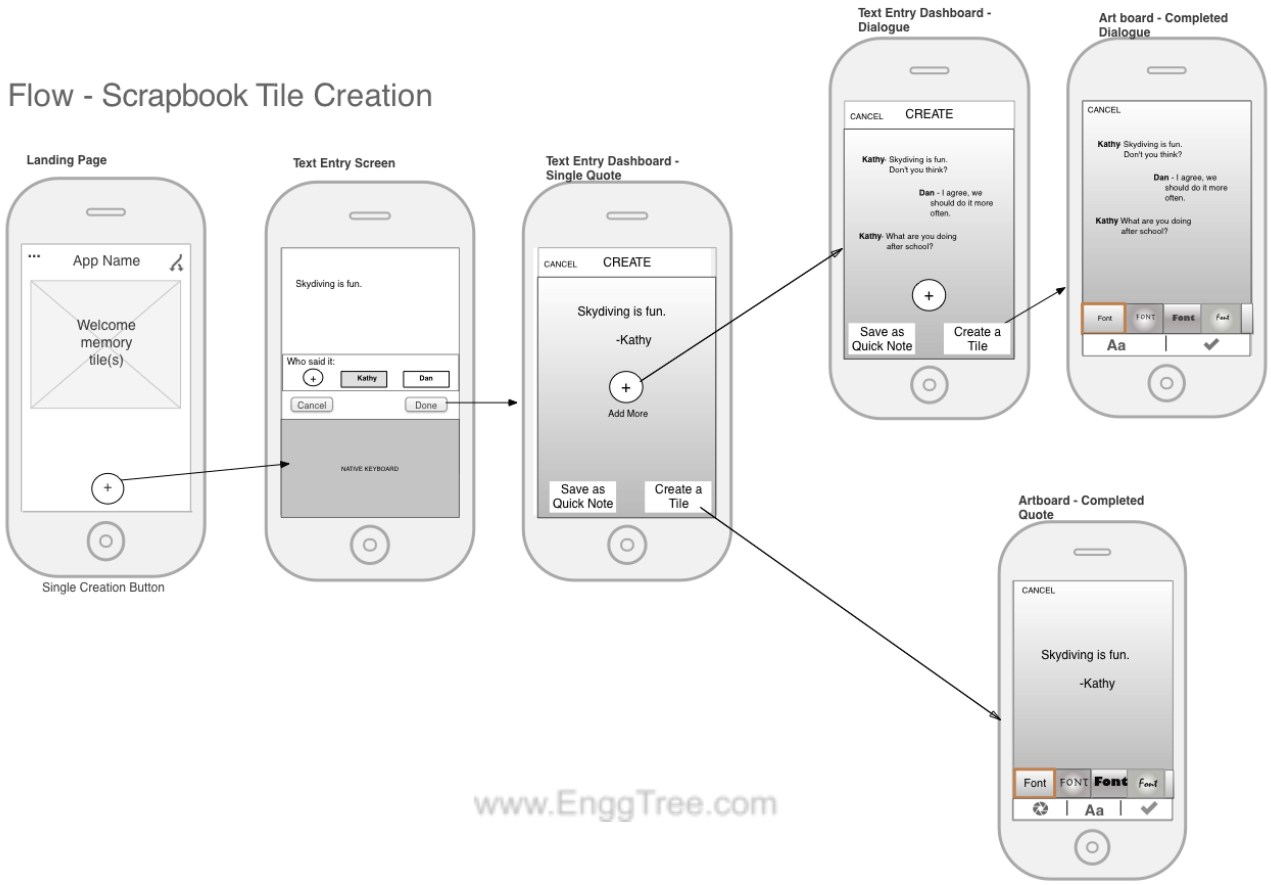
- Wireflows are a combination of wireframes and flowcharts. They can document workflow and screen designs when there are few pages that change dynamically.

- In the UX field, wireframes are a common deliverable to show page-level layout ideas, whereas flowcharts are useful for documenting complex workflows and user tasks.

- Wireflows are used when documenting mobile, desktop, or web apps that don't have many unique pages, but instead feature a few core pages which change content (or layout) dynamically based on user interaction.

Wireflows as a Deliverable for Workflows

Definition: Wireflows are a design-specification format that combines wireframe-style page layout designs with a simplified flowchart-like way of representing interactions.



This low-fidelity wireflow shows a simple user task. The use of screen designs, rather than abstract flowchart symbols, keeps focus on the product with which users will be interacting. While wireflows can be created in high fidelity for the purposes of communicating detailed design specifications, they are just as useful as lower-fidelity documents to discuss and communicate interaction design and user workflows.

Wireflows Document Interactions

The classic use-case for wireflows is to document the process of a user working through a common task on the product (e.g. “send a direct message to someone in your network” on a social media app). At each step in the workflow a simple wireframe or high fidelity screen mock-up shows the screen available to users.

Wireflows for Collaborative Ideation

In addition to being a useful form of communication with project stakeholders and developers, wireflows also work well as a tool for collaboration between team members. Especially in Agile environments, being able to collaborate and communicate well among a crossfunctional team is critical.

BUILDING A PROTOTYPE

What is Prototyping?

Prototyping is an experimental process where design teams implement ideas into tangible forms from paper to digital. Teams build prototypes of varying degrees of fidelity to capture design concepts and test on users.

What is a Prototype?

A prototype is a simple experimental model of a proposed solution used to test or validate ideas, design assumptions and other aspects of its conceptualisation quickly and cheaply, so that the designer/s involved can make appropriate refinements or possible changes in direction.

Remarkable Reasons for Prototyping

The advantages of prototyping are that you:

- Have a solid foundation from which to ideate towards improvements—giving all stakeholders a clear picture of the potential benefits, risks and costs associated with where a prototype might lead.
- Can adapt changes early—thereby avoiding commitment to a single, falsely-ideal version, getting stuck on local maxima of UX and later incurring heavy costs due to oversights.
- Show the prototype to your users so they can give you their feedback to help pinpoint which elements/variants work best and whether an overhaul is required.
- Have a tool to experiment with associated parts of the users' needs and problems—therefore, you can get insights into less-obvious areas of the users' world (e.g., you notice them using it for additional purposes or spot unforeseen accessibility issues such as challenges to mobile use).
- Provide a sense of ownership to all concerned stakeholders—therefore fostering emotional investment in the product's ultimate success.
- Improve time-to-market by minimizing the number of errors to correct before product release.

The three primary types of prototypes based on fidelity are:

1. Low-Fidelity Prototypes: Simple and often hand-drawn representations, such as sketches or paper interfaces. They're quick to produce and useful for initial concept validations.

2. Mid-Fidelity Prototypes: More detailed than low-fidelity, these often use digital tools and give a clearer understanding of the product's aesthetics and functionality.

3. High-Fidelity Prototypes: Highly detailed and interactive, resembling the final product closely. They're used for advanced user testing and to get a realistic feel of the final design.

Low-fidelity

Example: Paper prototypes

Pros: Fast and cheap; disposable; easy to make changes and test new iterations; allow a quick overall view of the product; anyone can produce them; encourage design thinking since prototypes are visibly not finalized.

Cons: Lack of realism, so users might have a hard time giving feedback; hard to apply results from crude early versions; may be too basic to reflect the user experience of the finished product; can oversimplify complex issues; lack of interactivity deprives users of direct control; users must imagine how they would use the product.

High-fidelity

Example: Digital prototypes created on software such as Sketch or Adobe XD

Pros: Engaging—all stakeholders have the vision realized in their hands and can judge how well it matches users' needs and solves their problems; testing will yield more accurate, more applicable results; versions closest to the final product enable you to predict how users will take to it in the marketplace.

Cons: Longer/costlier to create; users are more likely to comment on superficial details than on content; after hours of work, you the designer are likely to dislike the idea of making changes, which can take considerable time; users may mistake the prototype for the finished product and form biases.

Why We Need to Prototype

Early Research isn't Everything

Research conducted during the early stages of your Design Thinking project does not tell you everything you need to know in order to create the optimal solution. Use prototyping as a form of research even before other phases in Design Thinking, allowing you to explore problem areas in interfaces, products or services, and spot areas for improvement or innovation.

Prototype to Empathise, Define, Ideate, and Test

Some of the purposes that prototypes fulfil are:

Exploring and Experimentation
You can use prototypes to explore problems, ideas, and opportunities within a specific area of focus and test out the impact of incremental or radical changes.

Learning and Understanding
Use prototypes in order to better understand the dynamics of a problem, product, or system by physically engaging with them and picking apart what makes them work or fail.

Engaging, Testing, and Experiencing
Use prototyping to engage with end users or stakeholders, in ways that reveal deeper insight and more valuable experiences, to inform design decisions going forward.

Inspiring and Motivating
Use prototypes to sell new ideas, motivate buy-in from internal or external stakeholders, or inspire markets toward radical new ways of thinking and doing.

How Prototyping Works

Bias Towards Action

One of the essential mindsets for Design Thinking is having a bias towards action:

Learning by Doing

One of the most important aspects of Design Thinking is exploring unknown possibilities and uncovering unknown insights. This is the reason the discipline places emphasis on learning and on activities that increase the learning potential of the team.

Prototyping to Test

This will be the most common prototype you will create in a design project. Create iteratively improved prototypes in order to test out solutions quickly, and then use the test results to improve your ideas.

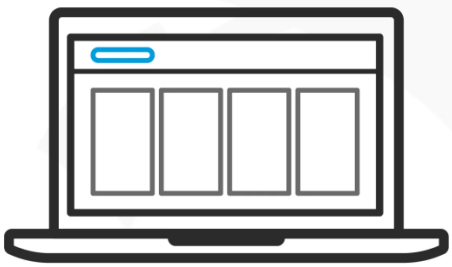
Prototyping to Decide

Sometimes in your design project, you may face conflicting ideas from different team-mates or stakeholders. Prototyping can be an effective tool for enabling your team to compare the ideas and prevent any disagreements from developing.

When building a prototype to decide, you can see how each of the solutions will work better. You will be able to see whether the prototypes lack in some areas; for example, you may realise that the prototype would not work in the natural environment of users. Your team will also be able to see the different ideas tangibly, and hence discuss the ideas and build on them, or suggest ways to merge the best aspects of each prototype.

BUILDING HIGH-FIDELITY MOCKUPS

Mock-ups are used by designers mainly to acquire feedback from users about designs and design ideas early in the design process. Mock-ups are 'very early prototypes' made of cardboard or otherwise low-fidelity materials. The user, aided by the designer, may test the mock-up (imagining that it works) and thus provide valuable feedback about functionality/usability/understanding of the basic design idea/etc.



Mockups look like screenshots from a completed, real app, they are little more than images
Mockups are fully polished visual designs sometimes rendered in realistic devices that include branding, colors, images and typography.

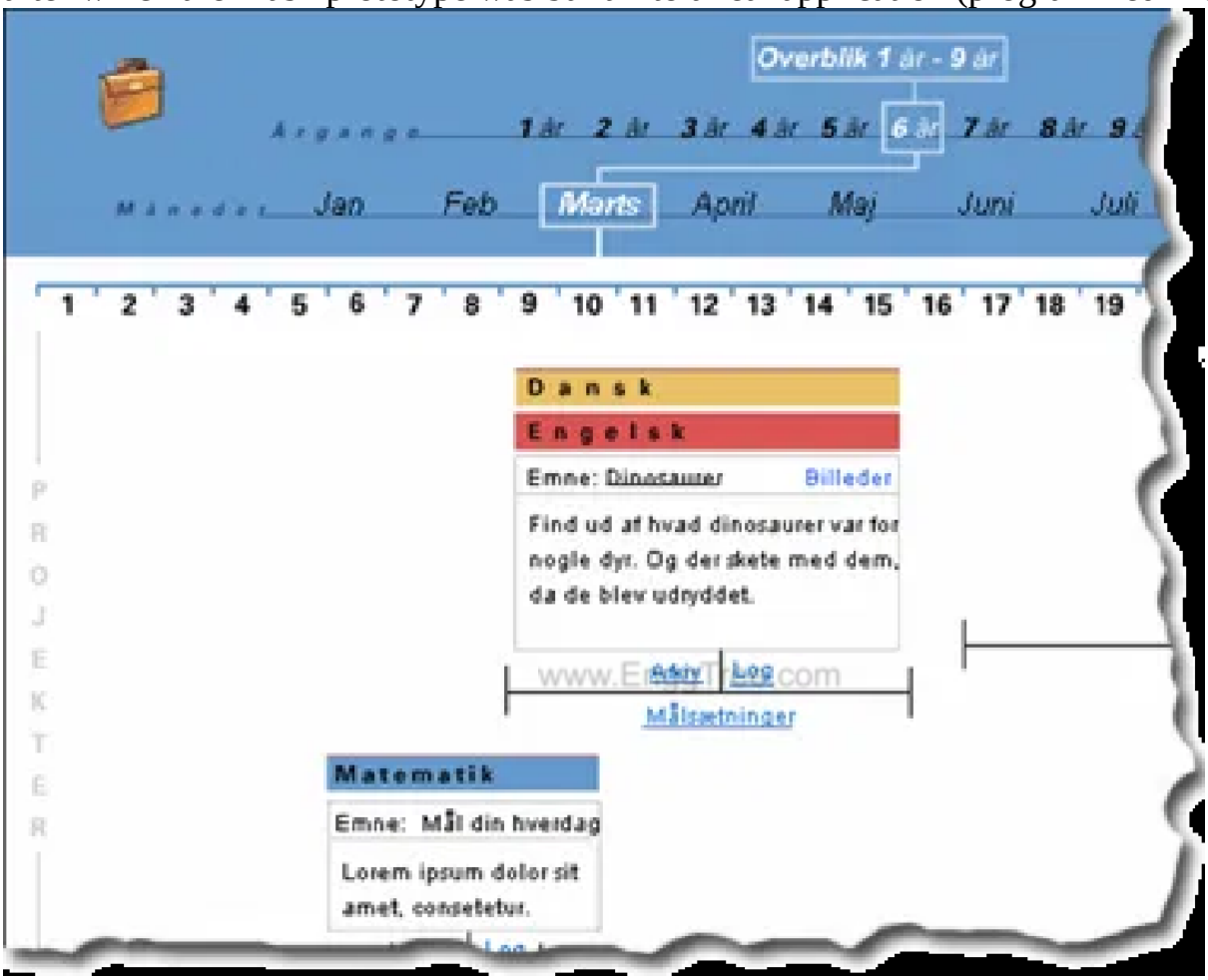
Advantages:

- Mock-ups incite criticism from users because they are low-cost (can be made of cardboard) and low-fidelity. If a user is presented with an early version of a system that has required substantial work, he/she is likely to be more reluctant (as well as able) to critise it.
- When using mock-ups of cardboard or similar materials, the user and designer can collectively change the design using familiar tools such as pens, scissors etc. As such, mock-ups are a discussion medium and a discussion facilitator between designer and user.
- Not only can the mock-up function as a discussion medium between designer and user but also between the members of the design team. Thus, mock-ups may help facilitate work across disciplinary borders, bringing together a disparate team.
- Mock-ups make it possible to do usability testing early in the development process.
- Mock-ups incite and legalise experimentation as they are inexpensive to alter.
- Mockups focus on content and functionality and turn attention away from details of graphic design.

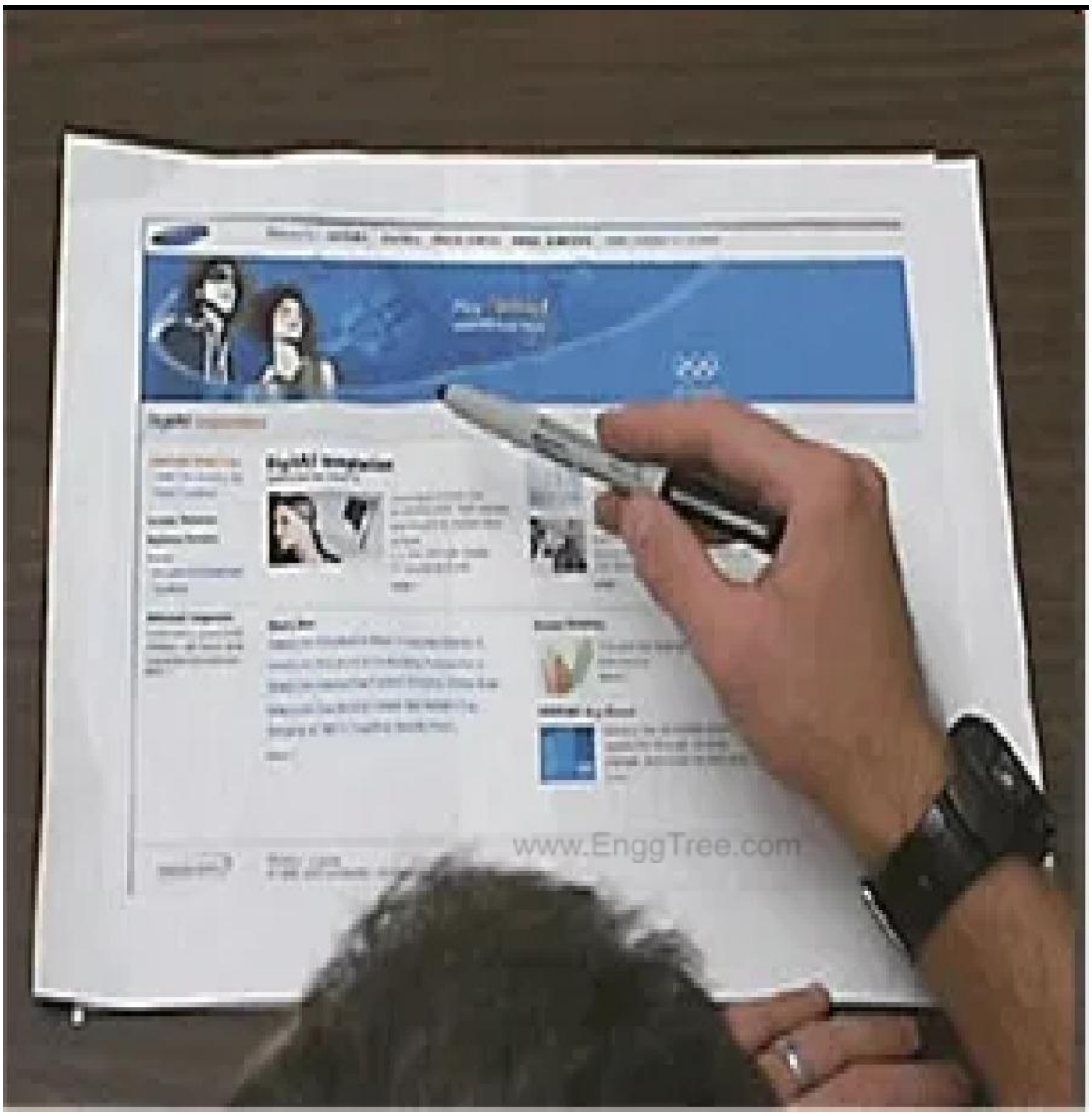
Examples of mockups

Figure 1: Cardboard Mockup of a calendar application for school kids

After a couple of tests with the mock-up, it was made into a prototype programmed in Macromedia Flash (figure 2). The prototype was more 'polished' and allowed for more interactivity. Using prototype, various scenarios of use (use cases) were tested with the users, after which the Flash prototype was built into a real application (programmed in Java).



The same calendar application,
this time as a prototype made in Macromedia Flash**.**



A mock-up of a website

DESIGNING EFFICIENTLY WITH TOOLS

What are UX Tools?

User experience designers use UX tools—often purpose-built software—at different stages of their work. For example, designers test their assumptions using prototyping software (e.g., Balsamiq) and do usability testing with other software (e.g., Loop11). To stay competitive, brands make UX tools extremely easy to learn.

Types of tools

Questionnaire tools – To gather users' information and feedback in quantitative research: E.g., Google Forms, SurveyMonkey.

Flowcharting tools – To help predict users' needs, thoughts and actions and align these with business needs through flowcharts: E.g., LucidChart, OmniGraffle.

Low-fidelity prototyping/Wireframing tools – To realize more-basic visualizations of potential solutions to problem statements: E.g., Marvel, Balsamiq.

High-fidelity prototyping and user interface (UI) design tools – To realize sophisticated visualizations of design solutions: E.g., Sketch, Figma.

Usability testing tools – For qualitative research and to test the usability and accessibility of solutions (e.g., as prototypes): E.g., Loop11, UserTesting.

Handoff tools – To send completed design work to developers: E.g., Mockplus iDoc, Zeplin. Microsoft Visio is a feature-rich flowcharting tool that has a similar UI to the Microsoft Office suite of apps, which means you probably don't have to learn to use it.

How to Approach the Right UX Tools

Before reaching for any UX tools, you should consider:

What you do matters more than the tool you choose – UX tools are instrumental to—not guarantees of—your success. As a designer, you can only make impressive and useful solutions if you know what goes where and why. UX experts and recruiters agree that skills come first. So, you should always start with important UX considerations and know what you want to achieve. Then, you select the best tool for the job at hand, even if it's only pencil and paper. Otherwise, you'll constrict your vision because the tool can frame your ideas and blind you to users' needs. Beautiful, trendy-looking products won't necessarily prove you empathize with users.

UX tools are constantly evolving – New tools and third-party add-ons to existing ones keep appearing on the market. So, it's vital to stay grounded in the timeless principles of human psychology and your craft, instead of chasing the fleeting shadows of software's freshest updates. Software will keep changing; users' brains won't.

Organizations use different tools –Company practices—including choice of UX tools—vary. Moreover, with time, they'll switch to the next best thing for them.

Key Features, Strengths, and Use Cases of Popular UI and UX Design Tools

UI UX Design Tools	Features	Strengths	Use Cases
Figma	Supports advanced drawing tools and reusable components, and real-time collaboration.	Cloud-based nature, seamless collaboration.	Create graphics, interactive prototypes, websites, and more with real-time collaboration.
Adobe XD	Supports voice prototyping, auto-animate features, and repeat grid tool	Quick mockups, extensive asset, and integration with other Adobe tools.	Create digital design and prototyping user interfaces (UI) and user experiences (UX).
Sketch	Rreusable components, plugins, and shared libraries for teams.	Extensive plugin ecosystem.	Create concept pages, icons, and other web elements.
InVision	Responsive design, rapid prototyping, and advanced animations.	Assets sharing, giving and gethering real time feedback.	Basic prototyping, collaboration (Freehand), and handoff (Inspect) capabilities.
Balsamiq	Extensive library of UI components, drag-and-drop functionality, and low-fidelity wireframes.	Good for beginners or quick, low-fidelity wireframes.	Create quick wireframes and mockups, ideal for sketching.
Marvel	User testing features like user flows, heatmaps, and screen recordings.	Get valuable insights with help of user testing features.	Create all sorts of mockups, prototypes, and wireframes.
axure	Conditional logic, variables, adaptive views and automated documentation.	Advanced interaction features for complex projects and detailed prototyping.	Built for interaction design and functional prototyping.

Interaction Design Foundation
interaction-design.org

Adobe XD: This all-in-one UX/UI design software allows for wireframing, prototyping, and collaboration in the same platform.

Figma: Known for its cloud-based interface, Figma enables real-time collaboration, making it a favorite among design teams.

Sketch: Although the Sketch app is only available for macOS, Sketch has a robust set of features and an extensive plugin ecosystem, making it a powerful tool for user experience design.

InVision: InVision offers a suite of tools for prototyping, collaboration, and workflow management, making it a comprehensive solution for design teams.

Axure RP: This tool stands out for its advanced prototyping capabilities, allowing designers to create highly interactive and dynamic prototypes.

Wireframing Tools

Wireframing tools are the blueprint machines of the design process. They allow designers to create a skeletal layout of a web page or app, laying the groundwork for more detailed design work. The primary function of a wireframe is to illustrate the page structure, content arrangement, and intended functionalities.
Benefits: Wireframing software expedites the initial design phase by providing simple drag-and-drop elements, making it easy to visualize the layout. They facilitate rapid iterations and allow you to explore different layout options. Also, they establish the basic structure before you get to the detailed design. Wireframes also have the advantage of looking malleable. Colleagues and users are less reluctant to suggest changes compared to high-fidelity prototypes.

Limitations: Wireframes lack the visual design appeal of a fully designed interface. This may make it challenging for stakeholders unfamiliar with the design process to envision the final product.

Examples: Balsamiq, Sketch, and Adobe XD are popular choices for wireframing due to their simplicity and efficiency.

Prototyping Tools

Once the basic structure of the design is in place, prototyping tools come into play. These tools allow designers to create interactive mockups and showcase how the final product will work. This includes everything from button interactions and animations to transitions and user flow.

Prototyping tools are vital for usability testing, as they provide a hands-on experience of the design before any coding begins. They help identify potential issues and improvements to reduce the risk of costly changes later in development.

Benefits: Prototypes give a real feel for the user experience, enabling you to identify and resolve usability issues early in the process. They also help communicate design ideas more effectively to stakeholders for better feedback and alignment.

Limitations: Creating high-fidelity prototypes can be time-consuming. Moreover, some prototyping tools may have limitations in simulating complex interactions. It may lead to discrepancies between the prototype and the final product.
Examples: Figma, InVision, and Axure RP are renowned for their prototyping capabilities. They provide a wide array of interactive elements and transition effects.

Graphic Design Software

For the visual refinement of a design, graphic design software is the tool of choice. They offer a high level of control over the visual elements of a design, from typography and color to imagery and iconography. They are essential for creating the final look and feel of a product.

Benefits: Graphic design software offers extensive features that help create and manipulate visual elements. They allow you to achieve the exact look and feel they envision. They also support various file formats to help you work with multiple assets.

Limitations: Graphic design tools often have a steep learning curve due to their complex functionality. Moreover, they typically focus on creating static assets and may lack the collaborative and interactive features found in UX/UI design software.

Examples: Adobe Illustrator and Photoshop are industry standards for graphic design. Affinity Designer is another powerful alternative that is gaining popularity.

User research tools

User research tools are critical instruments used to gather insights about users' behaviors, needs, and motivations. These tools help understand the user journey, identify pain points, and craft a user experience that is intuitive and satisfying for the end user.

Benefits: User research tools provide data-driven insights that can inform every stage of the

design process to create user-centric products. They allow researchers to test hypotheses, validate designs, and understand user needs and preferences in a detailed manner.

Limitations: The effectiveness of user research tools largely depends on the sample size and representativeness of the user group involved in the research. These tools also require time and resources to set up and analyze. Sometimes, the data can be overwhelming and challenging to interpret without the right expertise.

Examples: SurveyMonkey and Google Forms are simple, accessible tools for conducting surveys and Lookback for user interviews. UserTesting provides audio and video feedback from users interacting with your designs. UX research tools like Hotjar offer heatmaps, session recordings, and other tools for understanding user behavior on a website. For early design, products such as Optimal Workshop provide card sorting, tree sorting and first-click testing.

Criteria for Choosing UI and UX Design Tools

- Ease of Use
- Features
- Cost
- Platform Compatibility

INTERACTION PATTERNS

An interaction design (ID) pattern is a general repeatable solution to a commonly-occurring usability problem in interface design or interaction design. An ID pattern usually consists of the following elements:

- Problem: Problems are related to the usage of the system and are relevant to the user or any other stakeholder that is interested in usability.
- Use when: a situation (in terms of the tasks, the users and the context of use) giving rise to a usability problem. This section extends the plain problem-solutions dichotomy by describing situations in which the problems occur.
- Principle: a pattern is usually based on one or more ergonomic principles such as user guidance, or consistency, or error management.
- Solution: a proven solution to the problem. A solution describes only the core of the problem, and the designer has the freedom to implement it in many ways. Other patterns may be needed to solve sub problems.
- Why: How and why the pattern actually works, including an analysis of how it may affect certain attributes of usability. The rationale (why) should provide a reasonable argument for the specified impact on usability when the pattern is applied. The why should

describe which usability aspects should have been improved or which other aspects might suffer.

- Examples: Each example shows how the pattern has been successfully applied in a real life system. This is often accompanied by a screenshot and a short description.
- Implementation: Some patterns provide implementation details.

Example interaction design pattern: Multi-level Undo

Problem	Users do actions they later want reverse because they realized they made a mistake or because they changed their mind.
Use when	You are designing a desktop or web-based application where users can manage information or create new artifacts. Typically, such systems include editors, financial systems, graphical drawing packages, or development environments. Such systems deal mostly with their own data and produce only few non-reversible side-effects, like sending of an email within an email application. Undo is not suitable for systems where the majority of actions is not reversible, for example, workflow management systems or transaction systems in general. Both novice and expert users may want to reverse their actions, either because of mistakes or changes in intention. Expert users may want to use the history of their actions for more specific manipulation of the data in the application. For example, in a graphical modeling application, users may want to undo work on some specific object while keeping later work done on other objects.
Principle	Error Management (Safety) (Norman, 1988)
Solution	Maintain a list of user actions and allow users to reverse selected actions. Each 'action' the user does is recorded and added to a list.

This list then becomes the 'history of user actions' and users can reverse actions from the last done action to the first one recorded. This is also called a Linear Multi-level Undo.

- **Interacting with the history**

There are two variations on how to show the history of actions to the users. First there is the standard 'office-like' way where the 'Edit' menu contains both 'Undo' and 'Redo' functions with their keyboard shortcuts. Often there is also a widget in the toolbar that can show the last items in the history. By dragging the selection in the list, actions can be undone. A second variant is to work with primarily with the history list itself and moving a slider or scrollbar to move back in history and undo actions. Photoshop uses such a variant.

- **Displaying actions**

Actions in the history are usually displayed using a text label such as 'Create circle', 'Typing',' New contact'. Such labels only name the function and not the object the functions work on. In some applications it may be better to include the object and the parameters as well, for example 'Change-color Circle12 to Red'.

- **Granularity of actions**

When designing Undo it is important to determine the desired granularity of actions. For example, it is usually not desired to record each key press in a text editor as an action. Instead, typing a word is used as a unit of action. Designers need to determine what unit of action is appropriate in the application.

- **Non-reversible actions**

Although most actions in the application may be reversible, it is very likely that some actions will not be

reversible. For example, printing, saving, doing a payment, or downloading an object. For actions that are non-reversible and 'negative' of nature (like paying or destroying something), need to show the user a Warning Message and not add the action to the history.

- **Selective undo**

In some cases, it can be meaningful to allow single actions from the history to be deleted. This is the case when a certain 'episode' of work must be deleted or undone while keeping work that has been done later on. Selective undo is conceptually much more difficult than linear undo since there is a notion of 'dependency between actions' that determines the consequences of undoing a particular action. For example, if a 'create circle' action is undone at some point in the history, subsequent actions in the history working on that object loose their meaning and must be deleted. There are many semantic issues with selective undo

Object-based Undo

Object-based Undo can sometimes be considered as an alternative to Selective Undo. With Object-based Undo, each object has its own action history. Upon selecting the object, the users can undo actions done on the object. Naturally, this requires the application to have a clear concept of an 'object' and is therefore not applicable for bitmap editors.

Multi-user undo

If the application is a multi-user application and uses undo, the application must distinguish between local actions and global actions. That leads to multiple histories and requires special semantics for what happens when undoing actions.

Why

Offering the possibility to always undo actions gives users a comforting feeling. It helps the users feel that *they* are in control of the interaction rather than the other way around. They can explore, make mistakes and easily go some steps back, which facilitates learning the application's functionality. It also often eliminates the need for annoying warning messages since most actions will not be permanent

Examples

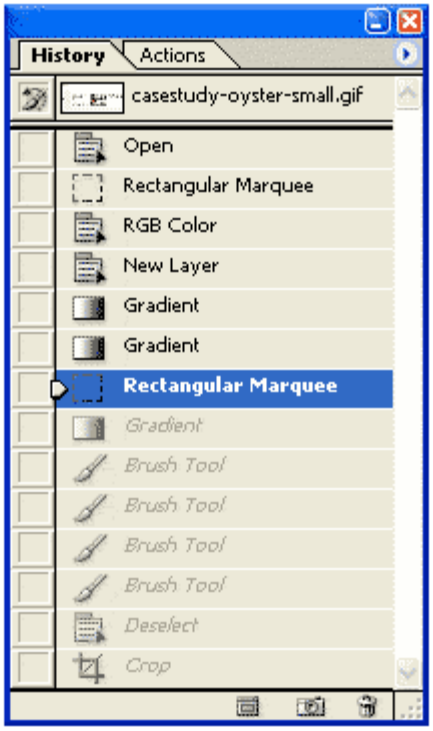
As in all MS Office applications, in Word 2000 the users can see the history of their actions and undo one or more of them. The actions are briefly described and the users can select a range of actions to be undone. After selecting undo, users can even redo the actions.

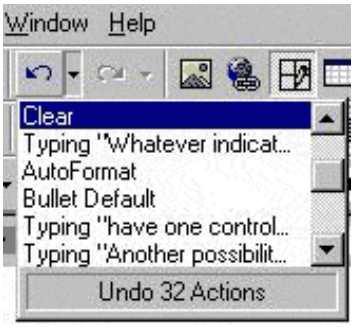
In Photoshop a selective undo is also possible. By moving the slider, users can do the normal multi-level undo but they can also drag an action into the trashcan and thereby do a selective undo. Operations that depended on that action are

automatically deleted as well of they are not relevant anymore.

Implementation

Most implementations of multi-level undo are based on the Command (Gamma et al 1995) pattern. When using the Command pattern, most functionality is encapsulated in Command objects rather than in other controlling classes. The idea is to have a base class that defines a method to "do" a command, and another method to "undo" a command. Then, for each command, you derive from the command base class and fill in the code for the do and undo methods. The "do" method is expected to store any information needed to "undo" the command. For example, the command to delete an item would remember the content of the item being deleted





CONDUCTING USABILITY TESTS

What is Usability Testing?

Usability testing is the practice of testing how easy a design is to use with a group of representative users. It usually involves observing users as they attempt to complete tasks and can be done for different types of designs. It is often conducted repeatedly, from early development until a product's release.

Usability Testing Leads to the Right Products

Through usability testing, you can find design flaws you might otherwise overlook. When you watch how test users behave while they try to execute tasks, you'll get vital insights into how well your design/product works. Then, you can leverage these insights to make improvements. Whenever you run a usability test, your chief objectives are to:

1) Determine whether testers can complete tasks successfully and independently.

2) Assess their performance and mental state as they try to complete tasks, to see how well your design works.

3) See how much users enjoy using it.

4) Identify problems and their severity.

5) Find solutions.

While usability tests can help you create the right products, they shouldn't be the only tool in your UX research toolbox. If you just focus on the evaluation activity, you won't improve the usability overall.

There are different methods for usability testing. Which one you choose depends on your product and where you are in your design process.

Usability Testing is an Iterative Process
To make usability testing work best, you should:

1) Plan –

a. Define what you want to test. Ask yourself questions about your design/product. What aspect/s of it do you want to test? You can make a hypothesis from each answer. With a clear hypothesis, you'll have the exact aspect you want to test.

b. Decide how to conduct your test – e.g., remotely. Define the scope of what to test (e.g., navigation) and stick to it throughout the test. When you test aspects individually, you'll eventually build a broader view of how well your design works overall.

2) Set user tasks –

a. Prioritize the most important tasks to meet objectives (e.g., complete checkout), no more than 5 per participant. Allow a 60-minute timeframe.

b. Clearly define tasks with realistic goals.

c. Create scenarios where users can try to use the design naturally. That means you let them get to grips with it on their own rather than direct them with instructions.

3) Recruit testers – Know who your users are as a target group. Use screening questionnaires (e.g., Google Forms) to find suitable candidates. You can advertise and offer incentives. You can also find contacts through community groups, etc. If you test with only 5 users, you can still reveal 85% of core issues.

4) Facilitate/Moderate testing –Set up testing in a suitable environment. Observe and interview users. Notice issues. See if users fail to see things, go in the wrong direction or misinterpret rules. When you record usability sessions, you can more easily count the number of times users become confused. Ask users to think aloud and tell you how they feel as they go through the test. From this, you can check whether your designer's mental model is accurate: Does what you think users can do with your design match what these test users show?

If you choose remote testing, you can moderate via Google Hangouts, etc., or use unmoderated testing. You can use this software to carry out remote moderated and unmoderated testing and have the benefit of tools such as heatmaps.

Keep usability tests smooth by following these guidelines.

1) Assess user behavior – Use these metrics:

Quantitative – time users take on a task, success and failure rates, effort (how many clicks users take, instances of confusion, etc.)

Qualitative – users' stress responses (facial reactions, body-language changes, squinting, etc.), subjective satisfaction (which they give through a post-test questionnaire) and perceived level of effort/difficulty

2) Create a test report – Review video footage and analyzed data. Clearly define design issues and best practices. Involve the entire team.

Overall, you should test not your design's functionality, but users' experience of it. Some users may be too polite to be entirely honest about problems. So, always examine all data carefully.
To conduct usability testing effectively:

Start by defining clear, objective goals and recruit representative users.

Develop realistic tasks for participants to perform and set up a controlled, neutral environment for testing.

Observe user interactions, noting difficulties and successes, and gather qualitative and quantitative data.

After testing, analyze the results to identify areas for improvement.
Usability testing is a popular UX research methodology.

In a usability-testing session, a researcher (called a "facilitator" or a "moderator") asks a participant to perform tasks, usually using one or more specific user interfaces. While the participant completes each task, the researcher observes the participant's behavior and listens for feedback.

The phrase "usability testing" is often used interchangeably with "user testing."

(One objection sometimes raised against the phrase "user testing" is that it sounds like researchers are testing the participant — we never test the user, only the interface. However, the term is intended to mean testing with users, which is exactly the point of empirical studies.)

Why Usability Test?
The goals of usability testing vary by study, but they usually include:

Identifying problems in the design of the product or service
Uncovering opportunities to improve
Learning about the target user's behavior and preferences

Usability testing helps us to uncover problems, discover opportunities, and learn about users. Why do we need to do usability testing? Won't a good professional UX designer know how to design a great user interface? Even the best UX designers can't design a perfect — or even good enough — user experience without iterative design driven by observations of real users and of their interactions with the design.

There are many variables in designing a modern user interface and there are even more variables in the human brain. The total number of combinations is huge. The only way to get UX design right is to test it.

Elements of Usability Testing
There are many different types of usability testing, but the core elements in most usability

tests are the facilitator, the tasks, and the participant.

A usability-testing session involves a participant and a facilitator who gives tasks to the participant and observes the participant's behavior.
The facilitator administers tasks to the participant. As the participant performs these tasks, the facilitator observes the participant's behavior and listens for feedback. The facilitator may also ask followup questions to elicit detail from the participant.

In a usability test, the facilitator gives instructions and task scenarios to the participant. The participant provides behavioral and verbal feedback about the interface while he performs those tasks.
Facilitator
The facilitator guides the participant through the test process. She gives instructions, answers the participant's questions, and asks followup questions.

The facilitator works to ensure that the test results in high-quality, valid data, without accidentally influencing the participant's behavior. Achieving this balance is difficult and requires training.

(In one form of remote usability testing, called remote unmoderated testing, an application may perform some of the facilitator's roles.)

Tasks
The tasks in a usability test are realistic activities that the participant might perform in real life. They can be very specific or very open-ended, depending on the research questions and the type of usability testing.

Examples of tasks from real usability studies:

Your printer is showing "Error 5200". How can you get rid of the error message?
You're considering opening a new credit card with Wells Fargo. Please visit wellsfargo.com and decide which credit card you might want to open, if any.
You've been told you need to speak to Tyler Smith from the Project Management department. Use the intranet to find out where they are located. Tell the researcher your answer.
Task wording is very important in usability testing. Small errors in the phrasing of a task can cause the participant to misunderstand what they're asked to do or can influence how participants perform the task (a psychological phenomenon called priming).

Participant

The participant should be a realistic user of the product or service being studied. That might mean that the user is already using the product or service in real life. Alternatively, in some cases, the participant might just have a similar background to the target user group, or might have the same needs, even if he isn't already a user of the product.

Participants are often asked to think out loud during usability testing (called the "think-aloud method"). The facilitator might ask the participants to narrate their actions and thoughts as they perform tasks. The goal of this approach is to understand participants' behaviors, goals, thoughts, and motivations.

Types of Usability Testing

Qualitative vs. Quantitative

Usability testing can be either qualitative or quantitative.

Qualitative usability testing focuses on collecting insights, findings, and anecdotes about how people use the product or service. Qualitative usability testing is best for discovering problems in the user experience. This form of usability testing is more common than quantitative usability testing.

Quantitative usability testing focuses on collecting metrics that describe the user experience. Two of the metrics most commonly collected in quantitative usability testing are task success and time on task. Quantitative usability testing is best for collecting benchmarks.

The number of participants needed for a usability test varies depending on the type of study. For a typical qualitative usability study of a single user group, we recommend using five participants to uncover the majority of the most common problems in the product.

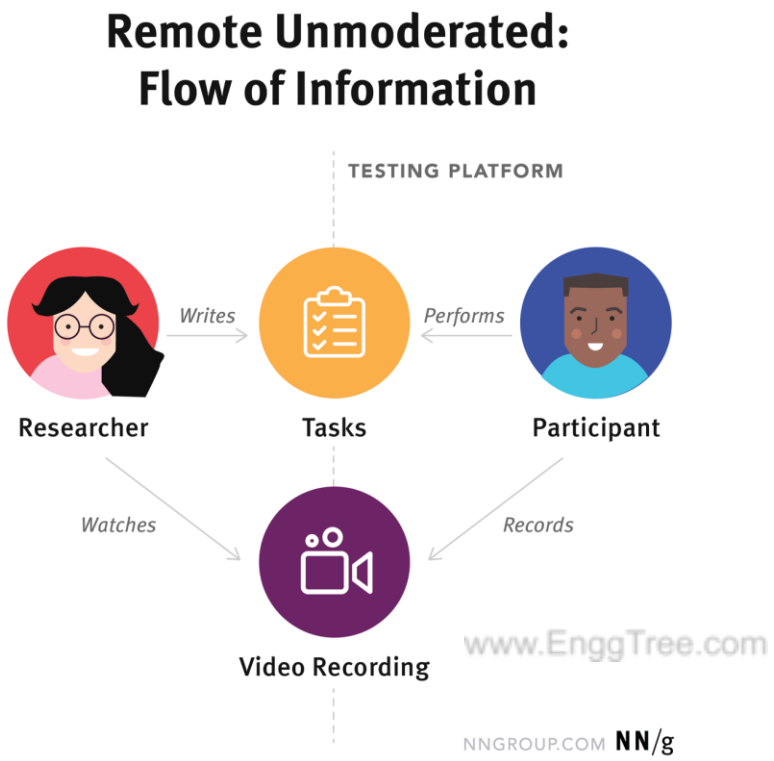
Remote vs. In-Person Testing

Remote usability tests are popular because they often require less time and money than in-person studies. There are two types of remote usability testing: moderated and unmoderated.

Remote moderated usability tests work very similarly to in-person studies. The facilitator still interacts with the participant and asks her to perform tasks. However, the facilitator and participant are in different physical locations. Usually, moderated tests can be performed using screen-sharing software like Skype or GoToMeeting.

Remote unmoderated remote usability tests do not have the same facilitator–participant interaction as an in-person or moderated tests. The researcher uses a dedicated online remote-testing tool to set up written tasks for the participant. Then, the participant completes those

tasks alone on her own time. The testing tool delivers the task instructions and any followup questions. After the participant completes her test, the researcher receives a recording of the session, along with metrics like task success.



SYNTHESIZING TEST FINDINGS

Synthesis, is about creatively putting together your analysis and research in order to form whole ideas.

Methods which will Help you Synthesise Your Research

Share Inspiring User Stories

One way of making sense of your data is to share with your team the most inspiring stories you've heard from the people you're designing for. Think about user stories or experiences that have stuck with you: stories which surprised you, made you curious, or verified or falsified your assumptions.

Best Practice: Construct Your User Story Madlib

As a [who are they], he/she wants to [what do they want to do], so that [their end goal].

Example: As a freelance consultant, Peter wants to easily schedule meetings, so that he can ensure his schedule is always organised and effective.

Example: As a corporate web designer, Lisa wants to improve the company's website, so that users can easily find and get access to what they need.

Make sense in your Research by Creating Maps

Mapping helps plot experiences, customer journeys, thought processes, a series of activities or actions and other related behaviour, as well as feelings, in one place. It would be useless having reams of data and not be able to understand the essence of it by extracting significant meaning from the data.

Affinity Diagrams and Space Saturate and Group – Clustering and Bundling Ideas and Facts

The "space saturate and group" method's goal is to get all of your observations and findings into one place: Immerse yourself in the chaos of information you've gathered during your research Empathise phase.

Write on post-its, draw your insights, tell stories, and share artifacts.

The term "saturate" relates to the way everyone covers or saturates the "space" with their images and notes in order to create a wall of information to inform and start "grouping" the following problem-defining process.

Empathy Map

An Empathy map will help you understand your user's needs whilst developing a deeper understanding of the person you are designing for. There are many techniques available for you to develop this type of empathy. An Empathy Map is one method that will help you define and synthesise your observations from your fieldwork and research phase, and draw out insights about your users' needs

Personas

Personas are fictional characters, which, based on your research, you create to represent the different user types that might use your service, product, site, or brand in a similar way. When you create personas you will understand your users' needs, behaviours, and goals – it will help you step out of yourself. It helps you recognise that different people have different needs and expectations, and it helps you to identify with the user you're designing for.

Stories

User stories are short stories that aim to insert the Persona into a situation in which he or she is using your product or aiming to fulfill the goal you seek to match. At this point, you should ignore minor details and get to the root of the who, what and why of the situation

Scenarios

Scenarios expand on user stories and fill in many valuable human and environmental factors, which flesh out the story providing much more meaning for exploring various aspects of the solution. Scenarios provide us with the context within which our personas function, and how their experiences and needs play out.

Define Your Point Of View (POV)

By the end of your Define mode, you should end up creating an actionable problem statement, also known as your Point of View (POV). You form your Point of View by extracting the most important insights about your users' core human needs that you should fulfill within the problem area you're investigating and designing for

Frame Your POV with How Might We Questions

When you've defined your design challenge in a POV, you can start opening up for ideas to solve your design challenge by asking "How Might We". You're now moving on to the next phase of the Design Thinking process, the third phase: Ideation. You start by rephrasing and framing your POV as several questions by adding "How might we" at the beginning of the POV.

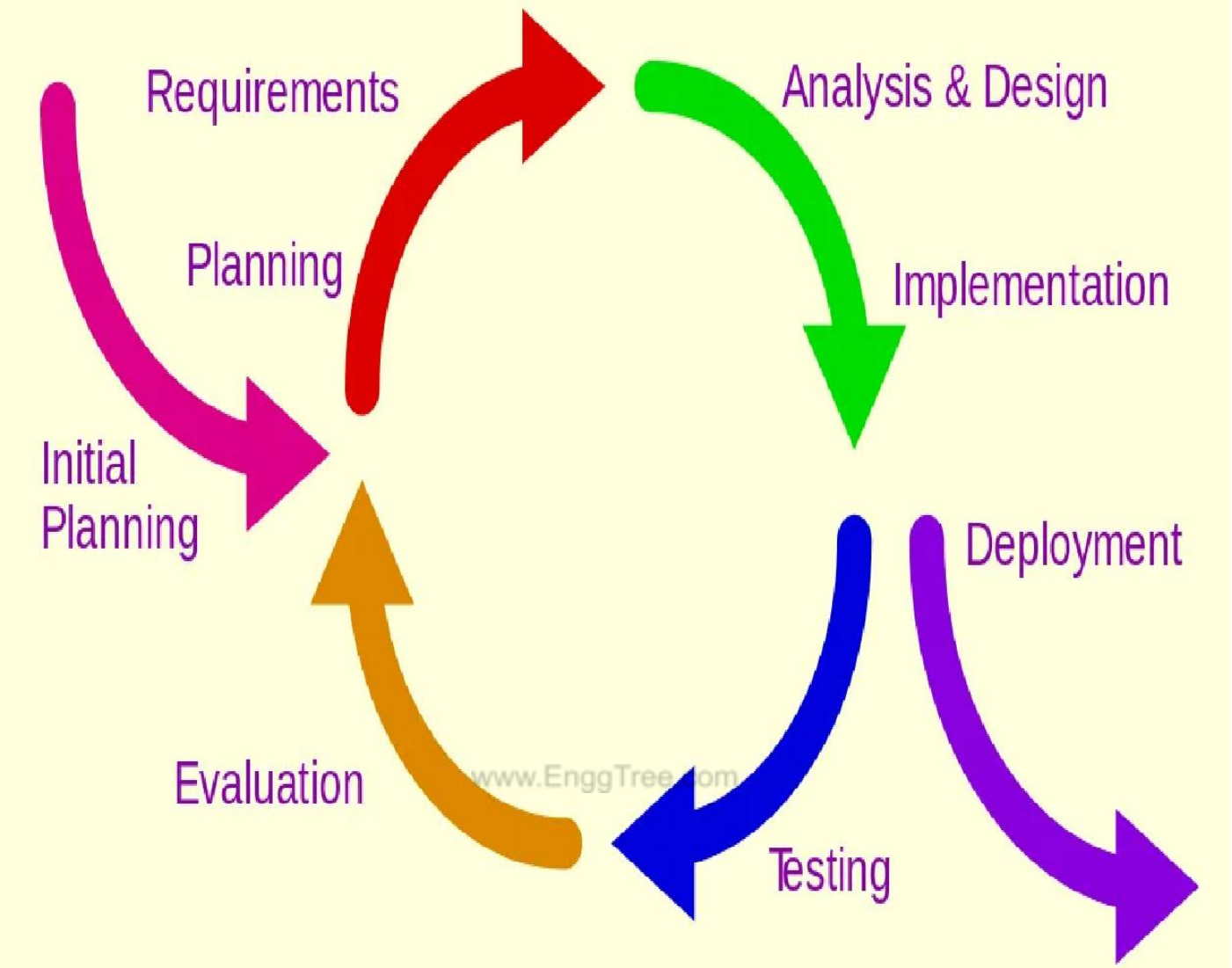
Why-How Laddering

Designers will use why to progress to the top of the so-called Why-How Ladder where the ultimate aim is to find out how you can solve one or more problems. In other words, you could say that the Why-How Laddering starts with asking Why to work out How they can solve the specific problem or design challenge.

PROTOTYPE ITERATION

The iterative design process is a simple concept. Once, through user research, you have identified a user need and have generated ideas to meet that need, you develop a prototype. Then you test the prototype to see whether it meets the need in the best possible way. Then you take what you learned from testing and amend the design. Following that, you create a new prototype and begin the process all over again until you are satisfied that you've reached the best possible product for release to the market.

This iterative process is often called "rapid prototyping" or "spiral prototyping."



When Do I Use Iterative Design?

Iterative design can be used at any phase of the design process, including when the product has already been launched in the market and you are looking to create improvements in that product.

Why Does Iterative Design Exist?

- User research prior to product development has to deal with what people say they will do in most cases. There's no product available to examine what they actually do. So the first model of any given product is likely to reflect the "theoretical use" of a product rather than its actual use.

- Iteration recognizes that this is the case and allows you to quickly develop a prototype (which is simply a model of the finished product) and then test that prototype with users to determine what they actually do when confronted with the product.

- Because prototyping is relatively cheap to do (for example the lowest fidelity prototype might consist of nothing but pen and paper sketches) and relatively quick to create, it makes for a cost-effective system to improve designs without doing all the hard work (development) and then discovering that the difference between what users said they would do and what they actually do is large and expensive to overcome.

The Benefits of Iterative Design

- It allows for rapid resolution of misunderstandings within the project team and established clarity early in the development lifecycle.
- It brings out user feedback to ensure that system requirements meet user needs.
- It can help with client relationships to show the evolution of a design rather than "dumping" a finished product on them.
- It gives the development team some certainty that their efforts are being focused on adding value for users.
- It provides regular testing which can provide a strong desired performance framework for acceptance testing.
- It allows for easy incorporation of "lessons learned" in the final product.
- It gives stakeholders better visibility of progress at each iteration.

Examples of Iterative Design

Best example of iterative design on the web is the use of Wikis. Wikipedia, for example, contains user generated content. Anyone is free to come along and improve on that content at any time. It's easy for a reviewer (or editor) to visit that improvement and make a decision as to whether the change is an improvement or whether it takes something away instead.

PANIMALAR INSTITUTE OF TECHNOLOGY

DEPARTMENT OF CSE

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BATCH :2021-2025

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UNIT-5

RESEARCH, DESIGNING, IDEATING, & INFORMATION ARCHITECTURE

UNIT V RESEARCH, DESIGNING, IDEATING, &INFORMATION ARCHITECTURE

Identifying and Writing Problem Statements - Identifying Appropriate Research Methods - Creating Personas - Solution Ideation - Creating User Stories - Creating Scenarios - Flow Diagrams - Flow Mapping - Information Architecture

IDENTIFYING AND WRITING PROBLEM STATEMENTS

What are Problem Statements?

- Problem statements are concise descriptions of design problems. Design teams use them to define the current and ideal states, and to freely find user-centered solutions.
- Then, they use these statements—also called points of view (POVs)—as reference points throughout a project to measure the relevance of ideas they produce.

Examples of problem statements:

- Users of our newspaper app often export content from our app, rather than sharing content through our app. This is a problem because target audiences are less likely to know that the content came from our app, leading to lower conversion rates. This is also a problem for app users, as exporting content is time-consuming and could lead to a decrease in app usage.
- Sales reps spend a long time planning which leads to visit each month. Because planning is done manually — using Excel spread sheets and printed paper lists — sales reps find it difficult to meet their targets. Many have complained that keeping track of which leads to visit takes away from the time they can spend with them. This is a problem because, when targets are not met, the business risks losing revenue.

How to Write a Problem Statement?

A problem statement should include:

The background of a problem: Which organization or department has the problem and what is the problem? Why has the problem arisen? This is what discoveries are for: to uncover root causes.

The people affected by the problem: There could be multiple user groups affected by a specific problem in different ways. In the problem statement, you should call out how the problem affects users. In some cases, internal employees can be affected by a problem, as they often bear the brunt of poor user experiences –- for example, by handling disgruntled customers.

The impact of the problem on the organization: If the problem is not fixed, what will be the effect on the organization? Reputational damage? Paying unavoidable costs? Losing out-of-market share? In some cases, you may want to quantify the impact in order to convince your organization to fix the problem. The discovery could involve working out how much this problem costs the organization, and this information could end up in your problem statement.

To gather the relevant facts for your problem statement, you can use a simple technique called the 5 Ws, which involves answering the questions below. This activity can be included in a discovery kick-off workshop with your team and stakeholders.

- Who is affected by the problem?
- What is the problem?
- Where does this problem occur?
- When does the problem occur?
- Why does the problem occur? Why is the problem important?

A problem statement should:

- Not be a laundry list of unrelated problems. A discovery effort should have one problem statement, and the problem statement should be focused on one problem. Of course, a single problem could cause further problems, and those related problems can be added to your problem statement. But listing many unrelated problems is a sign that you're tackling too much.
- Not contain a solution. Leave solutions out of your problem statement. At the beginning of discovery, there are too many unknowns, so the the best solution is not obvious. At the end of your discovery, you'll be in a good position to confidently put forward solution ideas that address the problem and take into account what you've learned.
- Be brief. Problem statements are effective when they're concise. If you can condense your problem statement down to a few sentences, others will quickly understand what you focus on and why, and what's out of scope. Spend some time to draft and redraft the problem statement with your team.

Problem Statements Don't Need to Be Negative

Problem statements can also capture opportunities

Here's an example of a problem statement that highlights an opportunity, rather than a problem that needs to be fixed:

The process of purchasing a newly built home can take a long time and requires many offline activities. This means sales often take a long time to close. There's an opportunity to make

home buying quicker and easier, and thus improve customer-satisfaction ratings and sales.

How to Use Problem Statements

- The problem statement can be used as the starting point for structuring the discovery work. For example, if the problem statement was about improving the home-buying process, the goal for the discovery should be to learn about opportunities to make home buying quicker and easier.
- Once we have a discovery goal, it becomes easier to know what unknowns need research. For example, in this case, we probably want to know things like:
  - Which activities do homebuyers perceive as difficult or time-consuming?
  - Which activities or use cases can slow down the home-buying process and why?
  - What does the end-to-end journey currently look like?

Need to define problem statement:

- Well-constructed, valid and effective problem statements are vital for your design team to navigate the entire design process.
- problem statements are what teams produce in the Define stage.
- To find the best solutions, your team must know what the exact problems are—i.e., you first need to define a problem statement.
- The goal is to articulate the problem so everyone can see its dimensions and feel inspired to systematically hunt for suitable solutions.
- When we unite around a problem statement, the team will have a common view of how users see what they must tackle.
- From there, all your team will know exactly what to look for and what to avoid.

Features of good problem statement:

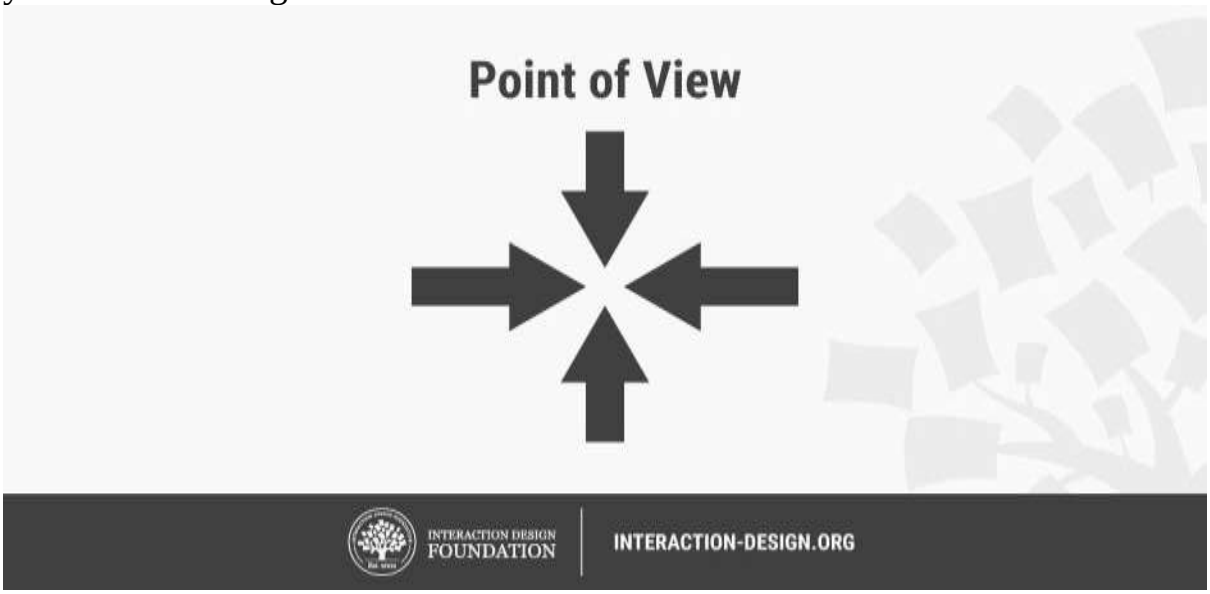
- Human-centered: Frame problem statements from insights about users and their needs.
- Have the right scope:
- Broad enough to permit creative freedom, so you don't concentrate too narrowly on specific methods for implementing solutions or describing technical needs; but
- Narrow enough to be practicable, so you can eventually find specific solutions.
- Based on an action-oriented verb (e.g., "create" or "adapt").
- Fully developed and assumption-free.

POV :

- Design teams refer to a problem statement as a "point of view" (POV) because they should word problem statements from the users' perspective and not let bias influence them.

- With an effective POV, your team can approach the right problem in the right way.

A Point Of view (POV) is a meaningful and actionable problem statement, which will allow you to ideate in a goal-oriented manner.

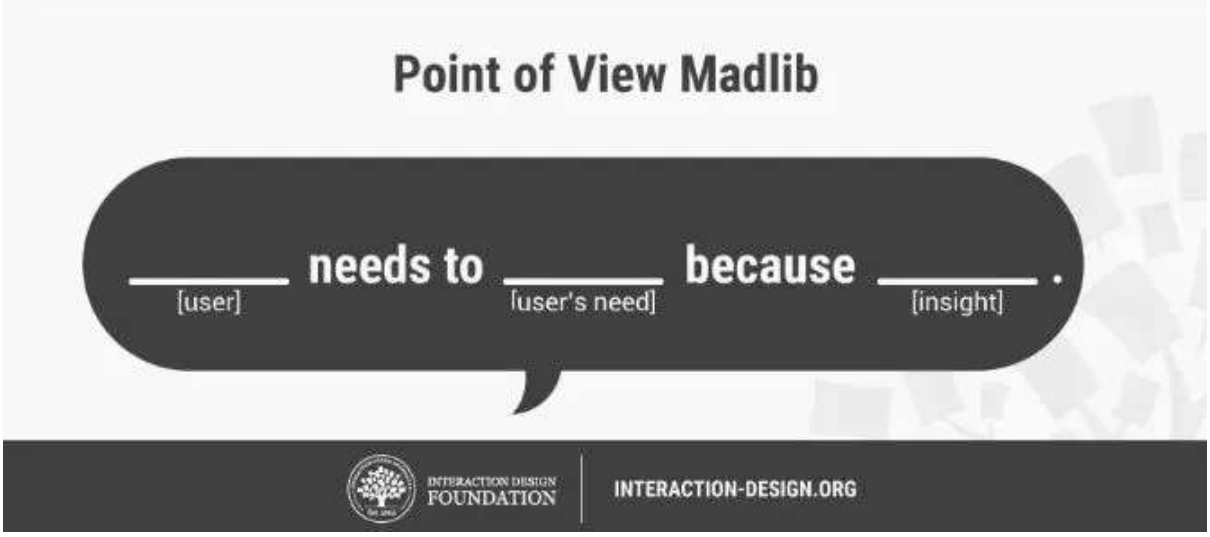


How to Define Problem Statements through a Point of View Madlib

- To define a problem statement, the team must first examine recorded observations about users. It must capture your users' exact profile in the problem statement or POV.
- So, the team need to synthesize research results and produce insights that form solid foundations

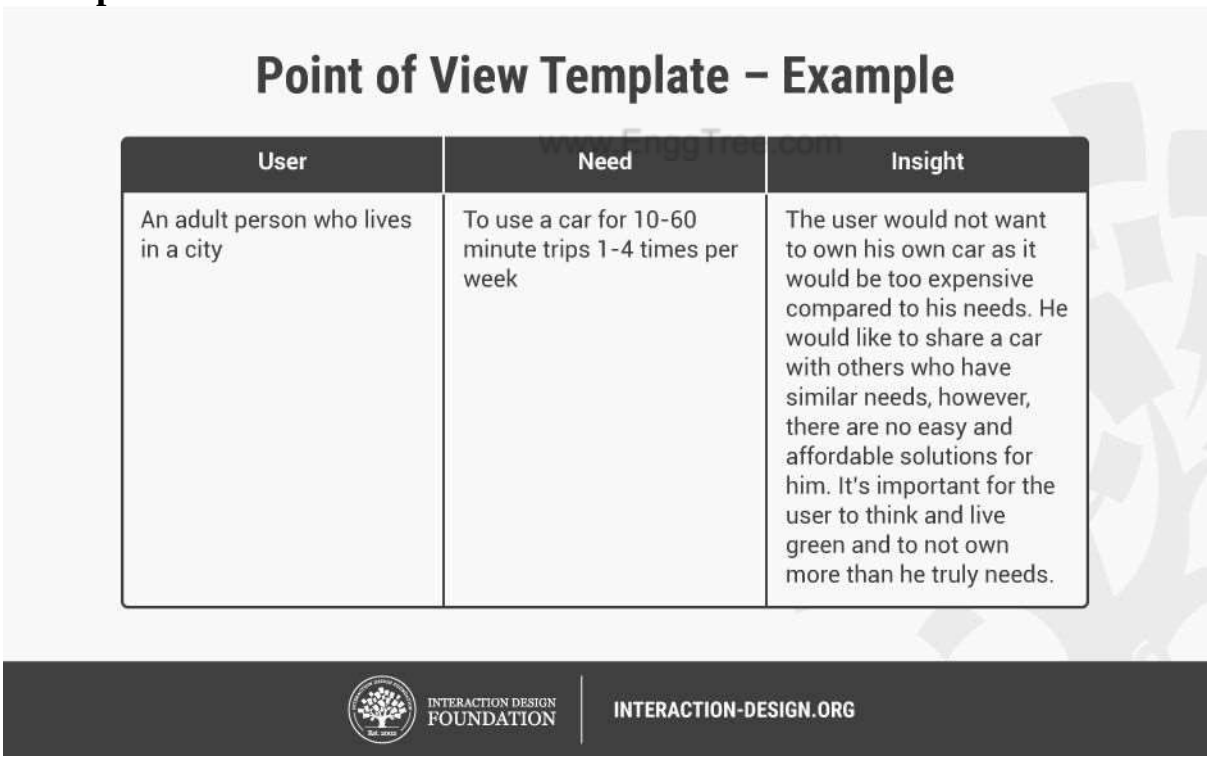
Teams typically use a POV Madlib to reframe the challenge meaningfully into an actionable problem statement. The POV madlib is a framework you use to place the user, need and insight in the best way. This is the format to follow:

[User… (descriptive)] needs [need … (verb)] because [insight… (compelling).]



A POV is combined these three elements—user, need, and insight—as an actionable problem statement that will drive the rest of your design work.

Example:



With a valid problem statement, the team can explore the framed "why" questions with "how"-oriented ones to proceed to find potential solutions. If you have a good problem statement if team members:

- Feel inspired.
- Have the criteria to evaluate ideas.
- Can use it to guide innovation efforts.
- Can't find a cause or a proposed solution in it

Identifying Appropriate Research Methods

Methods of interpreting results and findings from the observation oriented Empathise phase include:

Space Saturate and Group and Affinity Diagrams – Clustering and Bundling Ideas and Facts

- In space saturate and group, designers collate their observations and findings into one place, to create a collage of experiences, thoughts, insights, and stories.
- The term 'saturate' describes the way in which the entire team covers or saturates the display with their collective images, notes, observations, data, experiences, interviews, thoughts, insights, and stories in order to create a wall of information to inform the problem-defining process.
- It will then be possible to draw connections between these individual elements, or nodes, to connect the dots, and to develop new and deeper insights, which help define the problem(s) and develop potential solutions.

"How Might We" Questions

- Start using your POV by asking a specific question starting with: "How Might We" or "in what ways might we".
- How Might We (HMW) questions are questions that have the potential to spark ideation sessions such as brainstorms.
- They should be broad enough for a wide range of solutions, but narrow enough that specific solutions can be created for them.

Example:

For example, youths tend not to watch TV programs on the TV at home, some questions

which can guide and spark the ideation session could be:

- How might we make TV more social, so youths feel more engaged?
- How might we enable TV programs to be watched anywhere, at anytime?
- How might we make watching TV at home more exciting?

The HMW questions open up to Ideation sessions where you explore ideas, which can help you solve your design challenge in an innovative way.

Why-How Laddering

- In Why-How Ladder ultimate aim is to find out how you can solve one or more problems.
- The Why-How Laddering starts with asking Why to work out How they can solve the specific problem or design challenge.

Creating Personas

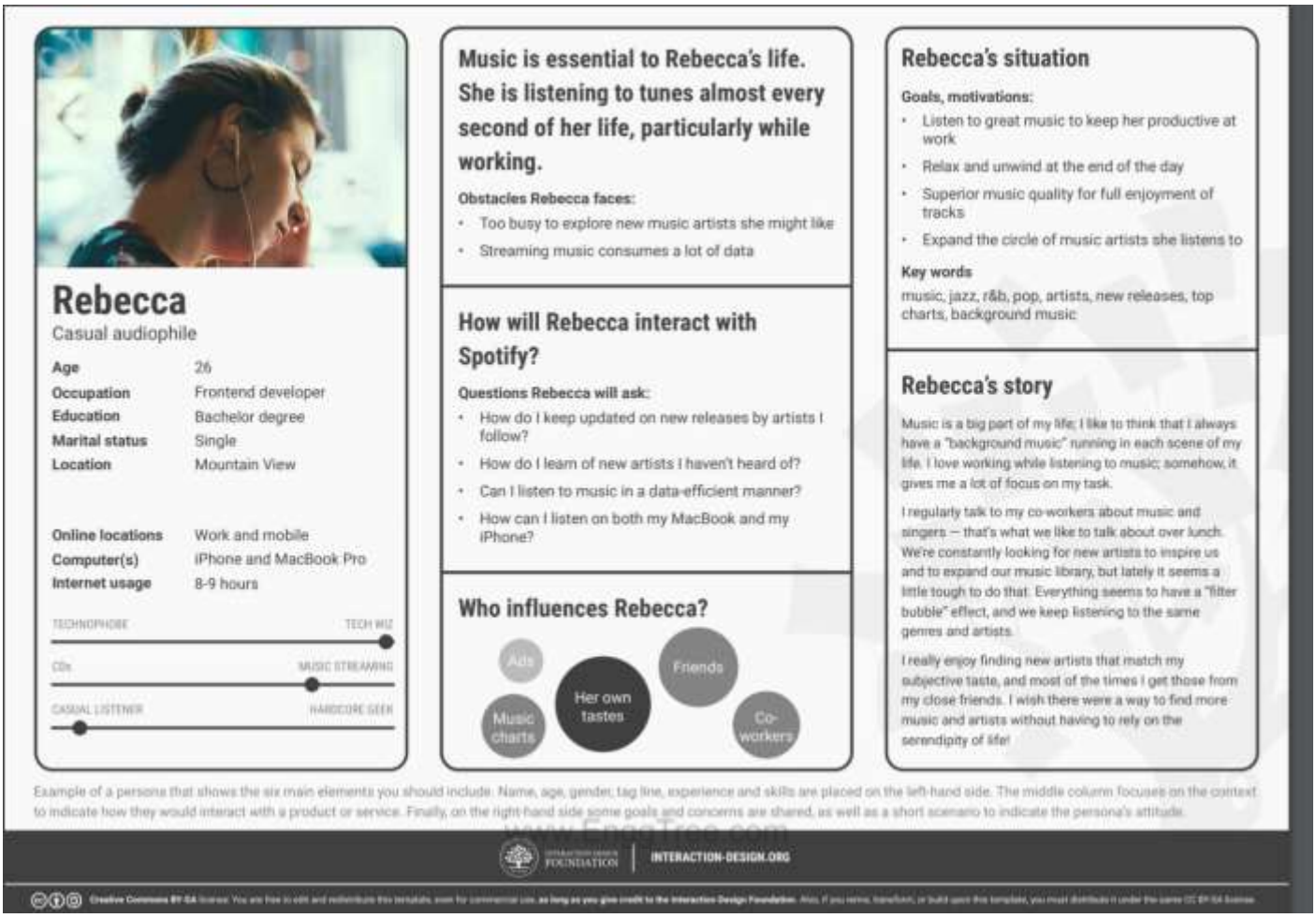
What are Personas?

Personas are fictional characters, which you create based upon your research in order to represent the different user types that might use your service, product, site, or brand in a similar way. Creating personas helps the designer to understand users' needs, experiences, behaviors and goals.

Personas are distilled essences of real users. In user experience (UX) design, you use personas to build empathy with target users and focus on their world. You should always create personas from observations about real users, personas should never be invented out of your assumptions about your users.

Example:

We divide users into manageable groups and represent each with a typical embodiment – a persona. For instance, for an app that helps students budget, "Amy" represents 18-year-old females who must adapt to college life. Through Amy, we see how our app helps these users in their day-to-day activities. We imagine Amy has just started banking online, lives in shared housing and works weekends. Her goal is to save money. Her scenario: she stretches $70 to cover her week's groceries.



Create Effective Personas

- Personas are deliverables in design thinking's Define phase. As they're extremely helpful in ideation, they should feature early in design processes. To create them, you:
- Collect extensive data on target users.
- Determine the qualities of and differences between users.
- Develop a hypothesis from the research, determining the qualities of and differences between users.
- Ensure stakeholders agree on the hypothesis about the users.
- Determine a number of personas – more than one per project, but focus especially on one.
- Name and describe each persona in 1-2 pages, including:
- A picture.
- User's values, interests, education, lifestyle, needs, attitudes, desires, limitations, goals and behavior patterns.

How to Use Personas in Design Projects

When you bring personas into projects, you help prevent stakeholders from designing for themselves. It also keeps them from stretching generic users to fit designs. Personas help in quick prototype testing, too. You'll confirm a persona works well when you ensure that "he/she":

1. Stays in context – What specific points about his/her situation can you map to how he/she can use your product now?

2. Reflects a target user's real behavior patterns, attitudes, skillset, motivations and goals within the product's domain.

3. Has an end-goal – What does the user want to achieve? What features would help him/her do that best?

4. Faces realistic, relevant scenarios—written from the persona's perspective—to envision how users would find they'd use the product to attain a particular goal.

5. Occupies a clear setting – a day-in-the-life approach that shows what he/she encounters in what environment.

6. Has visible pain points – What's the hardest/most frustrating aspect of his/her situation/context?

- Extra details about the persona (e.g., interests) – anything to make him/her more real and relevant and help build empathy. A written story is better than bullet points.

- Describe several situations/scenarios prompting the persona to use your product – put him/her in contexts with problems to overcome.

- Include everyone involved in the project so they'll accept the persona or advise revisions.

- Send them the persona to use in their work.

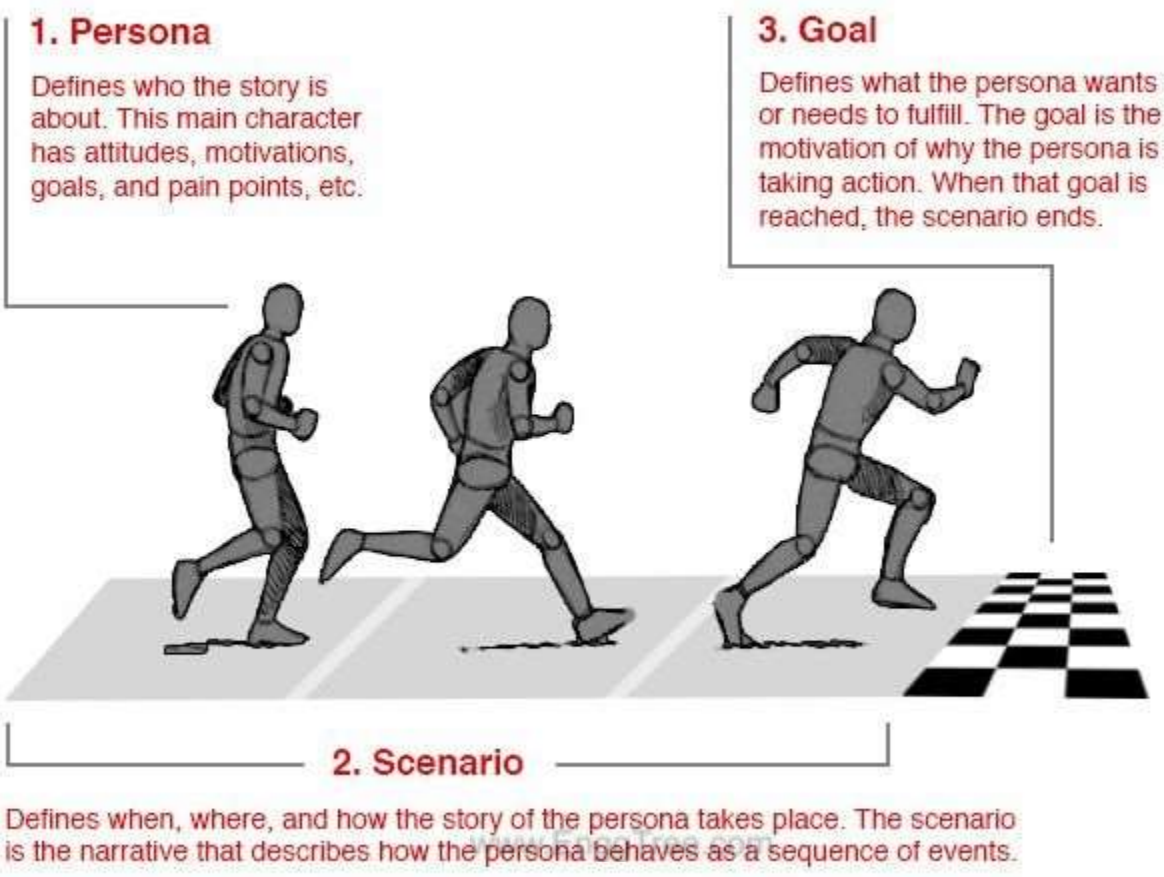
- Ensure everyone develops scenarios – these should expose the persona optimally to potential use cases.

- Make continuous adjustments – revisit the persona; add new features; add required new personas; discard outdated personas.

Four Different Types of Personas

1. Goal-directed Personas

This persona cuts straight to the nitty-gritty. "It focusses on: What does my typical user want to do with my product?". The objective of a goal-directed persona is to examine the process and workflow that your user would prefer to utilize to achieve their goals in interacting with your product or service.

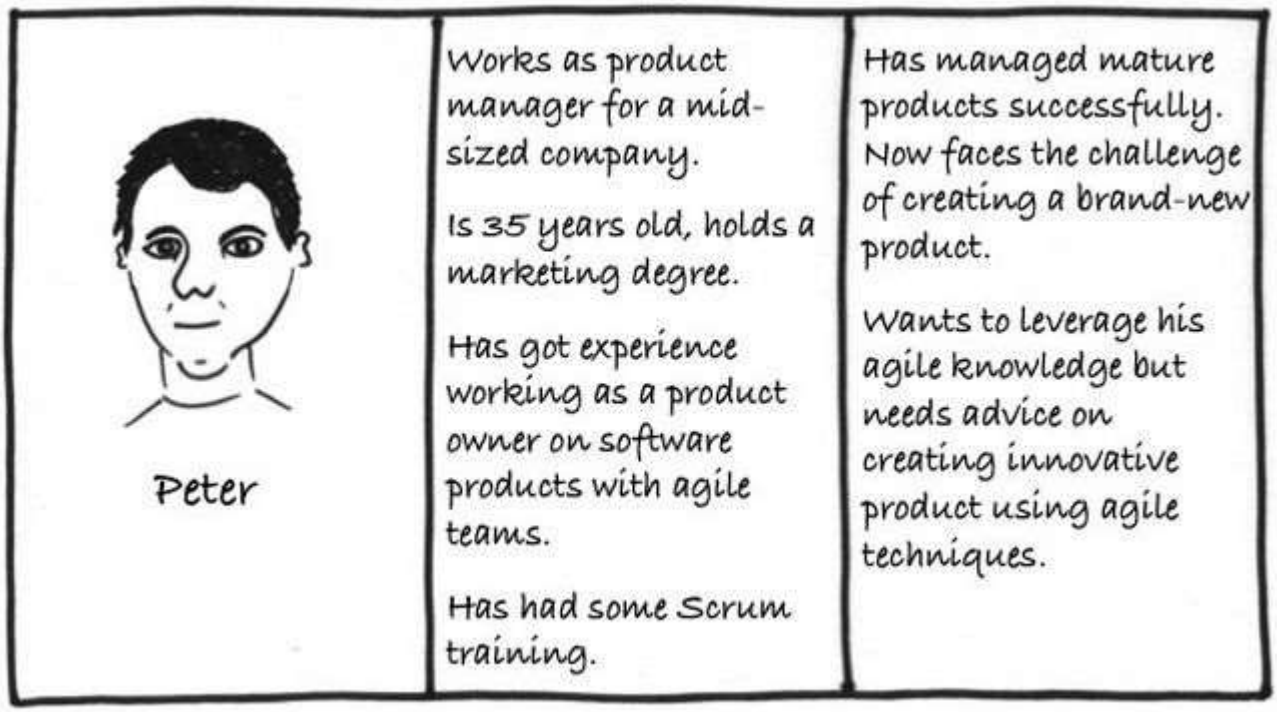


2. Role-Based Personas

The role-based perspective is also goal-directed, and it also focuses on behavior. The personas of the role-based perspectives are massively data-driven and incorporate data from both qualitative and quantitative sources. The role-based perspective focuses on the user's role in the organization.

3. Engaging Personas

Engaging personas can incorporate both goal and role-directed personas, as well as the more traditional rounded personas. These engaging personas are designed so that the designers who use them can become more engaged with them. The idea is to create a 3D rendering of a user through the use of personas. The more people engage with the persona and see them as 'real', the more likely they will be to consider them during the process design and want to serve them with the best product.



4. Fictional Personas

The fictional persona does not emerge from user research (unlike the other personas), but it emerges from the experience of the UX design team. It requires the team to make assumptions based upon past interactions with the user base and products to deliver a picture of what, perhaps, typical users look like.

10 steps to Creating Your Engaging Personas and Scenarios

Engaging personas emphasize how stories can engage and bring the personas to life. This 10-step process covers the entire process from preliminary data collection, through active use, to the continued development of personas. There are four main parts:
Data collection and analysis of data (steps 1, 2),
Persona descriptions (steps 4, 5),
Scenarios for problem analysis and idea development (steps 6, 9),
Acceptance from the organization and involvement of the design team (steps 3, 7, 8, 10).
The 10 steps are an ideal process, but sometimes it is not possible to include all the steps in the project.

Collect data. Collect as much knowledge about the users as possible. Perform high-quality user research of actual users in your target user group. In Design Thinking, the research phase is the first phase, also known as the Empathise phase.

Form a hypothesis. Based upon your initial research, you will form a general idea of the

various users within the focus area of the project, including the ways users differ from one another – For instance, you can use Affinity Diagrams and Empathy Maps.

Everyone accepts the hypothesis. The goal is to support or reject the first hypothesis about the differences between the users. You can do this by confronting project participants with the hypothesis and comparing it to existing knowledge.

Establish a number. You will decide upon the final number of personas, which it makes sense to create. Most often, you would want to create more than one persona for each product or service, but you should always choose just one persona as your primary focus.

Describe the personas. The purpose of working with personas is to be able to develop solutions, products and services based upon the needs and goals of your users. Be sure to describe personas in such a way as to express enough understanding and empathy to understand the users.

You should include details about the user's education, lifestyle, interests, values, goals, needs, limitations, desires, attitudes, and patterns of behavior.

Add a few fictional personal details to make the persona a realistic character.

Give each of your personas a name.

Create 1–2 pages of descriptions for each persona.

Prepare situations or scenarios for your personas. This engaging persona method is directed at creating scenarios that describe solutions. For this purpose, you should describe a number of specific situations that could trigger the use of the product or service you are designing. In other words, situations are the basis of a scenario. You can give each of your personas life by creating scenarios that feature them in the role of a user. Scenarios usually start by placing the persona in a specific context with a problem they want to or have to solve.

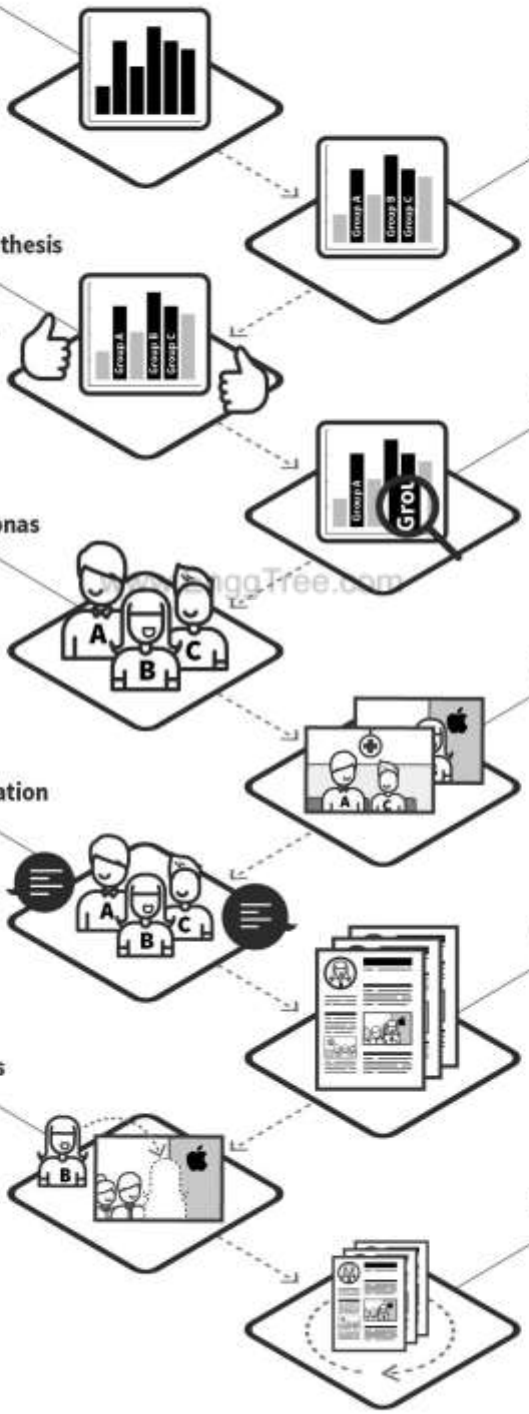
Obtain acceptance from the organization. It is a common thread throughout all 10 steps that the goal of the method is to involve the project participants. As such, as many team members as possible should participate in the development of the personas, and it is important to obtain the acceptance and recognition of the participants of the various steps. In order to achieve this, you can choose between two strategies: You can ask the participants for their opinion, or you can let them participate actively in the process.

Disseminate knowledge. In order for the participants to use the method, the persona descriptions should be disseminated to all. It is important to decide early on how you want to disseminate this knowledge to those who have not participated directly in the process, to future new employees, and to possible external partners. The dissemination of knowledge also includes how the project participants will be given access to the underlying data.

Everyone prepares scenarios. Personas have no value in themselves. Until the persona becomes part of a scenario – the story about how the persona uses a future product – it does not have real value.

Make ongoing adjustments. The last step is the future life of the persona descriptions. You should revise the descriptions on a regular basis. New information and new aspects may affect the descriptions. Sometimes you would need to rewrite the existing persona descriptions, add new personas, or eliminate outdated personas.

10 Steps to Personas



1. Collect data

Questions asked
Who are the users?
How many users are there?
What do they do with the system?

Methods used
Quantitative data collection

Documents produced
Reports

2. Form a hypothesis

Questions asked
What are the differences among users?

Methods used
Analyze the material
Group the users
Identify and name the groups

Documents produced
Draft description of target groups

3. Ensure everyone accepts the hypothesis

Questions asked
Data for Personas: Likes/dislikes, needs, values
Data for situations: Area of work, work conditions
Data for Scenarios: Work strategies and goals, information strategies and goals

Methods used
Qualitative data collection

Documents produced
Reports

4. Establish a number of personas

Questions asked
Does the initial grouping hold?
Are there other groups to consider?
Are all equally important?

Methods used
Categorization

Documents produced
Description of categories

5. Construct and describe your personas

Questions asked
Body (name, age, picture)
Psyche (extrovert/introvert)
Background (occupation)
Emotions (towards the tech, sender, information)

Methods used
Categorization

Documents produced
Descriptions of categories

6. Prepare situations for your personas

Questions asked
What are the needs of this persona?
What are the situations?

Methods used
Analyzing data for situations and needs

Documents produced
Catalogue of needs and situations

7. Get acceptance from your organization

Questions asked
Do you know someone like this?

Methods used
People who know the personas read and comment on persona descriptions

8. Disseminate knowledge

Questions asked
How can we share the personas with the organization?

Methods used
Posters, meetings, emails, campaigns of every sort, events

9. Create scenarios for your personas

Questions asked
In a given situation, with a given goal, what happens when the persona uses the technology?

Methods used
The narrative scenario—using personas, descriptions and situations to form scenarios

Documents produced
Scenarios, use cases, requirements, specifications

10. Make ongoing adjustments

Questions asked
Does new information alter the personas?

Methods used
Usability tests, new data collection
Feedback regarding users from all those interacting with them e.g., sales, support, trainers

Documents produced
Foundation document

Example of How to Make a Persona Description – Step 5

We will let you in on the details about our persona's education, lifestyle, interests, values, goals, needs, limitations, desires, attitudes, and patterns of behavior. We've added a few fictional personal details to make our persona a realistic character and given her a name.

Hard Facts
Christie is living in a small apartment in Toronto, Canada. She's 23 years old, single, studies ethnography, and works as a waiter during her free time.

Interests and Values
Christie loves to travel and experience other cultures. She recently spent her summer holiday working as a volunteer in Rwanda.

She loves to read books at home at night as opposed to going out to bars. She does like to hang out with a small group of friends at home or at quiet coffee shops. She doesn't care too much about looks and fashion. What matters to her are values and motivations.

On an average day, she tends to drink many cups of tea, and she usually cooks her own healthy dishes. She prefers organic food; however, she's not always able to afford it.

Computer, Internet and TV Use
Christie owns a MacBook Air, an iPad and an iPhone. She uses the internet for her studies to conduct the majority of her preliminary research and studies user reviews to help her decide upon which books to read and buy. Christie also streams all of her music, and she watches movies online since she does not want to own a TV. She thinks TV's are outdated, and she does not want to waste her time watching TV shows, entertainment, documentaries, or news that she has not chosen and finds 100% interesting herself.

A Typical Day
Christie gets up at 7 am. She eats breakfast at home and leaves for university at 8.15 every morning.

Depending on her schedule, she studies by herself or attends a class. She has 15 hours of classes at Masters level every week, and she studies for 20 hours on her own.

She eats her lunch with a study friend or a small group.

She continues to study.

She leaves for home at 3 pm. Sometimes she continues to study for 2-3 hours at home.

Three nights a week, she works as a waitress at a small eco-restaurant from 6 pm to 10 pm.

Future Goals
Christie dreams of a future where she can combine work and travel. She wants to work in a third-world country, helping others who have not had the same luck of being born into a wealthy society. She's not sure about having kids and a husband. At least it's not on her radar just yet.

Evoking Empathy with Engaging Personas

Developing an engaging persona starts with user research. Collecting insights about the social and cultural backgrounds of the users, their psychological traits, their feelings of frustration, and their goals will help you develop a broad knowledge of the users

Compare the following two user descriptions, to get an understanding of what we mean.

Description of the target group of a social media platform for seniors, based on research results only:

Single elderly inhabitants of the Timbuktu region

Living independently in the house they own

Children living at a distance with their families

Are feeling loneliest when they have to eat alone

Description of an archetypical user of a social media platform for seniors, including some fictional elements:

Example:

Mrs. Green is 68 years old, and always loved cooking for her husband. Since he passed away, she has been living alone in her house. Her children are all grown up, and are living outside the Timbuktu region with their families. They only come to visit her every other week. Mrs. Green doesn't want to bother them more, since they have busy lives with their work, children, and friends. She often feels lonely when there's no-one around, especially during meal times. She hates sitting at the table all by herself, so she doesn't cook as often as she used to. Sometimes she just has a sandwich in front of the television.

Both descriptions are based on the same research data. The first is not incorrect, but is far less helpful when you want to evoke the same empathy you have developed for the target group, in your fellow designers or client. Once you start putting this data in context, the archetypical user will come alive as a person they can feel for. An image of the user in context will help you strengthen this effect even further, as will some other elements that you should include in a persona.

Elements to Include in a Persona

There are six common pieces of information that make up a persona:

Name, age, gender, and an image of the persona, preferably including some context in the background

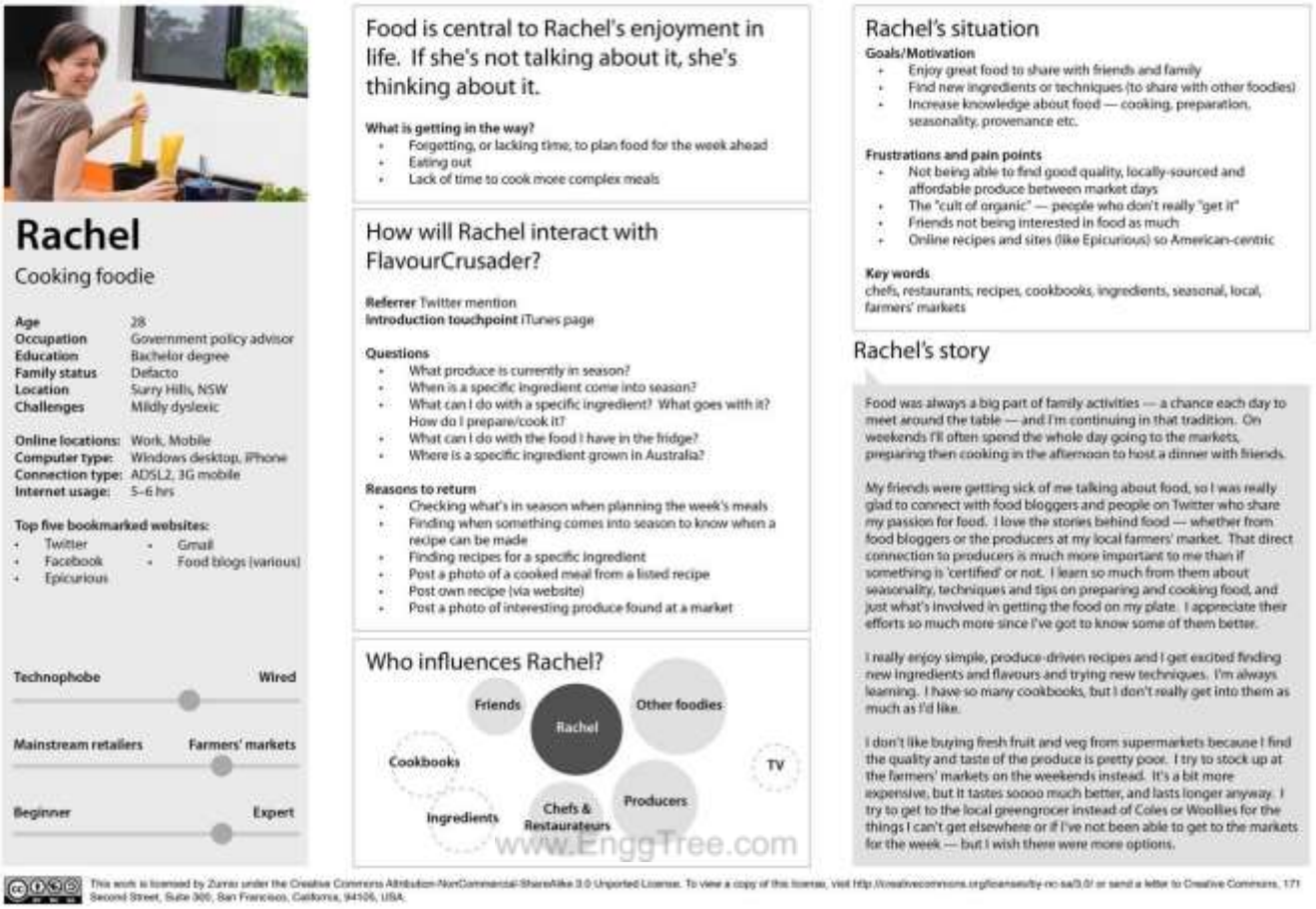
A tag line, indicating what the persona does or considers relevant in his or her life

The experience and relevant skills the persona has in the area of the product or service you will be developing

Some context to indicate how he/she would interact with your product or service (e.g., the voluntariness of use, frequency of use, and preferred device)

Any goals, attitudes, and concerns he/she would have when using your product or service

Quotes or a brief scenario, that indicate the persona's attitude toward the product or service you're designing. If the persona already uses an existing product or service to meet his or her needs, you might describe the use of that here.



Solution Ideation

Ideation is a creative process where designers generate ideas in sessions (e.g., brainstorming, worst possible idea). It is the third stage in the Design Thinking process. Participants gather with open minds to produce as many ideas as they can to address a problem statement in a facilitated, judgment-free environment.

Converging

At some point in your ideation session, you'll have reached a critical mass of ideas, and it will become unproductive to try to keep pushing for more. This is different from the natural creative slumps that teams experience throughout ideation sessions, and means it is a good point to stop and focus on pruning. This is referred to as the "convergent stage"—where ideas are evaluated, compared, ranked, clustered and even ditched in an attempt to pull together a few great ideas to act on

Dot Voting

You write all of the ideas which have been generated in the ideation session down on individual sticky notes.

Then you give all participants a number of votes (around 3–4 should do) to choose and write down their personal favorite ideas.
Participants vote by using stickers or simply using a marker to make a dot on the ideas they like.
You can also use variations in color in order to let participants vote on which ideas they like the most or which they dislike the most.
You can invent other voting attributes when it makes sense.

This process allows every member to have an equal say in the shortlisted ideas.

Four Categories Method

The Four Categories method entails dividing ideas according to their relative abstractness, ranging from the most rational choice to the "long shot". The four categories are: the rational choice, the most likely to delight, the darling and the long shot.

Bingo Selection

The Bingo Selection method inspires participants to divide ideas. However, in this method, the facilitator should encourage the participants to split ideas according to a variety of form factors, such as their potential applications in a physical prototype, a digital prototype and an experience prototype.

Idea Affinity Diagrams

Use affinity diagrams or similar activities to cluster similar ideas together and make connections between them that will help you uncover patterns or themes that may be promising.

Idea Selection Criteria

These idea selection criteria will help you at this stage to provide a guide for choosing ideas which fit well into your goals, your research about your users and their needs

Now Wow How

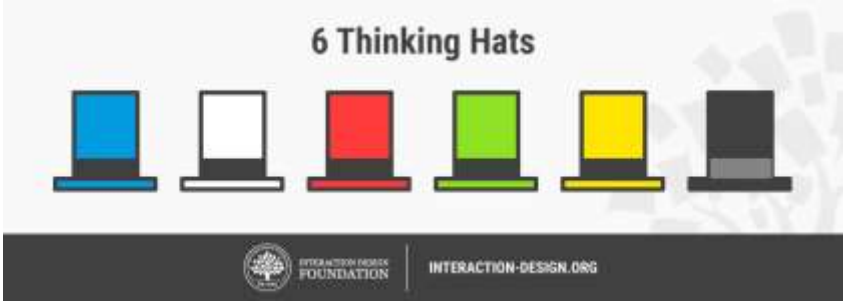
The Now Wow How Matrix provides a mechanism for evaluating ideas on a scale of:

Now: ideas that can be implemented immediately but which lack novelty.

Wow: ideas that can be implemented and are innovative.

How: ideas that could possibly be implemented in the future.

Idea Selection – Apply Edward De Bono's Six Thinking Hats



White Hat: The White Hat calls for information which is known or needed. It's all about this: "The facts, and nothing but the facts."

Yellow Hat: The Yellow Hat symbolizes optimism, confidence and brightness. Under this hat, you explore the positives and probe for value and benefit.

Black Hat: The Black Hat is all about judgment. When you put on this hat, you're the devil's advocate where you try to figure out what or why something may not work.
Red Hat: The Red Hat calls for feelings, hunches and intuition. When you use this hat, you should focus on expressing emotions and feelings and share fears, likes, dislikes, loves and hates.

Green Hat: The Green Hat focuses on creativity: the possibilities, alternatives and new ideas. It's your opportunity to express new concepts and new insights.

Blue Hat: The Blue Hat is used to manage the thinking process. It's your control mechanism that ensures the Six Thinking Hats guidelines are observed.

Creating User Stories

What are User Stories?

User stories are short statements about a feature, written from a user's perspective. A well-defined user story does not spell out the exact feature, but rather what the user aims to achieve, to give agile teams the freedom to identify the best possible way to implement the feature.

The User

While user stories are mostly written from the end users' point of view, that's not always true. Teams can write them from the perspective of business stakeholders, partners and even employees and team members.

The Goal / Action

User stories are problem- or goal-oriented and do not include specific solutions or features. Instead, they aim to serve as a springboard for teams to ideate and arrive at the most optimal solution to solve the problem for the user. Here's a hypothetical user story for a mobile application for diners:

"As a diner, I want to quickly locate good restaurants so that I can get good food fast."

Notice that this user story doesn't include specific features. These come later, when team members take the user story and work their way towards solutions or features, which, for this user story, could include:

Be able to save favorite restaurants.

Sort restaurants by location, reviews or delivery times.

View recommendations by friends.

The Outcome

The best stories are ones that lead to measurable outcomes. Examples of good outcomes are an X% increase in profile completion rates or an N% drop in payment flow errors. Outcomes that are tied to users or business goals free up the team to think about solutions to problems instead of churning out features for the sake of shipping something.

Features of user story

- A user story is short, specific and goal-oriented. It is a one-sentence statement that tends to have the following structure: "As a , I want so that ".
- User stories are collaborative design tools. All project stakeholders are expected to participate in the definition and sorting of user stories.
- User stories focus the project on the perspective of those who will use it.

User stories are – obviously – user-centered

The format of a user story forces you to think about others and keep them and their needs in focus, to work a little bit on your empathy and place yourself in the users' shoes.

User stories are simple and accessible

Use cases have a specific grammar and structure. Therefore, not everyone participates in defining them. Only the team or person in charge of defining the requirements or functional specs would write them.

"As a.... "The role refers to the one who makes the action and who benefits.

"I want... "It is the action executed.

"So That... "It is the added value that the user gets from the action.

User stories are collaborative

To promote a concrete, realistic and shared vision of the end user. User stories are your best ally here

User stories promote a shift in the way a project is discussed. We do not focus anymore on solutions and features.

User stories are about the present and the future

A user story has just the right level of detail. At a more abstract level, we have epics. In Agile, "epics" are used for a high-level overview of the needed features.

Writing User Stories

In many cases user stories are not created by the design or development team – they're provided by a customer or a business user to try and explain what they'd like the finished product to look like

In larger organizations, this responsibility may be covered by product managers in other organizations it may fall within the remit of the UX team.

A user story is going to capture a requirement of the product functionally they may also be used to describe non-functional capacities of products too (for example privacy or security requirements).

The idea is to use a simple question and answer format to develop the story. Then the designer or developer records each story on a single card. This story may then be revised for clarity after the requirements capture exercise is complete.

The generally accepted format for user stories is:

"As a , I want , for this "
Writing good user stories in Scrum requires an understanding of the basic user story template, a focus on the user or customer, and a clear picture of the desired functionality.

User Story Template
When writing a user story, remember that user stories follow a standard template:

As a < type of user >, I want < some goal > so that < some reason >.
User Stories and Agile Development
User stories are used in agile to define all functionality of the final product. They are not set in stone and it is completely accepted that requirements can (and often will) change throughout the lifecycle of a project.
Benefits of Using User Stories in Design and Development
There are several benefits of using user stories in design and development cycles:

- They are simple and quick to understand.
- They allow programmers to quickly (using agile) implement customer/user value
- They don't need very much maintenance
- They can be discounted except when they are being used in development
- They allow a project to be chunked into smaller milestones
- They make it easier to estimate costs on a project for development
- They facilitate cooperative working with clients and users

The Drawbacks of Using User Stories in Design and Development
There are possible drawbacks of using user stories and in particular of becoming overly-reliant on them at the expense of other tools:

- They are difficult to work into large scale projects (where thousands of stories might be required)
- They may be too vague to be useful and require a lot of back and forth between developers and clients
- They fail to capture performance measurements and sometimes non-functional aspects of the system – e.g. they are too simple

What is a user story?
A user story is a short, simple description of a feature told from the perspective of the person who desires the new capability, usually a user or customer of the system. User stories typically follow a simple template:
As a < type of user >, I want < some goal > so that < some reason >.

What Is a Good User Story?

Agile user stories are composed of three aspects that Ron Jeffries named in 2001 with the wonderful alliteration of card, conversation, and confirmation:

Card: Written description of the story, used for planning and as a reminder

Conversation: Conversations about the story that serve to flesh out the details of the story

Confirmation: Tests that convey and document details that can be used to determine when a story is complete.

Examples of User Stories

As a site member, I can fill out an application to become a Certified Scrum Trainer so that I can teach Certified Scrum Master (CSM) and Certified Scrum Product Owner (CSPO) courses and certify others.

As a trainer, I want my profile to list my upcoming classes and include a link to a detailed page about each so that prospective attendees can find my courses.

As a site visitor, I can access old news that is no longer on the home page, so I can access things I remember from the past or that others mention to me.

As a site visitor, I can see a list of all upcoming "Certification Courses" and can page through them if there are a lot, so I can choose the best course for me.

Creating Scenarios

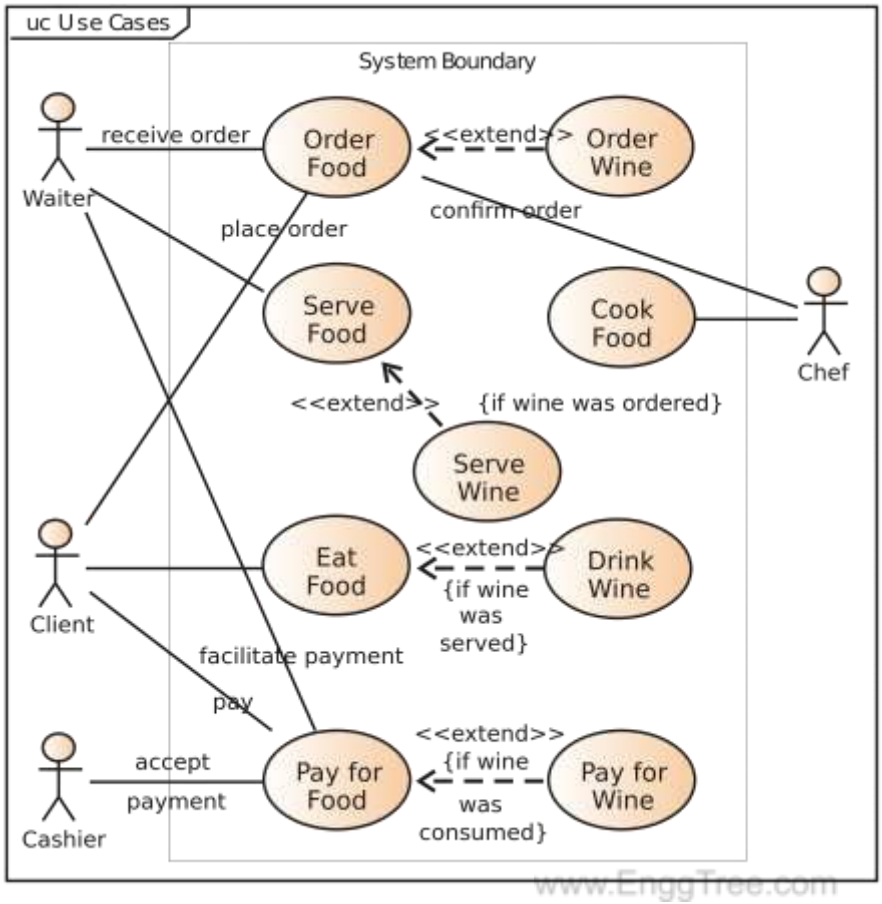
What is a User Scenario?

A user scenario simply describes a basic story of an action or goal that a user wants to accomplish.

Scenarios can be used to describe both what currently happens within a system or environment or more typically the intended behavior within a system or environment.

User scenarios can be useful when defining usability testing too. They enable testers to focus on the key tasks within a system.

User scenarios help you examine how your design will work.



When Should Scenario Mapping Be Used in a Project?

Scenario mapping can be effective at many points during a project but there are three great uses for it at specific stages:

Ideation – if you're trying to create a new product, then having scenario maps makes it very easy to explore ideas with your team and with users. It also helps, in a similar means to task analysis, formulate a shared vision for the project. (See the method below as to how to do this).

Iteration – if you're new to a product and you're going to be involved in creating future iterations then it's pretty easy to create scenario maps "on the fly" by observing users with the current product. (This can be done solo and doesn't need the method below).

Usability testing – user scenarios can also be used to define which are the most important areas to test during usability testing and to provide guidance on how it should be done.

How to Do User Scenario Mapping?

It's a pretty simple process to create user scenarios and here's a simple way to conduct it:

First, find a place that you can use to get creative – you're going to need somewhere where a group can talk and discuss without being interrupted and without disturbing others. You're probably going to need between 2 and 3 hours for the session.

Then invite a bunch of relevant people to the session – the UX team, the development team, the product manager, etc. but don't invite too many people, a maximum of 7 is a good idea as it means everyone can contribute without anyone getting lost in the mix.

Then get some post-it notes, flipchart paper, etc. stuff that makes it easy to capture an idea and get it in front of everyone. Bring sellotape or blu-tack in case things aren't sticky enough for the surfaces in your room.

Explain to everyone present what your objectives are and what a user scenario is – it's always good to have everyone on the same page. However, don't spend too much time on this either; you want people firing on their creative best not snoring in the corner because you've TMI'd them to death.

Hopefully you have user personas because they'll come in handy as you map your first user scenario. What is it that this user must do in this interaction with the product? This tells you what goes into the scenario.

You also need to provide context to make your scenarios as accurate as possible – the who, what, when, where and why detail that gives a scenario colour and makes it easy to relate to.

Then it's time to take some baby steps and walk through the scenario in the shoes of your user (referring to your user personas). What will the user do? What information do they need to get that done? What questions will they need answered or will you need answered to do this? What assumptions will you have to make to make this work?

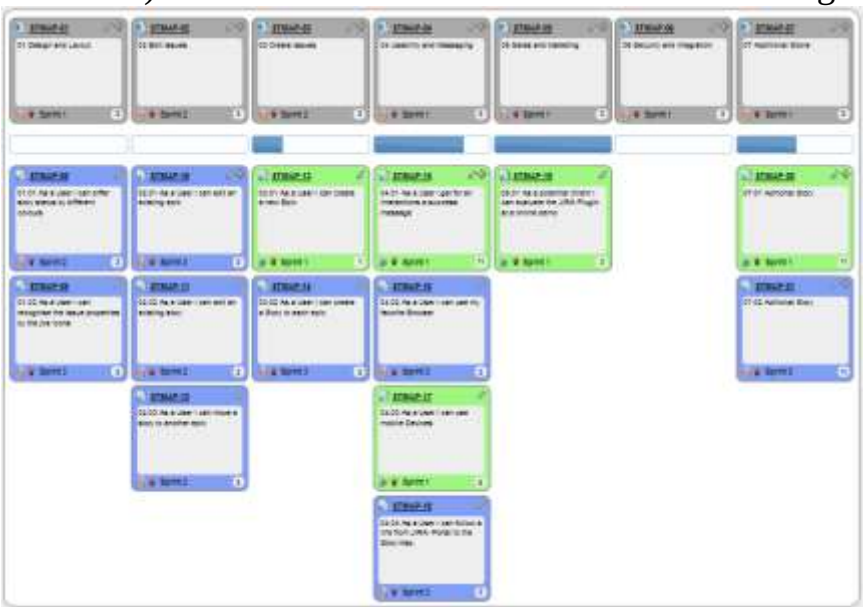
Finally, you also want to collect ideas from the team that don't fit within the scenario but may be related to it.

After you've completed each scenario make a written note of it and stick it to the wall. Try and get scenarios grouped so that you can make easy sense of them and spot any gaps that arise.
Repeat this process for each scenario. Until you've generated scenarios for every key task the user will perform with the product.

Need to find more scenarios? Then the question is "what key tasks must be performed in order to satisfy the user and/or the business" (though it's worth noting that tasks that satisfy the business and not the user are unlikely to be performed very often).

Once all your scenarios are complete – take a high-res photo of the wall (it saves you from having to copy all that data down before you give up the room to someone else) and ensure that you can read the notes you've made in the photo.

The last stage is to compile all that data into something useful (say a spreadsheet or a flowchart) and then share it with other stakeholders to get their feedback.

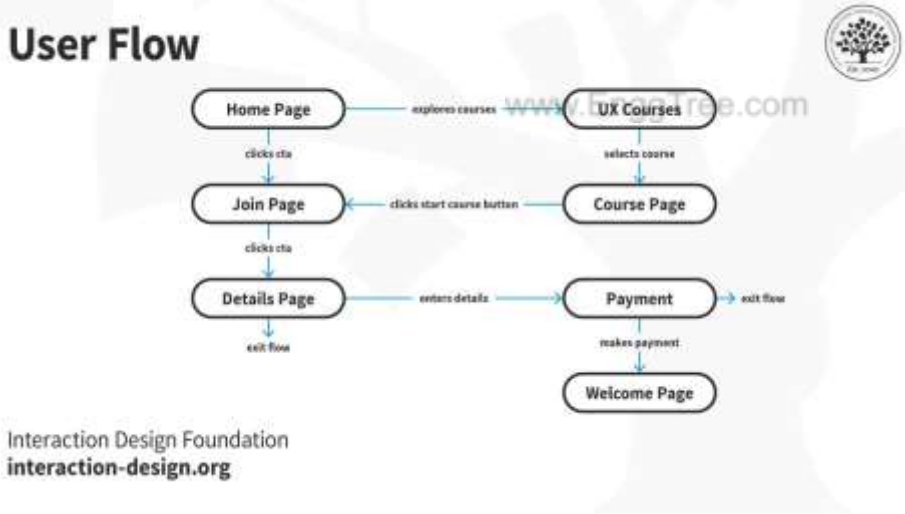


Flow Diagrams

User Flows

Illustration depicting a user flow.

A user flow (also known as a task flow) diagram is a simple chart outlining the steps that a user has to take with your product or service in order to meet a goal. In contrast to the customer journey map, the user flow diagram considers only what happens with your product (that is to say, ignoring all external factors). These diagrams can help designers quickly evaluate the efficiency of the process needed to achieve a user goal and can help pinpoint the "how" (i.e., execution) of the great ideas identified through brainstorming.



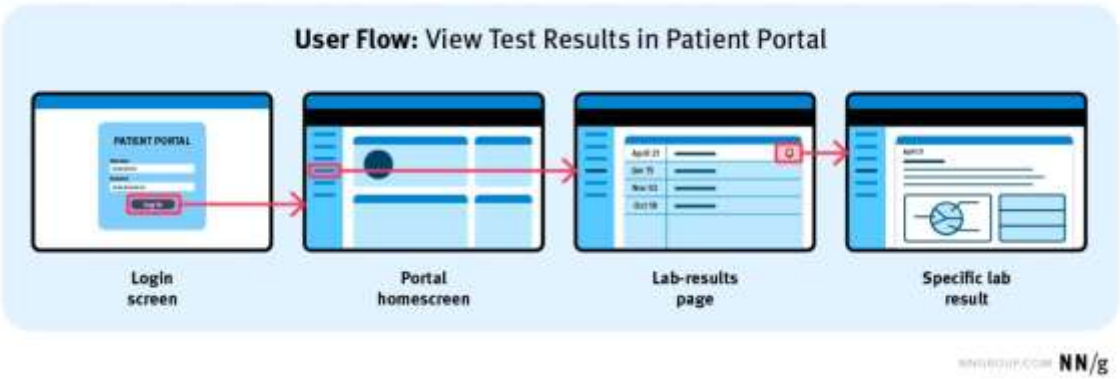
Definition: A user flow is a set of interactions that describe the typical or ideal set of steps needed to accomplish a common task performed with a product.

Compared to a user journey, the underlying goal of a user flow is much more granular, and the focus is narrowed to a specific objective within one product.

Some appropriate goals to capture in user flows might be: purchasing a tennis racket on a sporting goods site, signing up for email updates on a credit-score-monitoring application, or updating a profile picture on a company's intranet. These goals can be accomplished in the

short-term (minutes or hours, at the most), and with a relatively limited set of interactions.

User flows can be represented with artifacts such as low-fidelity wireflows, simple flow charts, or task diagrams. These maps capture key user steps and system responses; they do not contextualize the process with emotions and thoughts like a journey map does.



The best research method for obtaining the data to map user flows is usability testing, which allows us to watch users interacting directly with the product in directed scenarios. As with user journeys, tools that capture analytics (e.g., click heatmaps) are a useful secondary source of insights.

Comparison: User Journeys vs. User Flows

The main differences between user journeys and user flows are captured in the table below:

	User Journey	**User Flow**
Definition	A scenario-based sequence of the steps that a user takes in order to accomplish a high-level goal with a company or product, usually across channels and over time	A set of interactions that describe the typical or ideal set of steps needed to accomplish a common task performed with a product
Focus	Macro: Broad and high-level (e.g., the experience of becoming a new patient of a medical practice)	Micro: Specific and granular (e.g., signing up for alerts on a website)
Scope	Zooms out to consider multiple touchpoints and channels	Zooms in to understand interactions within a single product
What it captures	The user's actions, emotions, and thoughts, as well as	Product-based interactions (key user actions and system

	channels	responses)
Appropriate artifacts	Journey maps	Wireflows, flow charts, or task diagrams

To determine whether a user journey or a user flow is best for your specific context, consider the following questions:

Does your user process involve more than one channel or more than one, known product (e.g., your company's website)? User journeys are best for capturing activities dispersed over multiple channels; user flows are well-suited for interactions within one product.
Can users generally accomplish the goal in minutes or hours, at the most, or will they need to complete activities over days, weeks, or months? User journeys are better for communicating activities over longer periods of time; user flows are better for relatively short-term goals.
Will it be critical to understand not only the actions but the emotions and thoughts of users across more complex decision-making? User journeys capture those; user flows are limited to sequences of steps, with no additional information about users' emotional states.

How Do We Design for User Flow?
We begin with the user themselves. Instead of going through the technical specification documents and trying to base designs on that – we examine what the user's objective (or objectives) are and what the business's objective (or objectives) are.

So for example on a retail website this might include:

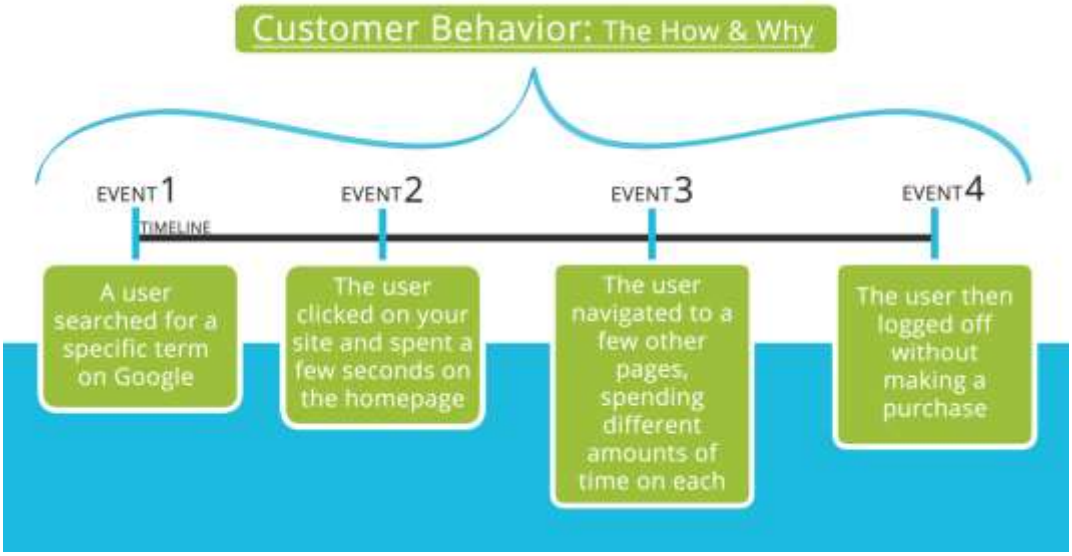
User wants to buy a new product

User wants to research alternative products

User wants to return a product

By mapping out all the possible objectives and comparing them to business objectives – it becomes easy to create user flows. Flows are simply the process steps from the user arriving on a website to completing their task or tasks.

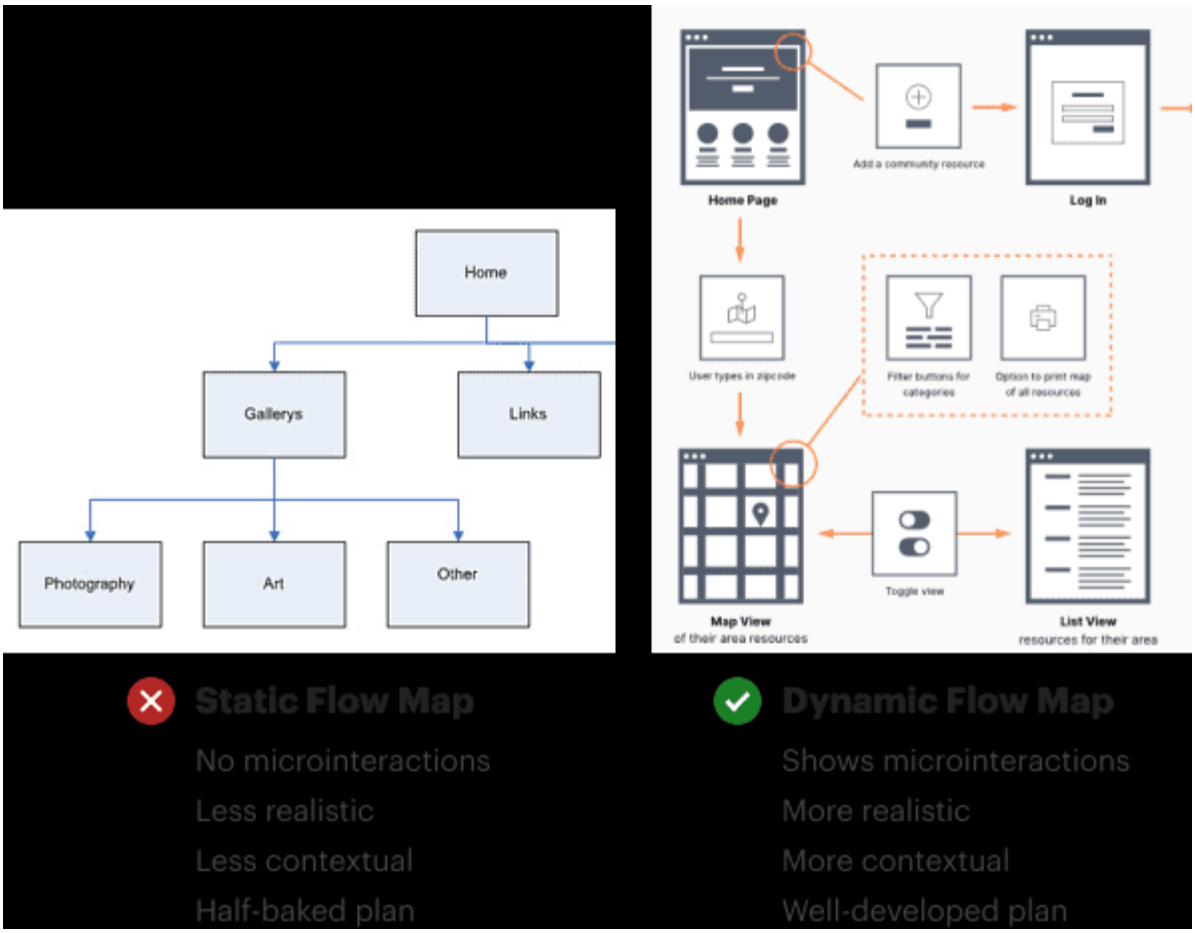
Once you know what users want to do – you might also want to look at where a user might arrive on your site and where they are coming from. A user who is responding to e-mail marketing will probably be delivered to a different place in the site to a user who finds you through organic search.



Flow Mapping

Flow maps are designed to represent all possible navigational paths of an interface to help designers plan. However, there are more that users do on interfaces than navigate. A flow map that only illustrates navigation doesn't represent interfaces realistically. It fails to account for the various interactions that occur on each screen. If flow maps are documents for planning, such a flow map will only plan to fail.

Real interfaces are dynamic, not static. A static flow map only shows you the next screen users navigate to



In contrast, a dynamic flow map shows each screen's microinteractions. These are the elements and components users interact with that move them to the next screen. They also include non-navigational interactions that occur on the screen. It's important to plan these out in your flow map so that you and the people you work with know what to expect.

A dynamic flow map should also display context. When you have a sense of context, you can better identify task complexity. You can see which screens are forms to fill out, and which ones are more text-heavy and media-rich than others. These details allow you to plan an interface that's more aligned with realistic expectations.

Information Architecture

What is Information Architecture?

Information architecture (IA) is the discipline of making information findable and understandable. It includes searching, browsing, categorizing and presenting relevant and contextual information to help people understand their surroundings and find what they're looking for online and in the real world.

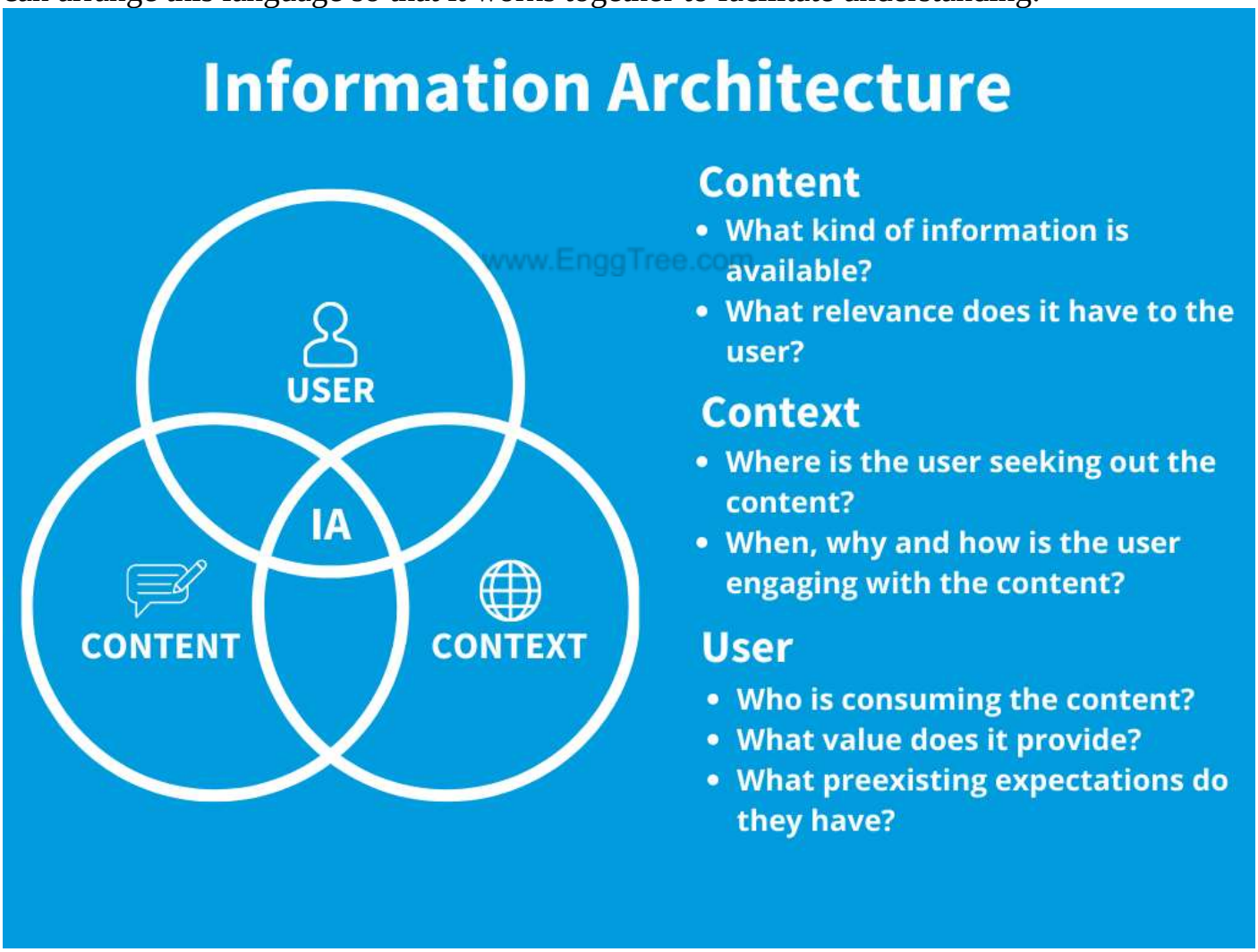
IA is used in physical spaces like museums or department stores, as well as in websites and applications. For instance, in a natural history museum, you will find fossils from the Jurassic period exhibited together, just as your favorite packet of chips will always be in the snack aisle of your supermarket.

Information architecture operates from two perspectives:

People perceive information, products and services as places made of language.

These places or information environments can be arranged for optimal findability and understandability.

Language in this instance means visual elements, labels, descriptions, menus, content. We can arrange this language so that it works together to facilitate understanding.



Context relates to business goals, funding, culture, technology, politics, resources and

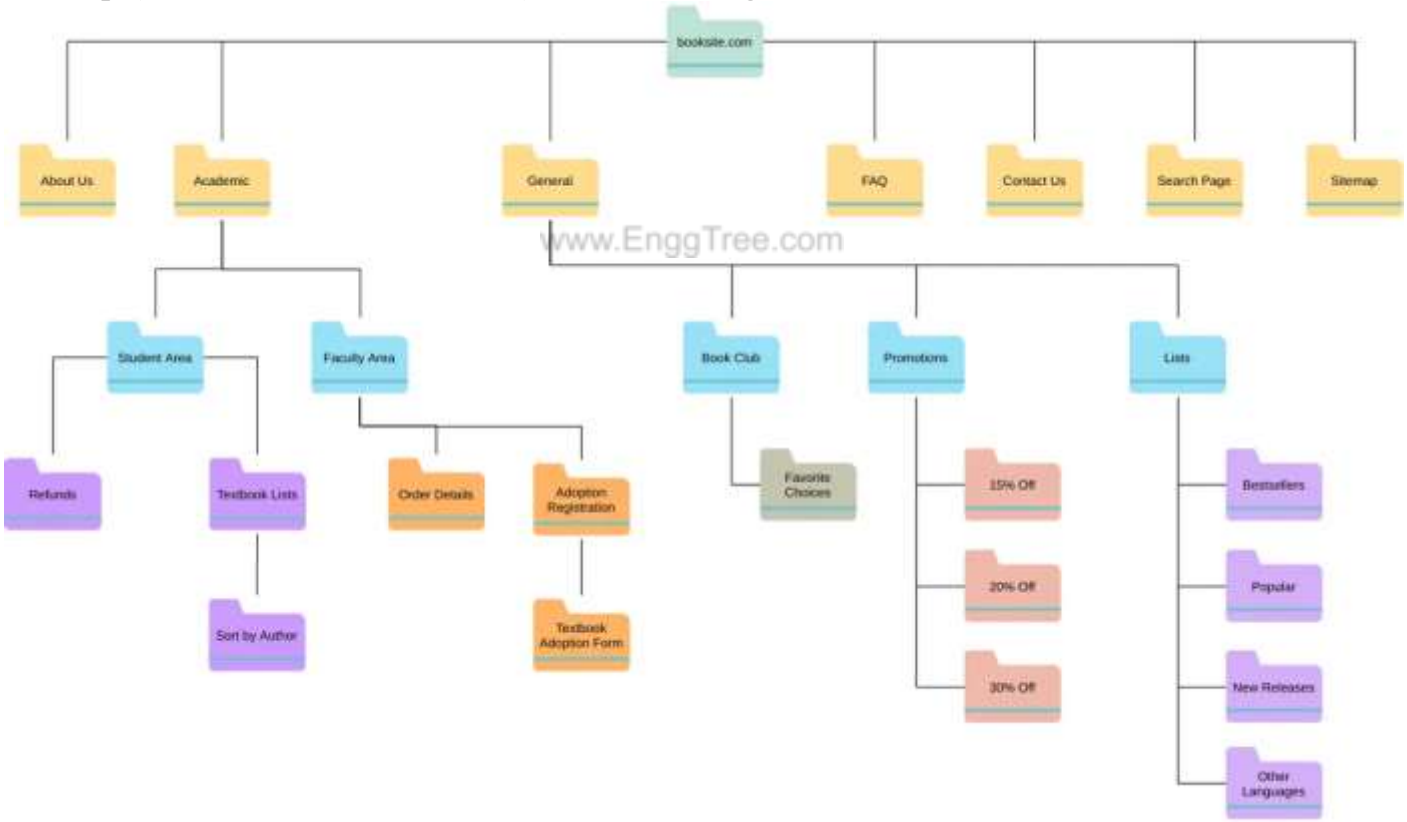
constraints. Content consists of the document or data types, content objects, volume and existing structures. Users comprise the audience, tasks, needs, experiences and how they seek information.

Good information architecture is informed by all three areas, all of which are in flux depending on the information environment.

IA and UX design

As with all aspects of UX design, information architecture starts with understanding people—namely, their reasons to use a product or service. A methodical and comprehensive approach to structuring information is needed to make it findable and understandable irrespective of the context, channel, or medium employed by the user.

Once you understand how a user behaves and seeks information, you can design a successful sitemap (like the one shown below), website navigation, user flows and so on.



Designers need to understand the following when designing websites and applications:

the information needs of users

the site or app's content

the business goals of the website, app, or organization

An information architect's deliverables typically include:

site maps

wireframes

hierarchies

navigation

and metadata.

Information architecture should be a holistic process, so when a new product or service is being designed, it's important to start with IA. Good IA serves as the foundation of effective user experience design.

Principles of Information Architecture

The IA's main focus is on the structure of information first, and the design of the actual user interface second (if at all);
The IA understands how people actually use content and how the structure should function to support that;
The IA grasps the range of content and functionality on a project and how that needs to be structured.

Principle of objects

The principle of objects says that content should be treated as an evolving thing that has its own lifecycle. Different content has different attributes and behaviors, and this has to be recognized in order to best utilize that content. You should start every project by identifying the kinds of content that will be present. That means both on a broad scale and a more granular one.

Principle of choices

The principle of choices means that you should offer your users meaningful choices. However, you need to make sure that those choices are focused on something specific. Too many choices can overwhelm a user and negatively affect their experience using your site.

Information should be arranged in hierarchies, avoiding long lists of options, which can become cumbersome to sort through. Categorizing and sub-categorizing content is much more effective if you have more than a handful of options to begin with.

Principle of disclosure

It's important to give your users the information they need. But be sure you identify what the necessary information actually is, and don't just give them information because you feel like it. Give them the information they need to have an idea of what they can expect to find as they delve deeper into your site, no more, no less (this is called progressive disclosure).

Principle of exemplars

Describing the content within a category of information via example makes it easier for your users to understand what they're getting. It greatly improves user experience. For example, when browsing categories on Amazon, they often show products that fall within that category. This makes it easy to immediately identify the correct category, especially if you're not exactly sure what the category in question might be called.

Principle of front doors

Half of your visitors are likely going to arrive on your site via a page other than your home page. That means that every page they land on should include some basic information so that they know what kind of site they're on. It also means every page should include at least top-level navigation, as well as navigation to related pages. There are two major avenues that visitors will access interior pages of your site from: search engine results and social media links.

Principle of multiple classification

Multiple classification means that there should be different ways for your users to browse the content on your site. Different people are likely to use different methods for finding the information on your site. For example, some users may go straight to your search function while others may want to browse

Principle of focused navigation

Navigational menus should not be defined by where they appear, but rather by what they contain. Your menus form the primary method for most users to find content on your site. In many cases, there may be more than one navigational menu on the site, to provide different ways to access the content.

Principle of growth

On the vast majority of sites, content is a fluid, changing thing. The amount of content you have on a site today may be only a small fraction of what you'll have tomorrow, next week, or next year. Organize your content in a way that allows it to grow over time. Your navigational menus and general information architecture should be able to scale to accommodate a lot of content without becoming cumbersome or unwieldy.