LEARN UX/UI

DEEPAK MADHANA RAJ

About Me

I am Deepak Madhana Raj, UX Designer with 15 years of experience. I am writing this book to share my knowledge and the process I use to design apps and websites. I have acquired knowledge by reading books, watching many videos and working on some real world projects. I hope this e-book is useful and helps you to build great web/mobile apps.

UX Practitioners I like to thank

I like to thank some of the authors and UX practitioners like,
Donald A Norman,
Susan Weinschenk,
Steve Krug,
Joe Natoli,
David Travis,
Cooper,
Aaron Lawrence,
Nir Eyal,

And many more authors and designers who inspire UX Designers around the world to build usable products and delighting the customers.

Thanks to HFI(Human Factors International) training where I learned few UX concepts on UCD and Usability.

Thank you!

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Chapter – 1. User Experience Design

The Disciplines of **User Experience Design**

2. What is User Experience Design

USER EXPERIENCE DESIGN

"USER EXPERIENCE (UX) IS HOW A PERSON FEELS WHEN INTERACTING WITH A PRODUCT, SERVICE, OR SYSTEM. IT ENCOMPASSES ALL ASPECTS OF THE INTERACTION—INCLUDING USABILITY, ACCESSIBILITY, AND EMOTIONAL RESPONSE. UX DESIGNERS CREATE SOLUTIONS THAT ARE USEFUL, USABLE, AND DELIGHTFUL BY BALANCING USER NEEDS WITH BUSINESS GOALS"

SAMPLE DASHBOARD PAGE, XYZ PRODUCT TO TRACK SALES ACTIVITY
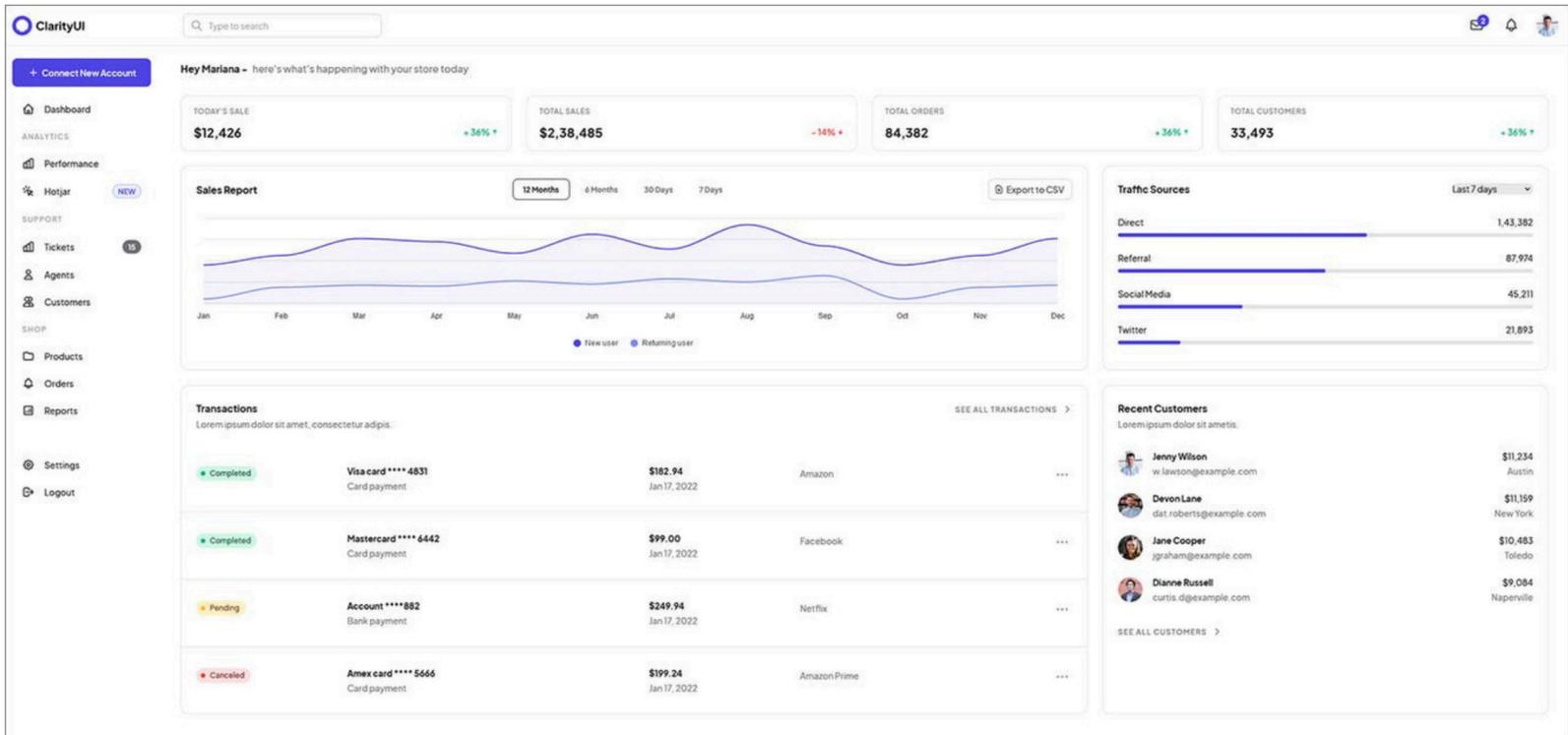
USER A
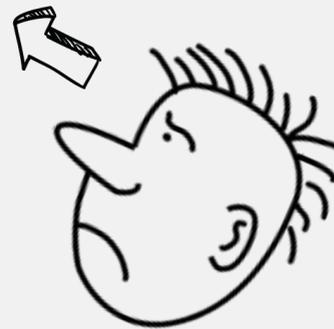
HAPPY WHILE USING PRODUCT
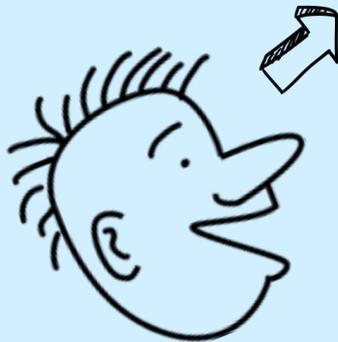
- The user can discover the features that he needs to perform task.
- Enough Signifiers and affordance to perform action.
- Aesthetically pleasing to eyes.
- Proper System feedback while performing task.
- Product works as expected.
- Matches the mental model of the user
- User knows the entry point and exit point

USER B

FURSTRATED WHILE USING PRODUCT

- The user does not know where to start and could not find the features.
- Not enough cues provided to perform task.
- Poor system feedback
- Does not match the mental model of the user
- Not able to complete the intended task.
- High cognition load.

3. What is User Interface Design

USER INTERFACE DESIGN

"A USER INTERACTS WITH INTERFACE OF A PRODUCT LIKE DIGITAL WEBSITE, MOBILE APP, REMOTE CONTROL, RADIO OR MACHINERY TO PERFORM A TASK. DESIGNERS CREATE AND LAYOUT THE INTERFACE LIKE BUTTONS, TEXT LINKS, IMAGE LINKS, VIDEO OR AUDIO INTERFACE IN MOBILE OR WEB APP, DIAL BUTTONS, TOUCH INTERACTION, HAPTIC FEEDBACK AND TAKING CARE OF THE CURRENT STATE OF UI AND FUTURE STATE OF UI IS CALLED USER INTERFACE DESIGN"

UI INTERFACE ELEMENTS USED IN MOBILE, DESKTOP APP

UI INTERFACE ELEMENTS(BUTTON, KNOB, DIAL, LIGHT) USED IN REMOTE AND RADIO
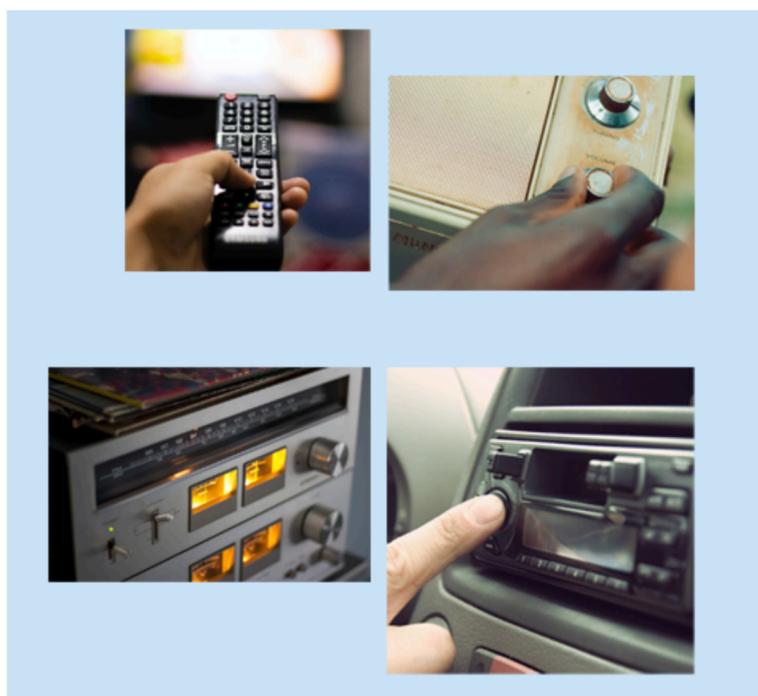
NOTE: INTERACTION DESIGN PLAYS A IMPORTANT ROLE IN CREATING USER INTERFACE.

YOU CAN REFER MORE ON USER INTERFACE IN INTERACTION DESIGN CHAPTER.

4. History of User Experience Design

DON NORMAN COINED THE TERM USER EXPERIENCE

One of the renowned expert in the filed of User Experience and Interaction Design, Sir Don Norman coined the term "User Experience" while working at Apple computers. Apple had a creative team and Don was managing the team. The team was working at many apple products and solving the design issues faced in each of the product based on the User's/Customers problems. Don decided to call "UX Designers" or "User Experience Designers" for all the design members of the Team and eventually the name User Experience Design Team was born.

In the early 70's and 80's Graphic Design was familiar with many product companies. Graphic Designers or Engineers working in the companies had the sole responsibility in creating interface for radio, remote, tv and other electronic devices and engineers were responsible creating interface for cockpit in aero planes and other machinery. Users were not consulted and many of the interfaces has to be learned by reading the manual to operate. With the advance of computers and Xerox machines Graphical User Interface was invented. Xerox was the first company to come up with GUI for Xerox Machines. And apple took it further by creating a operating system for their computers which had Graphical User Interface for the software they created. Apple introduced typography, menus and buttons in their software with mouse to interact with the software and perform action such as mouse click as the interaction. The earlier software had only Command Line interface to perform any action where user as to enter a command to execute or instruct the computer to perform some kind of action. (i.e, Delete, Edit, Insert, Save)

And people like Don Norman from Apple and Dieter Rams from company Braun started to focus on users and simplicity. Along with them many more design practitioners around the world started to focus on users problem to build better products. Today the User Experience Design has evolved and many companies started to implement UX in their products. Currently many companies use Design Thinking and UCD process to implement UX for their products.

5. Human Psychology

WHY DO I NEED TO KNOW HUMAN PSYCHOLOGY TO CREATE UX

User Experience is all about people behaviors, needs, cognition an emotions. Its closely related to Human Psychology.

All the great authors and UX Practitioners which I have mentioned in this E-book have practiced or learnt Psychology and have degree in Psychology. These people have written UX/UI Guidelines, Interaction Principles and even Visual Design Principles. I think people in UX should read and learn Psychology to create better User Experiences. This Chapter is to motivate UX professionals and learn Psychology.

HUMAN COGNITION AND EMOTION

Cognition deals with attention, perception, reasoning, emoting, learning, synthesizing, problem solving, rearrangement and manipulation of stored information, memory storage, retrieval, metacognition and motor cognition.

Emotion deals with feeling like happiness, sadness, fear, disgust, anger and surprise.

THE BRAIN CHEMICALS AND ITS FUNCTION

The psychology of design deals with, how people see, read, remember, think, attention, motivation, socialize, feel, make mistakes, interpret information, get influence by stories, relate to technology, use creativity to influence design and decide.

The brain produces dopamine, oxytocin, serotonin and endorphins during interaction with any product. When a interaction happens like touch the human brain sends signal to the brain in form of synapses, refer to the points of contact between neurons where information is passed from one neuron to the next. Synapses are part of the circuit that connects sensory organs, like those that detect pain or touch, in the peripheral nervous system to the brain.

Dopamine is called reward, motivation and addiction/pleasure chemical. i.e motivate to complete task.

Serotonin regulates human emotions stable, more energetic and more focused. i.e showing the completion or status of a task encourages the user to complete a task.
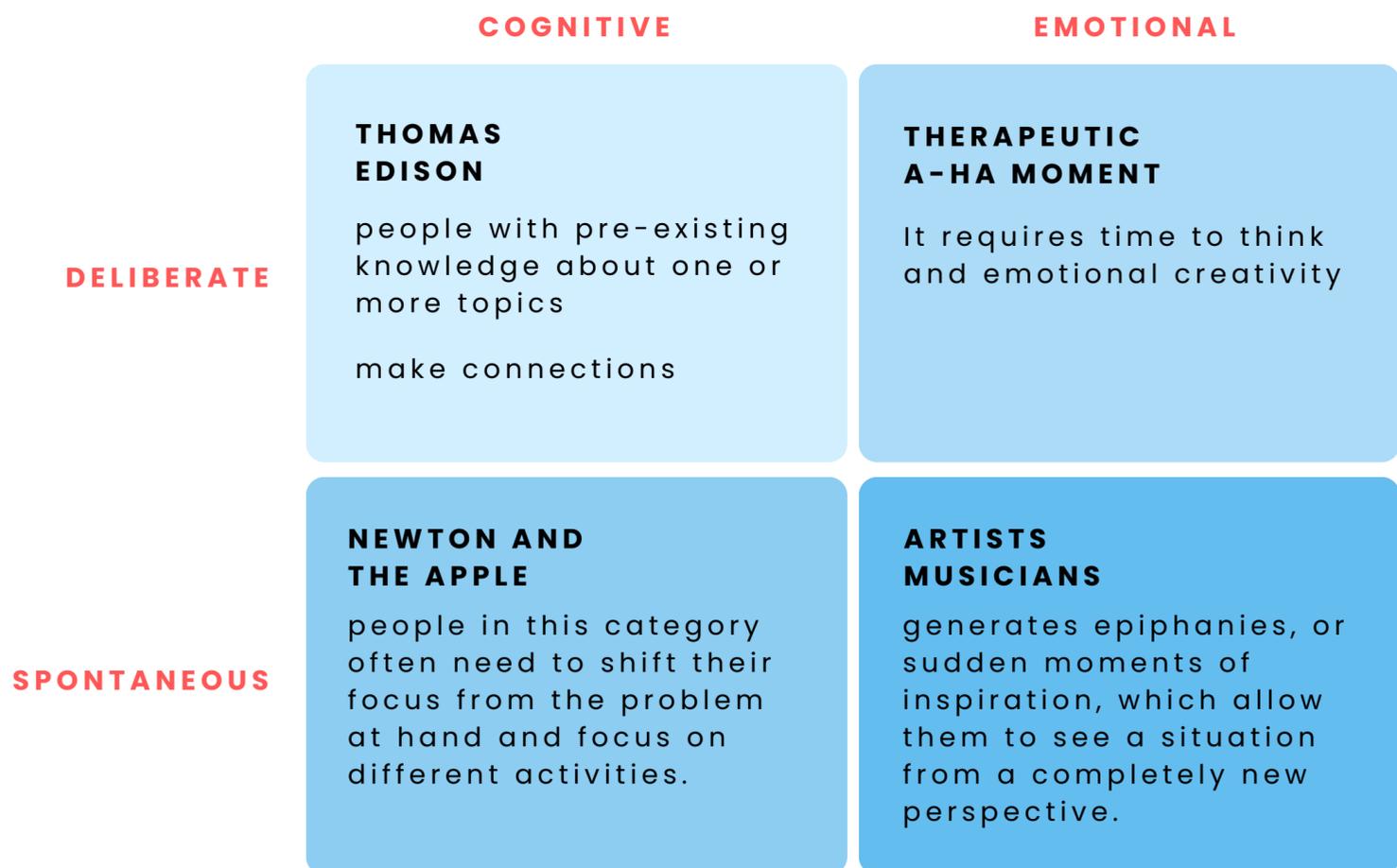
Oxytocin is called love/fear(control emotions) chemical. It brings closeness to people, feel clam when you interact with people. i.e display human face photographs to sell products or warning sign boards.

Endorphins – regulates the human body when exposed to stress and pain. i.e feeling frustrated during a task and sense of euphoria when a task is completed.

HOW PEOPLE THINK: CREATIVITY IS RELATED TO THINKING, FOUR TYPES OF CREATIVE

	COGNITIVE	EMOTIONAL
DELIBERATE	**THOMAS EDISON** people with pre-existing knowledge about one or more topics make connections	**THERAPEUTIC A-HA MOMENT** It requires time to think and emotional creativity
SPONTANEOUS	**NEWTON AND THE APPLE** people in this category often need to shift their focus from the problem at hand and focus on different activities.	**ARTISTS MUSICIANS** generates epiphanies, or sudden moments of inspiration, which allow them to see a situation from a completely new perspective.

Deliberate and cognitive creativity. Individuals who exhibit deliberate and cognitive creativity are research-oriented and favor repeated experiments and investigations to achieve their creative goals. A part of the brain called the prefrontal cortex (PFC) allows for extended periods of focus and information-gathering that typifies this kind of creativity. Thomas Edison's work on the light bulb, which required numerous trials, is a perfect example of deliberate and cognitive creativity.

Deliberate and emotional creativity. The amygdala and cingulate cortex regulate deliberate and emotional creativity, which combines a reliance on logic and facts with emotional sensitivity. Individuals who fall under this category favor quiet time, which helps generate random "a-ha" moments of clarity and creative inspiration.

Spontaneous and cognitive creativity. A "eureka" moment, like the one that reportedly inspired Isaac Newton's theories on gravity, defines spontaneous and cognitive creativity. Creative people in this category often need to shift their focus from the problem at hand and focus on different activities. At these moments, the basal ganglia of the brain activate unconscious awareness, allowing the PFC to draw on their body of knowledge and connect information. Solutions arise when an idea or external inspiration triggers the brain.

Spontaneous and emotional creativity. Great artists—like painters, authors, and musicians—often meet the criteria for spontaneous and emotional creativity. The amygdala—which oversees emotional thinking—generates epiphanies, or sudden moments of inspiration, which allow them to see a situation from a completely new perspective. Epiphanies aren't forced or manufactured but simply require patience.

NOTE: YOU CAN REFER MORE ON HUMAN PSYCHOLOGY IN INTERACTION DESIGN CHAPTER. PAGE NO:

6. UXD Principles

UXD principles are defined based on the context of the domain/project and service provided to the customers or users. Designers should define principles based on the context of domain like, news website, banking site, shopping site, task based website like train or bus or flight booking application, app to track sales activity or applications to monitor security alarms or cameras and much more

The UXD principles should be defined for a product before the start of the project. So everyone in the design team is aware of the principles so designers understand and work towards the goals and satisfy the principles defined for the product.

Let's see some of the UXD principles with different context or business domains,

AIRBNB.COM (ACCOMODATION BOOKING)

Unified
Each piece is part of a greater whole and should contribute positively to the system at scale. There should be no isolated features or outliers.

Universal
Airbnb is used around the world by a wide global community. Our products and visual language should be welcoming and accessible.

Iconic
We're focused when it comes to both design and functionality. Our work should speak boldly and clearly to this focus.

Conversational
Our use of motion breathes life into our products, and allows us to communicate with users in easily understood ways.

BASECAMP.COM (PROJECT MANAGEMENT APP)

Useful is forever
Bells and whistles wear off, but usefulness never does. We build useful software that does just what you need and nothing you don't.

Great service is everything
We're famous for fast and friendly customer service. We work hard to make sure we live up to that reputation every day.

Clarity is king
Buzzwords, lingo, and sensationalized sales-and-marketing-speak have no place at 37signals. We communicate clearly and honestly.

Our customers are our investors
Our customers fund our daily operations by paying for our products. We answer to them — not investors, the stock market, or a board of directors.

The basics are beautiful
We'll never overlook what really matters: The basics. Great service, ease of use, honest pricing, and respect for our customer's time, money, and trust.

No hidden fees or secret prices
We believe everyone is entitled to the best price we can offer. Our prices are public, published right on our site, and the same no matter who you are.

Software should be easy
Our products are intuitive.

NOTE: REFER DESIGN PRINCIPLES @ HTTPS://PRINCIPLES.DESIGN/EXAMPLES/

Chapter-2. Design Thinking and UCD

1. What is Design Thinking and UCD?

DESIGN THINKING

"DESIGN THINKING IS A PROCESS WHICH TRIES TO SOLVE THE PROBLEM AND GENERATE IDEAS OR SOLUTIONS FOR THE PROBLEMS WHICH USER FACE USING CREATIVITY AND EMPATHY.

USER CENTERED DESIGN

"USER CENTER DESIGN IS THE ACTIVE INVOLVEMENT OF USERS AND A CLEAR UNDERSTANDING OF USER AND TASK REQUIREMENTS, AN APPROPRIATE ALLOCATION OF FUNCTION BETWEEN USERS AND TECHNOLOGY, ITERATION OF DESIGN SOLUTIONS; MULTIDISCIPLINARY DESIGN. ISO 13407"

DO WE NEED BOTH DESIGN THINKING AND USER CENTERED DESIGN?

Both design thinking and user centered design put users in the forefront of their process while creating user experience design. The only difference is the approach in the process while creating UXD.

WHY DESIGN THINKING?

In Design thinking there are two phases, the problem phase and solution phase. The problems are first identified based on the situation, doing root cause analysis and picking the correct problems for the product intended to solve. And then generating ideas for the correct problems and test it so the product can fail early in the process instead after launching. And its a non-linear process. As Albert Einstein said "If you give me 1 hour I will think and analyze the problem for 55mins and take 5mins to find the solution for the problem". Design Thinking process encourages to find correct problems before starting with solutions.

UX - Design Thinking Process (Adaptable and Flexible)

2. Design Thinking Methods

UX - Design Thinking Process, Tools and Methods

	Problem Space			Solution Space			https://en.dt-toolbook.com

diverge / converge (Problem Space) — diverge / converge (Solution Space)

"The Design Thinking Playbook"
Credit to Authors:
Michael Lewrick, Larry Leifer, and Patrick Link

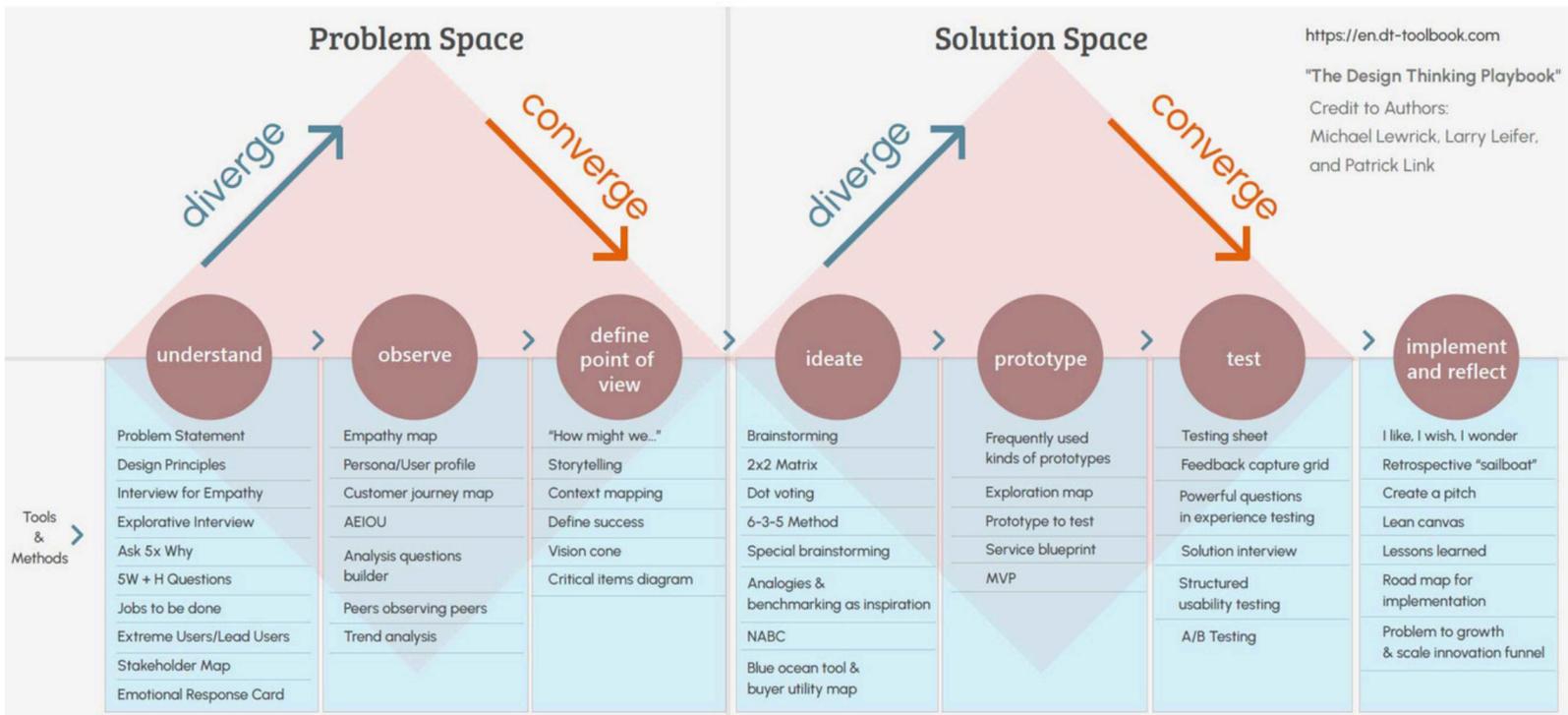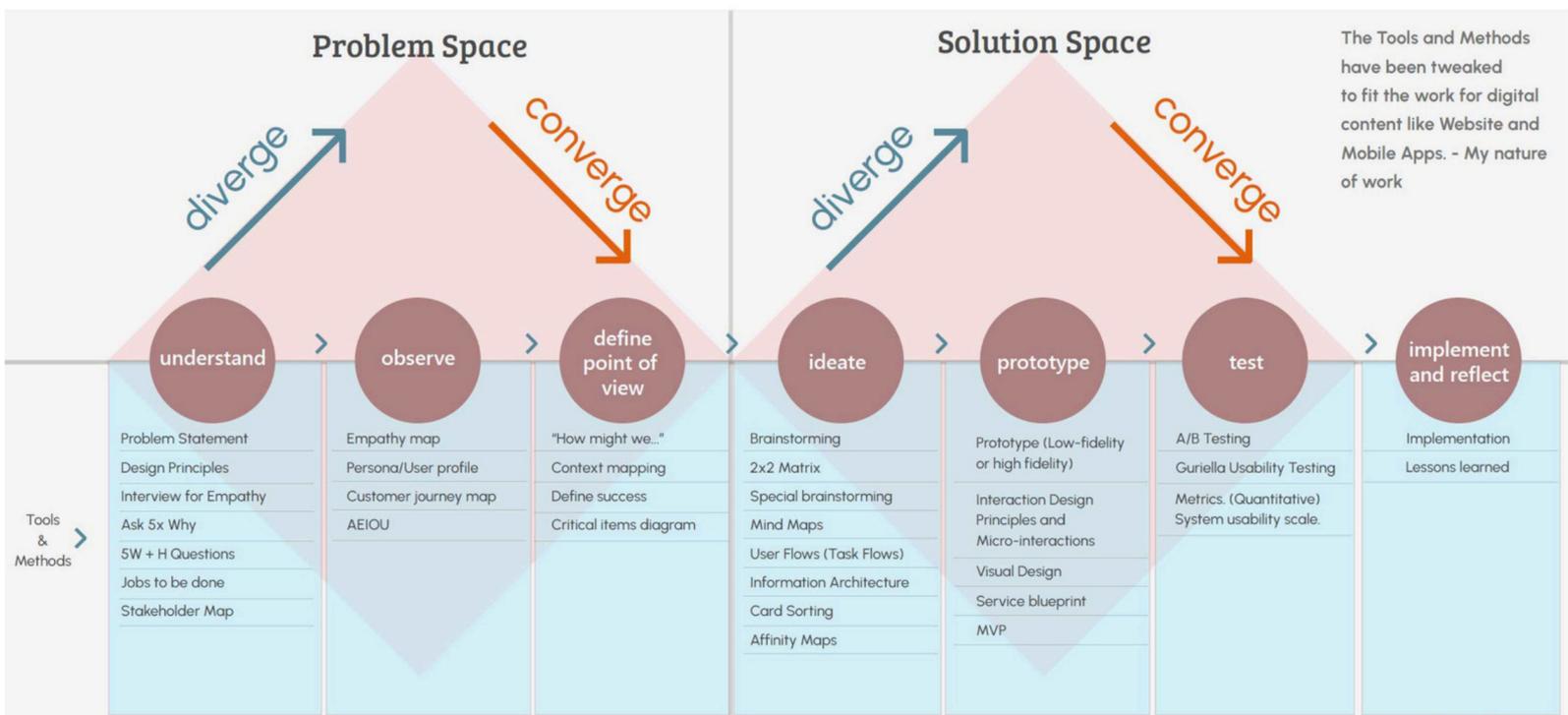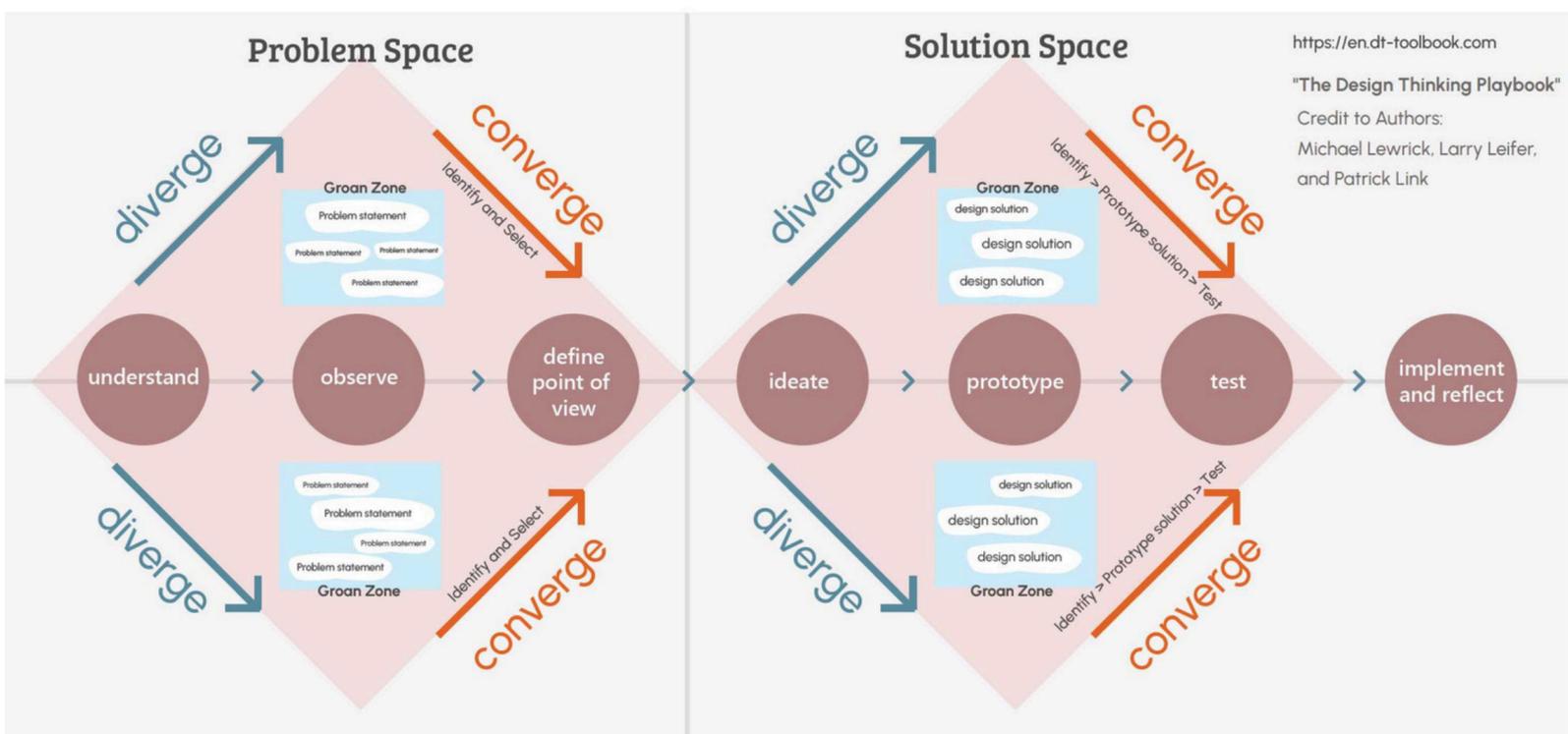| understand	observe	define point of view	ideate	prototype	test	implement and reflect
Problem Statement	Empathy map	"How might we..."	Brainstorming	Frequently used kinds of prototypes	Testing sheet	I like, I wish, I wonder
Design Principles	Persona/User profile	Storytelling	2x2 Matrix	Exploration map	Feedback capture grid	Retrospective "sailboat"
Interview for Empathy	Customer journey map	Context mapping	Dot voting	Prototype to test	Powerful questions in experience testing	Create a pitch
Explorative Interview	AEIOU	Define success	6-3-5 Method	Service blueprint	Solution interview	Lean canvas
Ask 5x Why	Analysis questions builder	Vision cone	Special brainstorming	MVP	Structured usability testing	Lessons learned
5W + H Questions	Peers observing peers	Critical items diagram	Analogies & benchmarking as inspiration		A/B Testing	Road map for implementation
Jobs to be done	Trend analysis		NABC			Problem to growth & scale innovation funnel
Extreme Users/Lead Users			Blue ocean tool & buyer utility map			
Stakeholder Map						
Emotional Response Card						

Tools & Methods

UX - Design Thinking Process, Tools and Methods I am familiar and use for my work

	Problem Space			Solution Space			

diverge / converge (Problem Space) — diverge / converge (Solution Space)

The Tools and Methods have been tweaked to fit the work for digital content like Website and Mobile Apps. - My nature of work

understand	observe	define point of view	ideate	prototype	test	implement and reflect
Problem Statement	Empathy map	"How might we..."	Brainstorming	Prototype (Low-fidelity or high fidelity)	A/B Testing	Implementation
Design Principles	Persona/User profile	Context mapping	2x2 Matrix	Interaction Design Principles and Micro-interactions	Guriella Usability Testing	Lessons learned
Interview for Empathy	Customer journey map	Define success	Special brainstorming		Metrics. (Quantitative) System usability scale.	
Ask 5x Why	AEIOU	Critical items diagram	Mind Maps	Visual Design		
5W + H Questions			User Flows (Task Flows)	Service blueprint		
Jobs to be done			Information Architecture	MVP		
Stakeholder Map			Card Sorting			
			Affinity Maps			

Tools & Methods

UX - Design Thinking Process, Groan Zone(messy zone).

	Problem Space			Solution Space			https://en.dt-toolbook.com

diverge / converge — Identify and Select

Groan Zone — Problem statement

Groan Zone — design solution — Identify >Prototype solution > test

"The Design Thinking Playbook"
Credit to Authors:
Michael Lewrick, Larry Leifer, and Patrick Link

understand	observe	define point of view	ideate	prototype	test	implement and reflect

Lets see problem statement and how to use it in design.

PROBLEM STATEMENT

I AM _____ PERSONA

I'M TRYING TO _____ GOAL

_____

_____

BUT I CAN'T BECAUSE _____ PROBLEM

_____

_____

_____

_____

_____

ONLY IF I HAD _____ SOLUTION

_____

_____

The problem statement can be used to state the problem and the solution for the problem.

Before starting any design finding out the root cause of the problem will help to define the features in the product that meets user needs and benefit the business.

In second revision I will cover some of the methods

Chapter-3. Design Strategy

1. What is Design Strategy and Components of Design Strategy

DESIGN STRATEGY

"FOR A PRODUCT TO BE DESIGNED, DESIGN STRATEGY SHOULD INCLUDE USER NEEDS, BUSINESS NEEDS AND TECHNOLOGICAL CONSTRAINTS. PRIMARILY CONSISTS OF TARGET USERS, BUSINESS GOALS, TECHNOLOGICAL CONTRAINTS, TASKS, MARKETING GOALS AND SUCCESS FACTORS."

DESIGN STRATEGY COMPONENTS AND CREATING A DESIGN STRATEGY

1. Clear Problem statements the product intended to solve and UX design principles the product should follow.
2. Targeted users: The users who will use or buy the product and their expectation.
3. Business Goals: What does business wanted to sell to the customers or create for the company and what benefits the company. Define KPI metrics, like convert users to customers or retain customers.
4. Technological constraints: What are the technological constraints based on which the product has to be built. Works only for mobile or for both desktop and mobile. Native app or web app(browser based) or Hybrid app(single code but works regardless the OS.) Built in UI Components should be used for the project while using framework, React JS or Angular JS or .Net framework for printers and medical device. Or Legacy Application, database, standards.
5. Tasks: What are the important tasks that the app or the product should support to complete a purchase or the users need to achieve their goals.
6. Marketing Goals: Personality of the product. Fun or serious. How to differ from the competitors.
7. Success Factors: ROI metrics to measure. What are key outcomes that are considered as successful for the business.

Chapter-4. User Research

1) Qualitative Research and methods

QUALITATIVE RESEARCH

"RESEARCH THAT CONTAINS INFORMATION IN FORM OF REPORTS BASED ON OBSERVATION, EXPERTISE, JUDGEMENT, OR DECISION BASED ON OBSERVATION AND INTERPRETATION IS CALLED QUALITATIVE RESEARCH"

QUALITATIVE METHODS

Methods like focus group, Interviews, Card sorting, Surveys, Diary Studies and Observation are qualitative research. Others like Persona, User Journey Map, Affinity Diagram, Empathy Map are result of Qualitative research.

FOCUS GROUP

Focus group are conducted with 5 or 6 participants by asking questions about the product or the domain or business and gather information like thought process, tasks, frustrations or paint points which can be used or assist while building or make changes to the product.

INTERVIEWS

Interviews are conducted face to face with users or the participants who are part of the study. Interviews with participants identifies the user understanding about the product, his daily task, what purpose the user uses the product, needs and pain points.

CARD SORTING

Card sorting is used to find the mental model about groupings and categories the users or the participant has in his mind. It can be used to layout navigation or group the content for each screen or pages and the labels for each category. There are three different types of card sorting,

1. Closed card sorting - The labels or the names of each category is specified in cards and the user has to group the cards under each of the main category based on their mental model.
2. Open Card sorting - Here the participant will be given blank cards. The user or the participant has to write labels for each category and group the sub-category under each main category based on their mental model.
3. Reverse Card Sorting - Once the site is published or its live and users are facing issues because of the navigation or content grouping, a test can be conducted with users by giving the cards to them and arrange or group the cards for the live site and make changes to the site.

Surveys

If we want to conduct a survey with a set of participants, we can send survey link with open ended or closed ended questions with answer choices to find the users feedback. Based on the collective feedback from the survey we can analyze and find the users pain point, what works or not with the product or website.

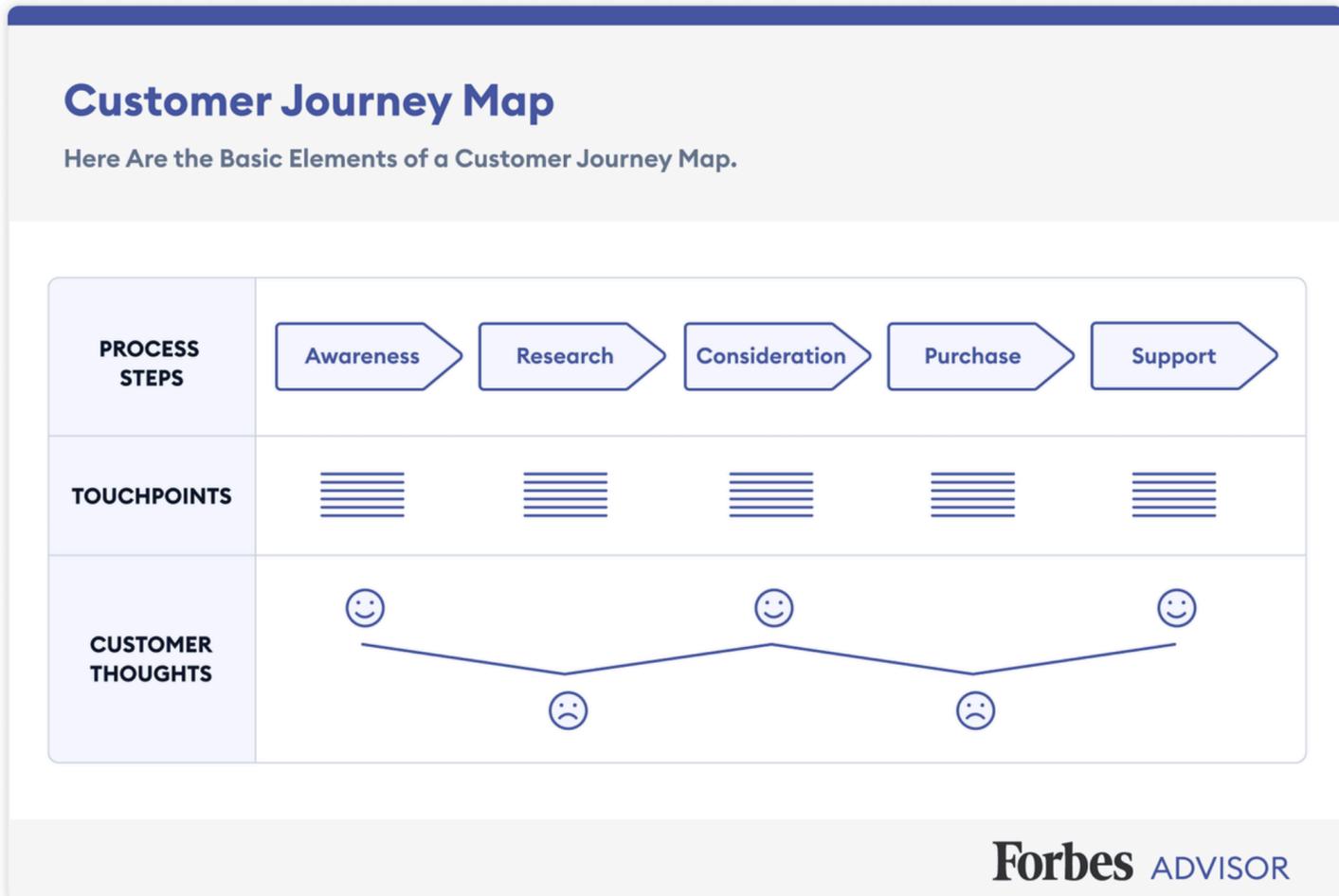Survey monkey and Google form are two of the best online survey tools in the market.
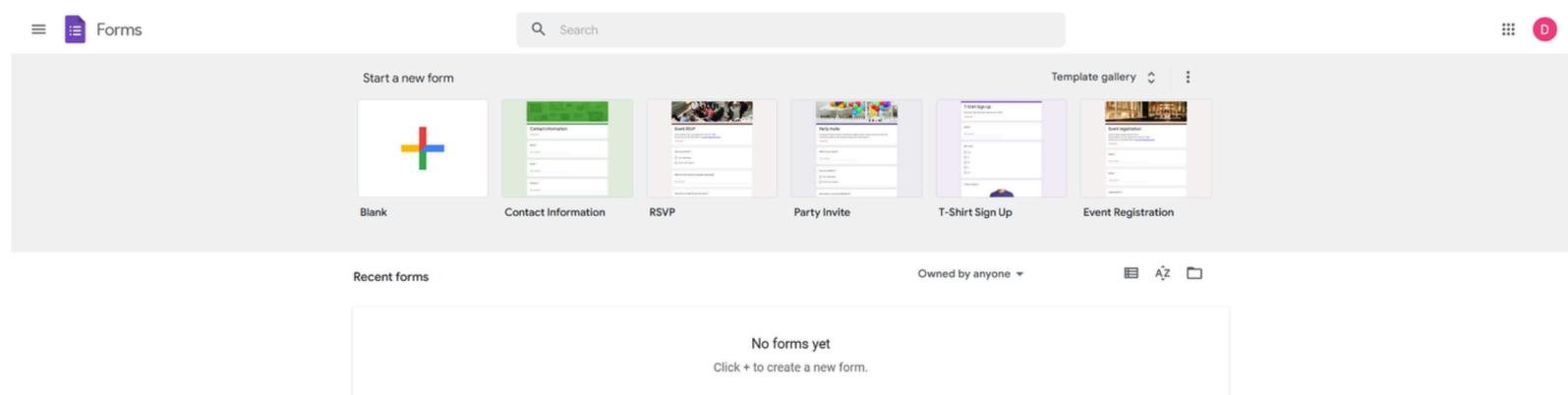
Diary Studies

Diary studies is a research method that collects qualitative information by having participants record entries about their everyday lives in a log, diary or journal about the activity or experience being studied. Mainly the user's behavior are recorded in the log.

Observation

Contextual observation like observing users at their own environment to understand what users do or what task do they perform can be useful design the product. Like, do the users sit in a busy environment, lighting conditions, do they sit or walk while performing the task, do they use mobile or desktop to perform a task, do they take notes. All these can be considered as part of observation.

QUALITATIVE RESEARCH ARTIFACTS

Persona

Persona is a fictious character representing real users. Its used as part of research to know more about the users who are going to use the product. It describes the user needs, pain points and biography about the users.

Primary Persona, Joe Daniel (Employee & Super Admin)

"I need to park my car daily and its furstrating to find a car parking spot in my office building/area. And I also need to assist other admin/security for parking visitor cars who come to office everyday."

Joe Daniel
Age, 35

Works as Employee and admin in ElementK. He supervises many divisons like Logistics, Security and others.

He is technically savvy and well versed in communication and highly skilled in supervision.

He uses Desktop and Mobile frequently for his daily activities

Current Frustrations
1. Finding parking spot is too difficult.
2. Lot of time is wasted because of assiting parking.
3. Help admin/security people in finding parking spot for visitors.
4. Delay in daily day to day activities.
5. Providing help and access to security gaurds.

Needs and Goals
1. Quick way to find a parking spot.
2. Find and pick a parking spot from office or home.
3. Show location of car, destination of parking and route to parking spot
4. Show history of parking for quick booking of parking spot.
5. Suggest Parking Spot based on availability

User Journey Map

User Journey Map is used to show the journey of user completing a task within a app or website. The user journey map consists of touchpoint(mobile or desktop screens), User actions, User thinking(front of stage), System response(back of stage), user feels(emotions), support(like messages or email or phone calls). It helps to find the opportunities and problems to solve.

User Journey Map, (Primary Persona, Daniel Parks his Car)

What is the difference between User Journey Map and Customer Journey Map?

User Journey Map is used to show the journey of user completing a task within a app or website. **Customer Journey Map** shows the entire journey of the user from start of the user journey to end of the user journey wile using a service or product. For ex: going to restaurant to have breakfast or visiting a retail store to purchase grocery/clothes/shoes.


Customer Journey Map
Here Are the Basic Elements of a Customer Journey Map.

PROCESS STEPS	Awareness	Research	Consideration	Purchase	Support
TOUCHPOINTS					
CUSTOMER THOUGHTS					

Forbes ADVISOR

Affinity Diagram

Affinity diagram is used to cluster ideas into group to generate solutions. The entire team can collaborate to generate ideas and cluster them into groups.

What are the problems with the way our team runs meetings?

Timing

- Some meetings are too short and feel rushed
- Some meetings are too long and drag on forever
- Some recurring meetings are unnecessary
- Too many meetings are scheduled during peak work hours/busy times

Focus

- Too many meetings don't have an agenda or clear goal
- People jump in with tangents or unnecessary topics
- Meetings don't have a facilitator to keep the conversation on track

Attendees

- Meetings have too many attendees
- Involved in too many meetings I don't need to be a part of
- Lack of clarity about what each person should contribute

Empathy Map

Empathy Map is used to know the emotions and the frustrations of the user while performing certain task that will help to build a product. Ex: Booking a Holiday vacation
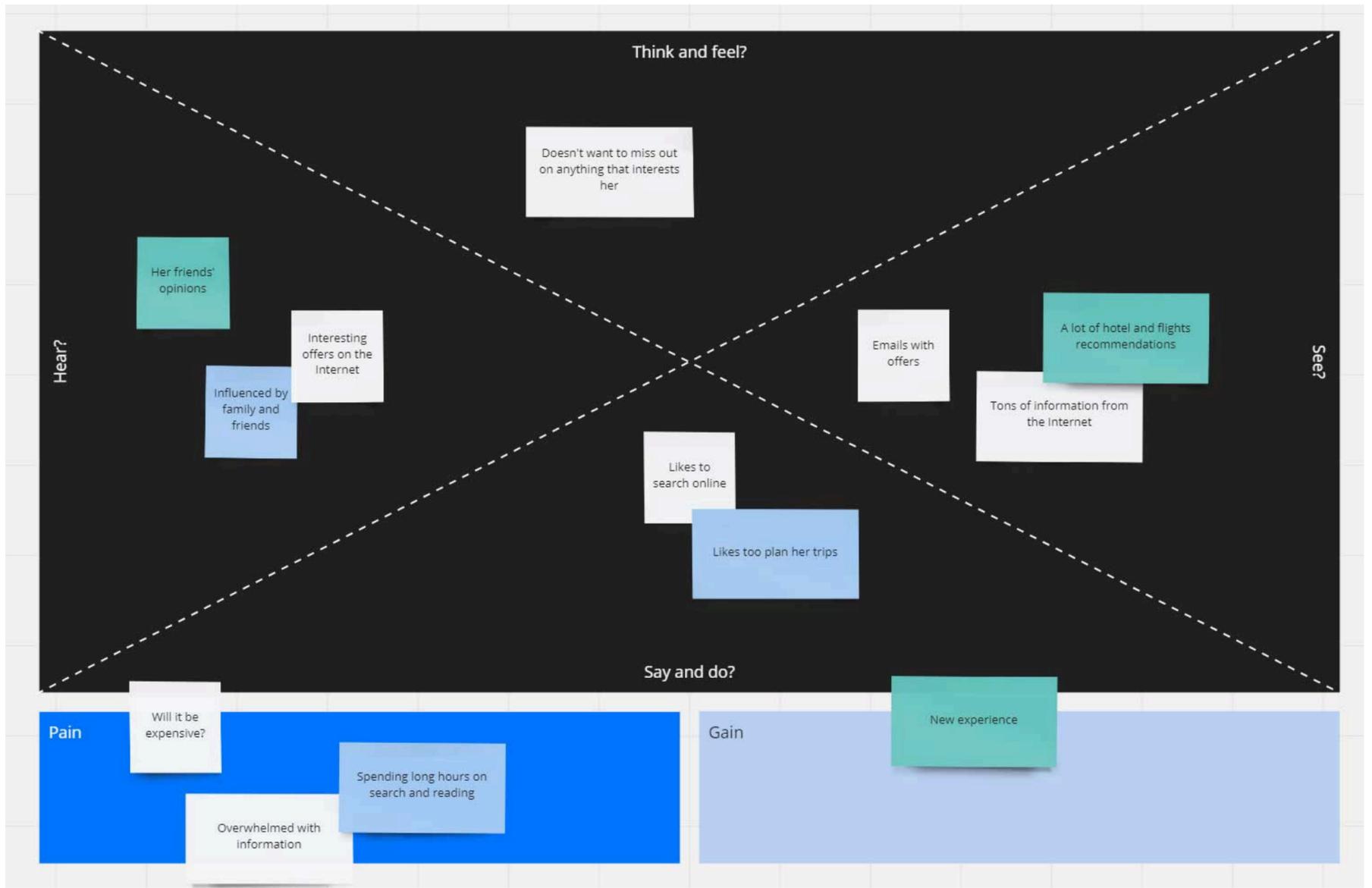
2) Quantitative Research and methods

QUANTITATIVE RESEARCH
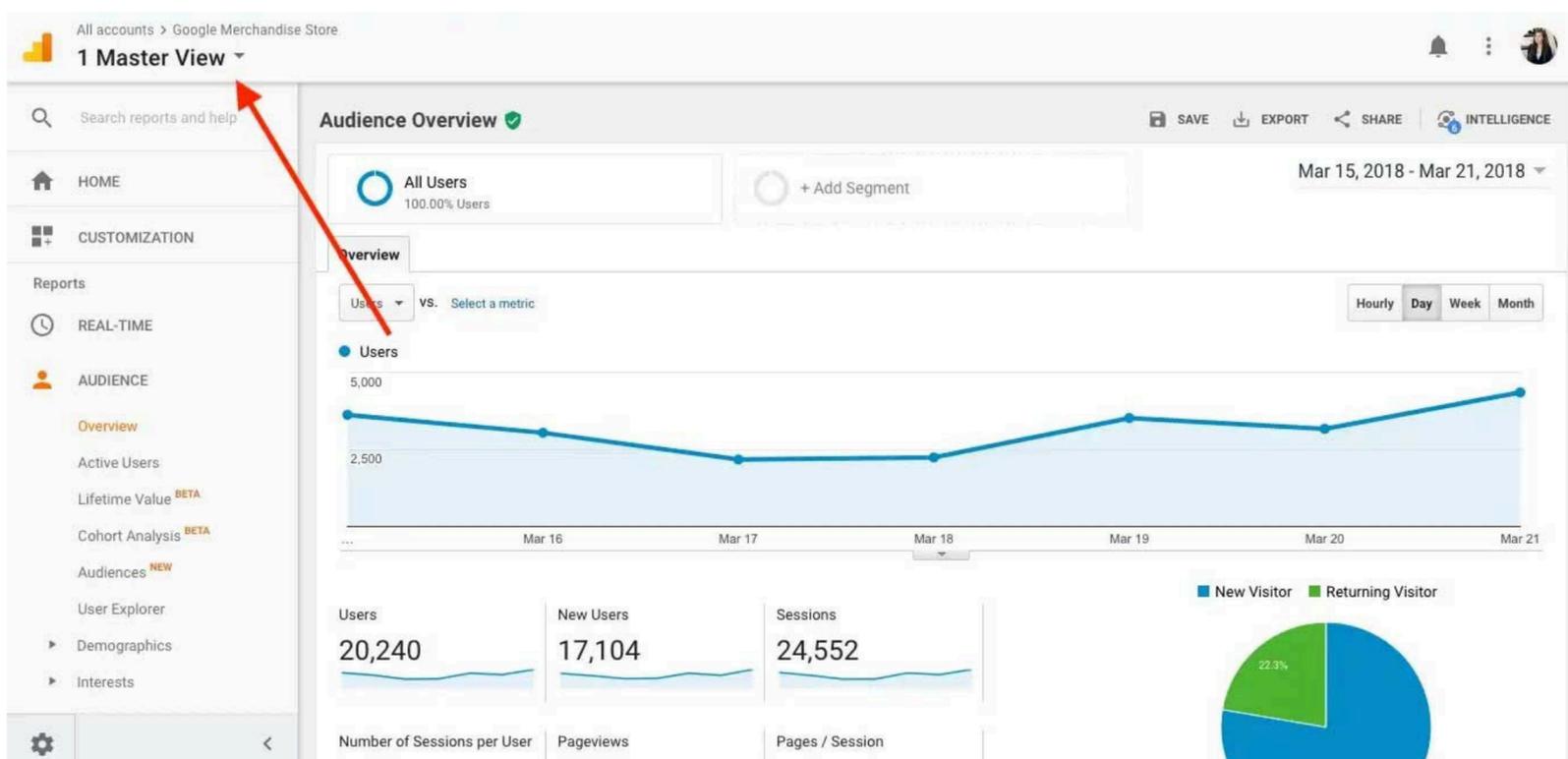
"RESEARCH THAT CONTAINS INFORMATION IN FORM OF REPORTS IN FORM OF NUMBERS OR NUMERICAL DATA BASED ON TESTING, ANALYTICS, STATISTICS WITH QUESTIONS LIKE "HOW MANY?, HOW MUCH?, HOW OFTEN?," AND DATA WHICH CAN BE MEASURED IS CALLED QUANTITATIVE RESEARCH"

QUANTITATIVE METHODS

Analytics, heatmaps, Funnel analysis, Usability Testing and A/B testing are some of the Quantitative methods

Analytics

Google analytics is one of the best tool to collect the data for your website. It can measure no of users visited, impressions of webpage, user clicks of a page and visited pages.

Heatmaps

Heatmaps in website is used to show activity of the users on the site. Which information people search or click or scroll. Pagesense from zoho can be used to generate site heatmaps.
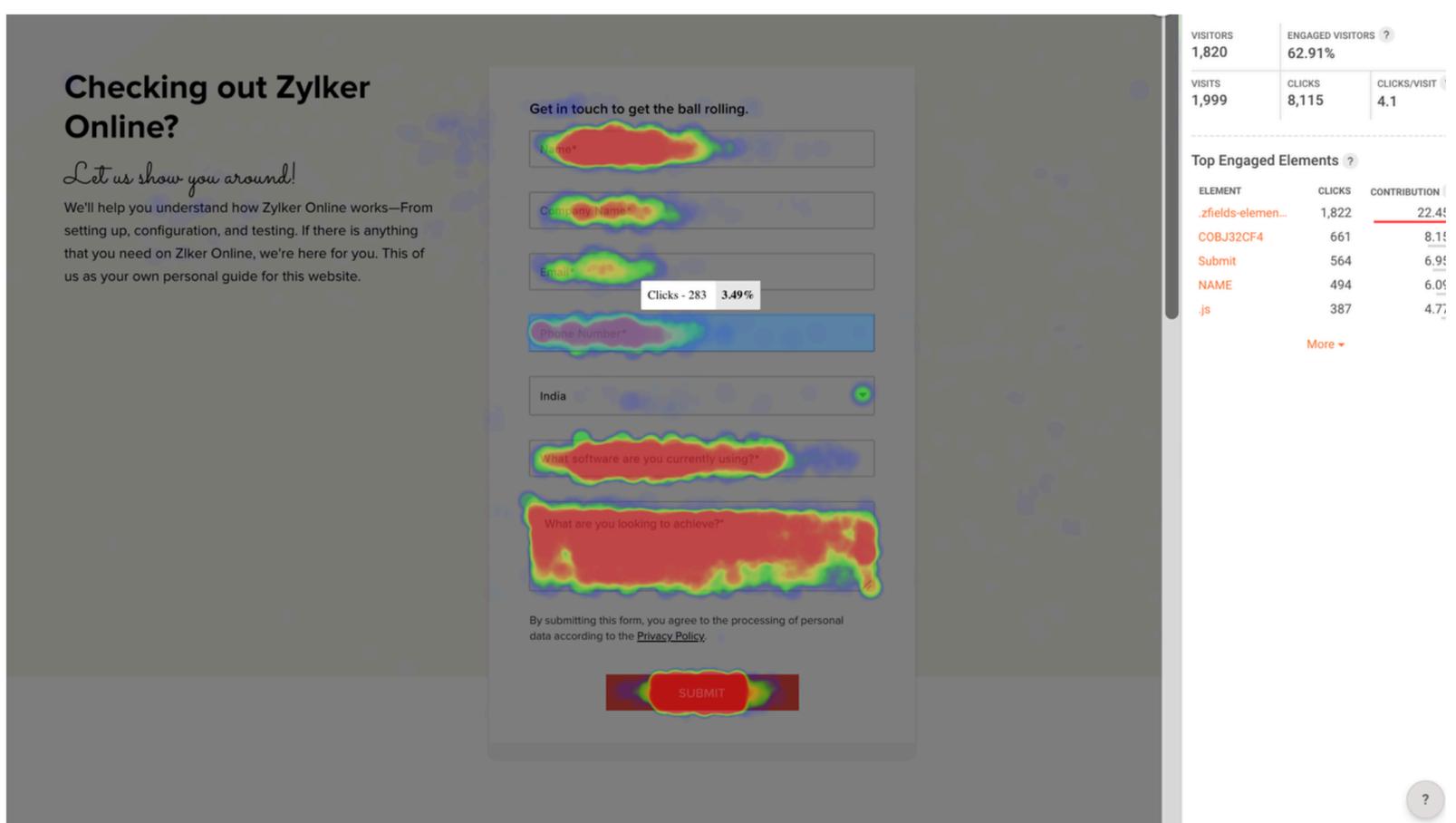
FUNNEL ANALYSIS

A funnel analysis is a method of understanding the steps required to reach an outcome on a website and how many users get through each of those steps. The set of steps is referred to as a "funnel" because the typical shape visualizing the flow of users is similar to a funnel in your kitchen or garage.

or example, consider a fictional e-commerce company whose ultimate goal (often called a conversion or macro conversion) is to get users who visit the site to make a purchase. The steps required to make a purchase on our site are: visiting the site, adding a product to the shopping cart, clicking to check out and completing the purchase. These steps are sometimes also called goals or micro conversions.

visit site	100.00%
add to shopping cart	50.00%
click to check out	30.00%
complete purchase	20.00%
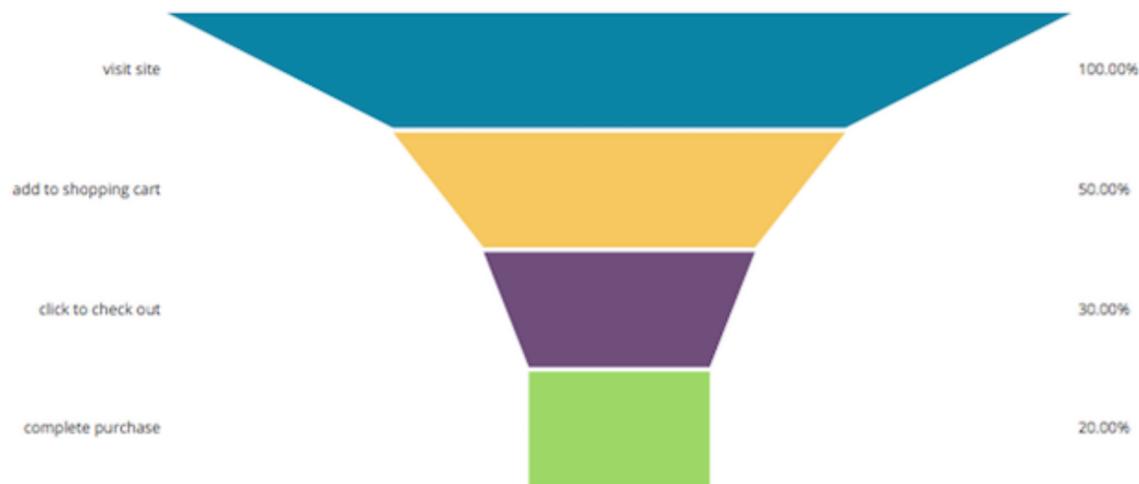
USABILITY TESTING

Usability Testing can be used to test the product with the users and observe the task the participants are performing. The usability session has observer who observes the participant behavior during the task, interviewer asking the users open and closed ended questions to find the users thoughts and emotions during the task and facilitator who setups the usability session.

The usability test reveals,
1) How many users were able to complete the task.
2) How much time did they take to complete the task.
3) How many errors did the user make while performing the task.

To test Mental model use Expectancy test, to test Organization of content use reverse card sort, to test Navigation Design use Performance test, to check Affordance use Visual Affordance test and to test Brand message use brand definition test.

A/B TESTING

In A/B testing, teams create two different live versions of the same UI, and then show each version to different users to see which version performs best. For example, you might create two versions of the same call-to-action button label: Get Pricing vs. Learn More. Then you could track the number of clicks that the button receives in the two versions. Multivariate testing is similar, but involves testing several design elements at once (for example, the test could involve different button labels, typography, and placement on the page.)

MORE ON QUANTITATIVE METHODS,
HTTPS://WWW.NNGROUP.COM/ARTICLES/QUANTITATIVE-USER-RESEARCH-METHODS/

MORE ON FORMATIVE AND SUMMATIVE METHODS,
HTTPS://WWW.NNGROUP.COM/ARTICLES/FORMATIVE-VS-SUMMATIVE-EVALUATIONS/

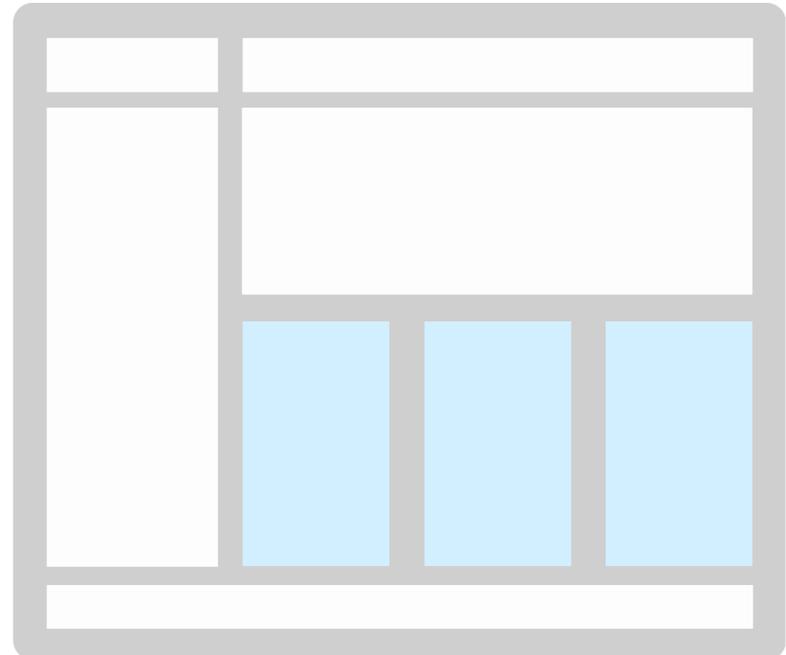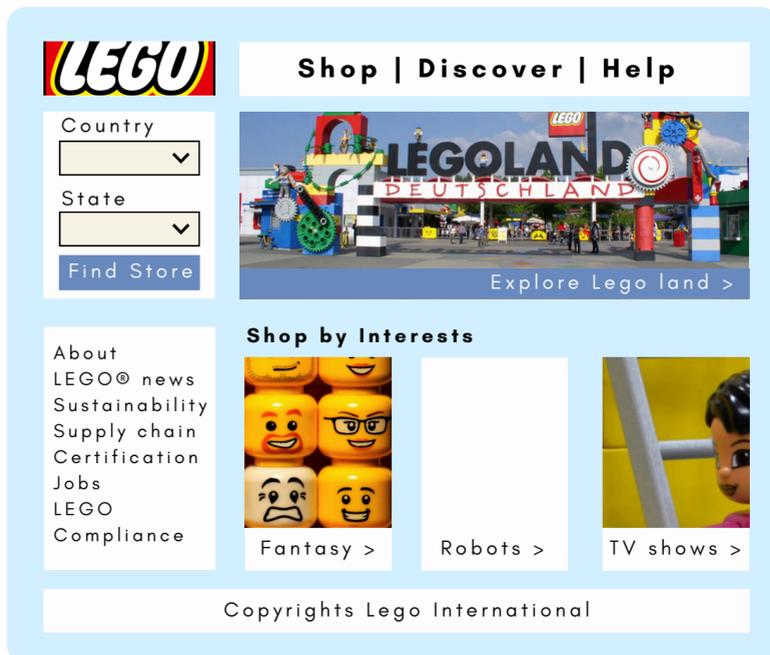# Chapter-5. Information Architecture

1) What is IA?

INFORMATION ARCHITECTURE

INFORMATION ARCHITECTURE (IA) IS A DESIGN DISCIPLINE THAT IS FOCUSED ON MAKING INFORMATION FINDABLE AND UNDERSTANDABLE.

INFORMATION ARCHITECTURE IS ALL ABOUT: ORGANISING CONTENT OR OBJECTS, DESCRIBING THEM CLEARLY, PROVIDING WAYS FOR PEOPLE TO GET TO THEM

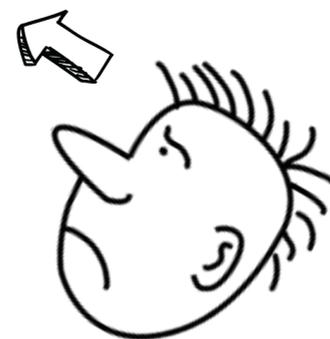IA IS ALL ABOUT CONTEXT OF USE, USERS AND CONTENT.

HOW INFORMATION PLAYS A HUGE ROLE IN DIGITAL WORLD

USER A

WHILE INTERACTING WITH WEBSITE

- I see the logo of Lego. I am in Lego website.
- I can see the navigation
- I can find store near my area.
- I can explore what's in Lego Land.
- I can shop by interests
- I can buy products online.
- I see images and text.

USER B

WHILE INTERACTING WITH WEBSITE

- I just see boxes, lines and color.
- I do not see any information or content.
- What do I do here?

Content is the "King" when it comes to digital space. Content which is well organized like text along with image, audio, video is what people consume in digital space. If people find the information or content what they need you satisfy their instant gratification. That's why Information Architecture is more important for any product. For Ex: People tend to make quick decision to click on a button with "text" than button with icon.

The main thing we learn from user research is people look for information they need and people start with a task and not looking for any documentation.

Before starting a project we need to understand,
Goals: What are the aims or goals of doing this work?
Technology: What are the technology opportunities and constraints?
Design: Are there design constraints you need to consider?
Culture : What sort of culture are you working within, and how will that affect your project?
Stakeholders: Who is, and who should be, involved in the project?

Start with context of use: Factors that influence how people interact with you content, navigation and information structures.

5 states that affect context are,
- **Physical**(using mobile, using left or right hand, performing another task),
- **Environment**(Is it noisy, loud or crowded. Are they standing, sitting or walking in the crowd)
- **Preferential**(how do they access the content, mobile, table or desktop. Prefer text or audio or video),
- **Emotional**(How is the person feeling, Is he stressed, Is he motivated)
- **Cognitive** (assumptions they make based on what they read and interact with?, ability to learn, skill levels)

The anatomy of IA can be structured as,
- **Organization systems**(Alphabetical, Chronological, Geographical, Most Popular, Process Order and etc),
- **Labelling systems**(describe categories, options, and links in language that is meaningful to users),
- **Navigational systems**(help users move through the content, such as with the custom organization)and
- **Search systems**(allow users to search the content; when the user starts typing in the site's search bar, a list of suggestions is shown with possible matches for the user's search term.)

CONTENT STRATEGY
Is content relevant?
- Relevant to our reason for being
- Relevant to the reason people have come to the site?
- Will users identify with it and encourage them or convince to take action like join, share, buy or download

Is content appropriate?
- Is it consistent with the message and can be placed anywhere in the site
- Is it consistent in terms of theme and tone of voice.
- Is the style appropriate for both business and the audience. Is it strict? Is it actual? Is it Formal or strict? Is it truthful.

Is content useful?
- Is it useful, valuable or meaningful to the people consuming it.
- Is it provides a happy and positive message.
- Is it going to be about business or them?

Content strategy Starts with identifying content requirements,
- Who will create the content?
- Who will edit or approve it or publish it?
- Who will manage and update it?
- Will people think its valuable and useful?
- How will they find all of this content?
- What are different kind of content?
- How does the content fit in our established IA?
- How will we display Text, Image, Audio, Video?
- Form Factor > Screen Size > Is it mobile or Desktop?

"IA must be User Centered its purpose, strategy, form & function should all revolve around user Expectation"

ORGANIZING SYSTEMS(CONTENT CLASSIFICATION)

ORGANIZATION SYSTEMS(ALPHABETICAL, CHRONOLOGICAL, GEOGRAPHICAL, MOST POPULAR, PROCESS ORDER AND ETC)

1. **Alphabetical:** When users need to find something fast. This includes definitions, List of country, List of products, List of Books
2. **Chronological:** When time based content like most recent to oldest. Train, Bus, Flight timings.
3. **Geographical:** When content is specifically related to a physical place (country, city, layout)
4. **Most Popular:** Great for internet based browsing rather than content that what users need.
5. **Process Order:** When content represents a process organize based on the order of action. Like purchasing a product online - Add to cart > Select billing address > Select delivery method > Select payment method > Make payment > Order Confirmation.

IA AND SITE MAP

Information Architecture is concept where you organize, labeling, prioritizing and linking content. And site map is visual proof which shows the navigation, content and relationship between pages.

CATEGORIZATION AND LABELS

We should address two things,
Content Labelling and taxonomy
File(Html) naming and taxonomy

CONTENT LABELLING

Users have pre-existing mental model of how the site works. how content is organized & what things will be called. Good labeling helps people quickly & accurately predict what they'll get before they click or tap. The more descriptive the label, & the close it is to what the users would call it, the higher chance they'll interact with it. On every screen the user has to review & compare what's available to them & decide which one is the right one. It happens in seconds and if the content labeling is wrong it causes fatigue and frustration which makes user to leave the site.

Clients will often use the industry or company terminology, acronyms or jargon because it's natural to them they have worked in the specific industry or company. Always ask clients Is it what your customers would call it? or customer would call or what action they actually take when they click this button? while labeling the choose call-to-action button. Use clarity, descriptive words and phrases. Category labels should be distinct, descriptive and should not overlap other categories. And make sure the organizational scheme makes sense to users.
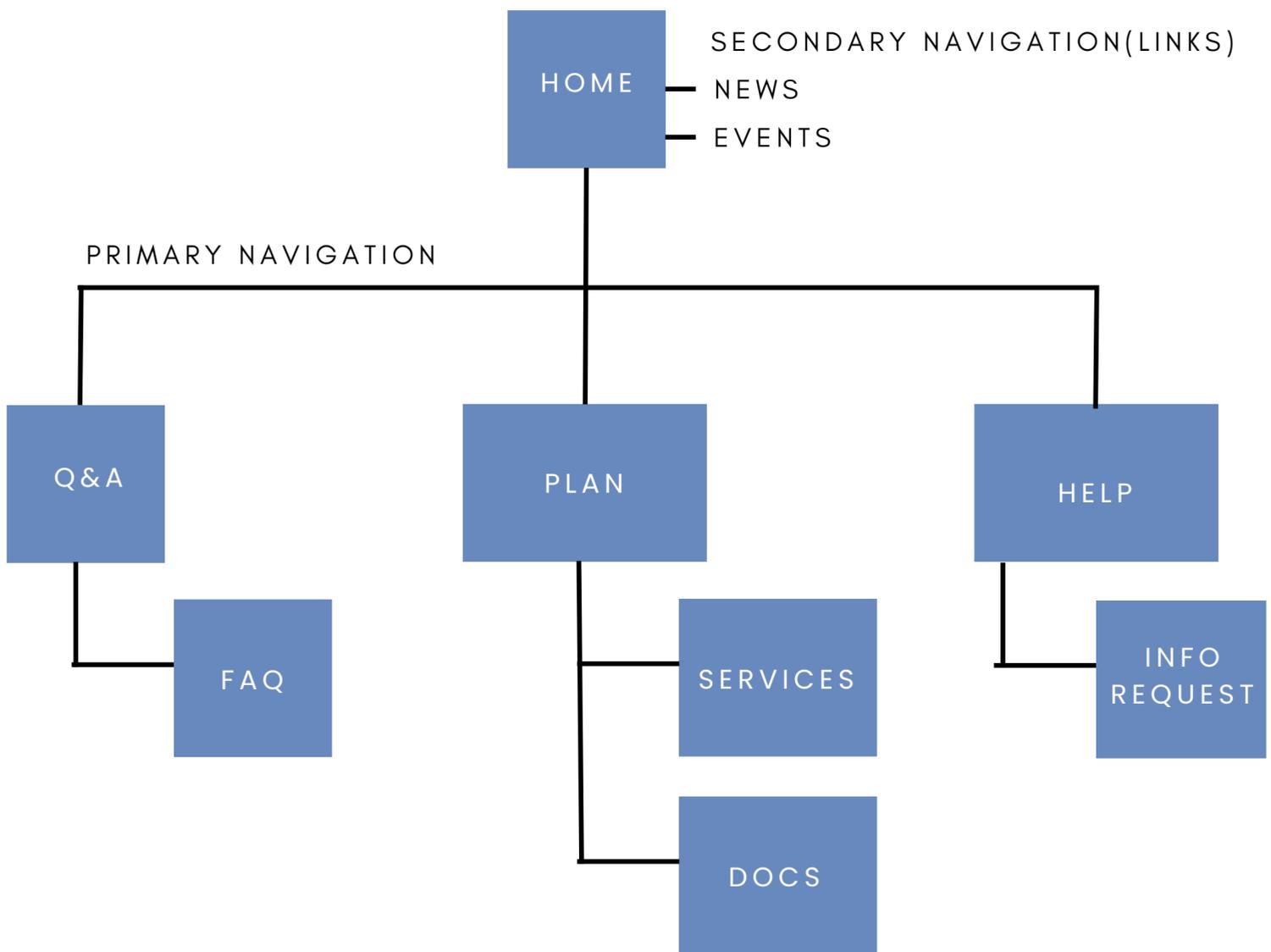
FILE NAMING

"File names should match IA category labels."

Consistency between your IA and your file structure gives you a map for everything goes and what is called. File and directory naming should follow the same scheme you've set for category naming. The filename should match the categories, sub categories and labels present in IA.

PRIORITIZING CONTENT

IA SPECIFICATION - PRIORITY

CATEGORY	CLIENT RANK	USER RANK
Event Information	1	5
FAQ	2	1
Company News	3	4
Plan > Services	4	2
Info Request	5	3

IA SPECIFICATION - MODEL

INFORMATION ARCHITECTURE MODEL FOR SITES AND WEB APPLICATIONS

For sites, The IA drives navigation flow and shows the depth and breadth of the IA. (Ex: News Sites)
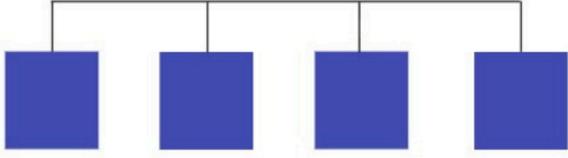
For Web Applications, Task Flow drive navigation flow and expose main sections and task entry points. (Dashboard to track the activity of Status of Parcel Delivery for a Delivery service)

Shopping Sites have both Navigation and Task Flows (Amazon, Flipkart)

3) IA Models and Navigation Design

TYPES OF TAXONOMY

Flat Taxonomy

Hierarchical Taxonomy
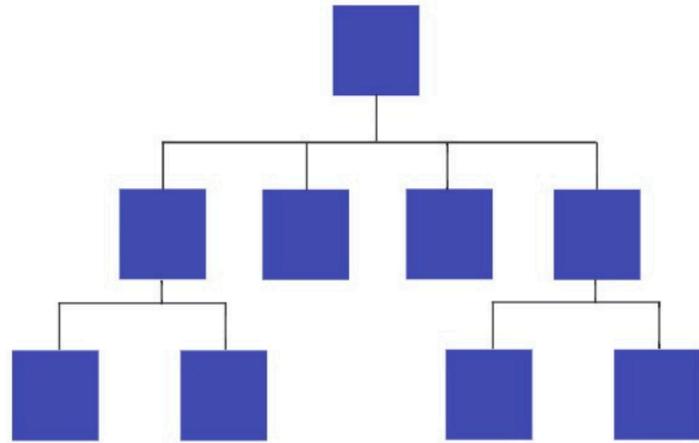
Network Taxonomy
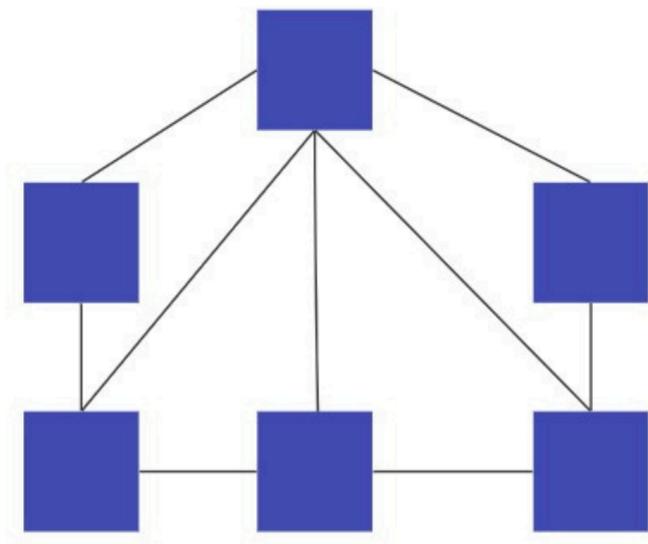
Faceted Taxonomy
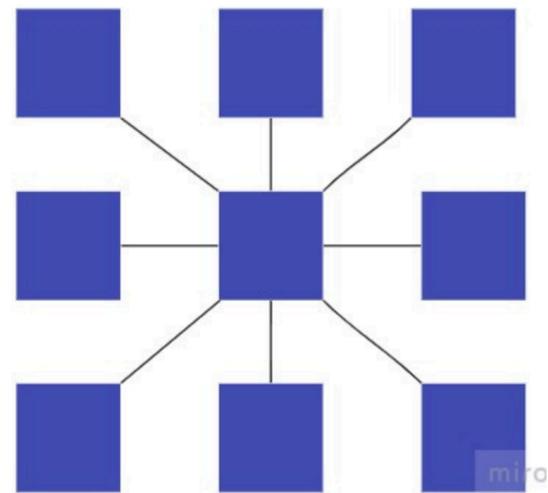
IA MODELS

Just imagine you are placed inside a trunk of a car and dropped in an unfamiliar place in a city which you do not know. You will ask the questions,

- Where am I?
- How did I get here?
- What can I do here?
- Where do I go from here?

The IA model used in digital like apps and website determines the navigational models which users rely on where they are or how to get there. So choosing right IA model is all about creating reliable wayfinding.

FIVE GENERAL IA MODELS USED IN WEBSITE AND APPS.

1. Hierarchical Tree
2. Nested Lists
3. Hub and Spoke Model
4. Bento Box
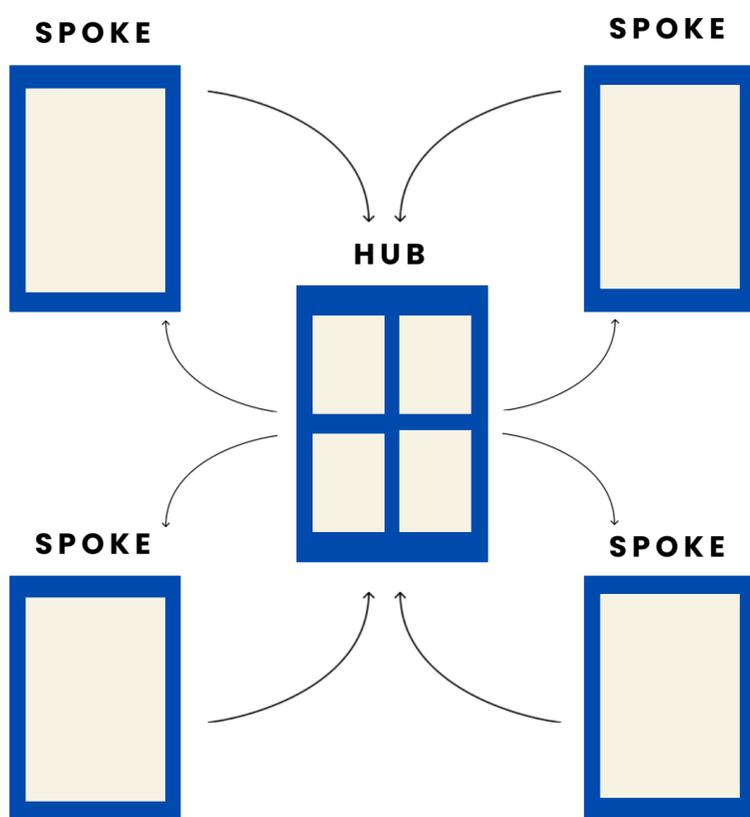5. Filtered View

HIERARCHIAL TREE
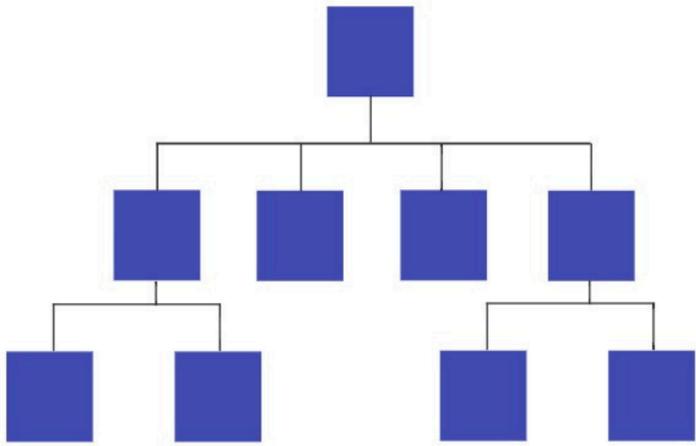
- Standard for content heavy websites.
- Provides multiple routes for users to explore
- Can become link-heavy hard to accommodate on smaller screens.

NESTED LIST

LIST

| BOOKS > |
| CLOTHES |
| GROCERY |
| ELECTRONICS |
| APPLIANCES |

SUB-LIST

| ACTION |
| ARTS, FILM |
| BIOGRAPHIES |
| COMICS |
| DESIGN |

NESTED-LIST

| GRPAHIC |
| UX DESIGN |
| UI DESIGN |
| VISUAL DESIGN |
| CODING |

CONTENT

UX DESIGN
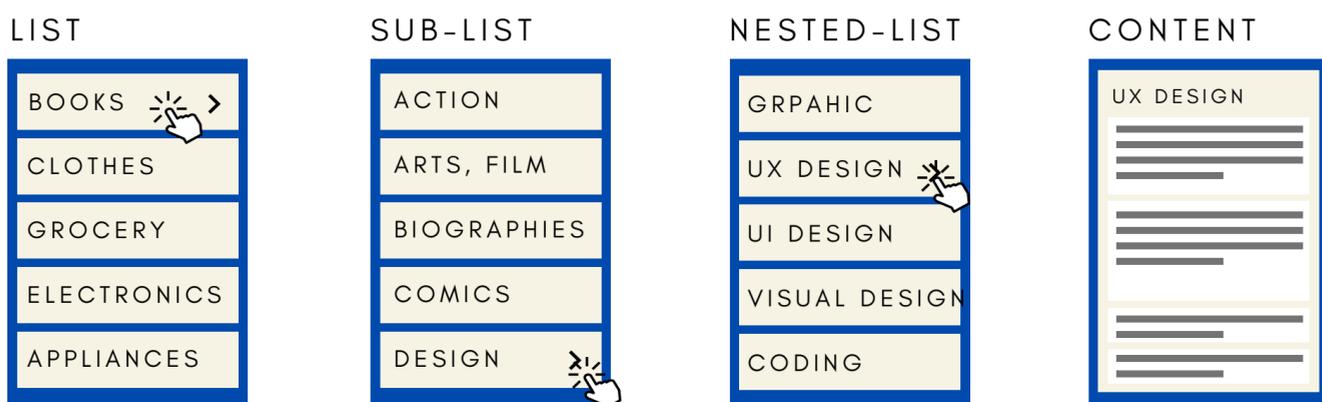
- Users tap on swipe to reveal additional menus
- Helps people focus on content within individual sections
- Great for small screens but difficult to browse laterally

HUB AND SPOKE MODEL

SPOKE

SPOKE

HUB

SPOKE

SPOKE

- Central screen(hub) acts as Launchpad
- Links point outward to other sections, each separated from the others.
- Eliminates the need for global nav on each screen.
- Best for task based sites & apps.

BENTO BOX

Menu

Videos

Live Track App

Dashboard

Statistics

Settings
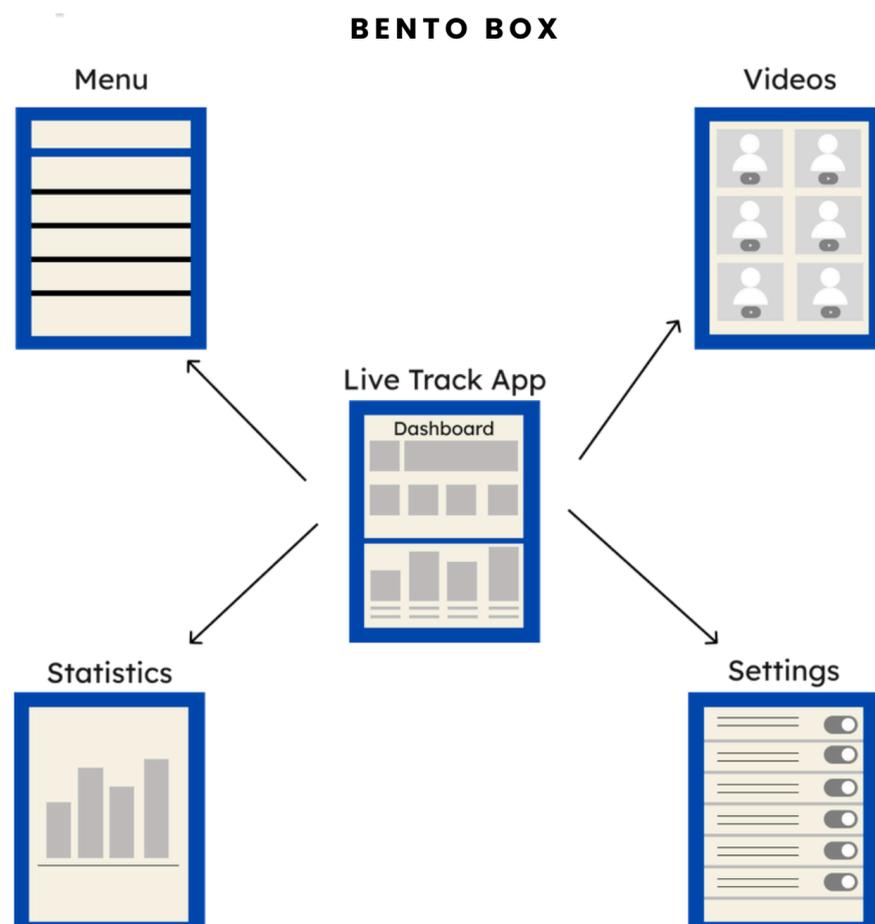
- Dashboard style App; pulls in dynamic components and information
- Most interactions occur in the content of a single multi purpose screen
- Useful when users need data aggregated from multiple sources.

Filtered View

Albums

Now Playing

Music App

Artists

Songs
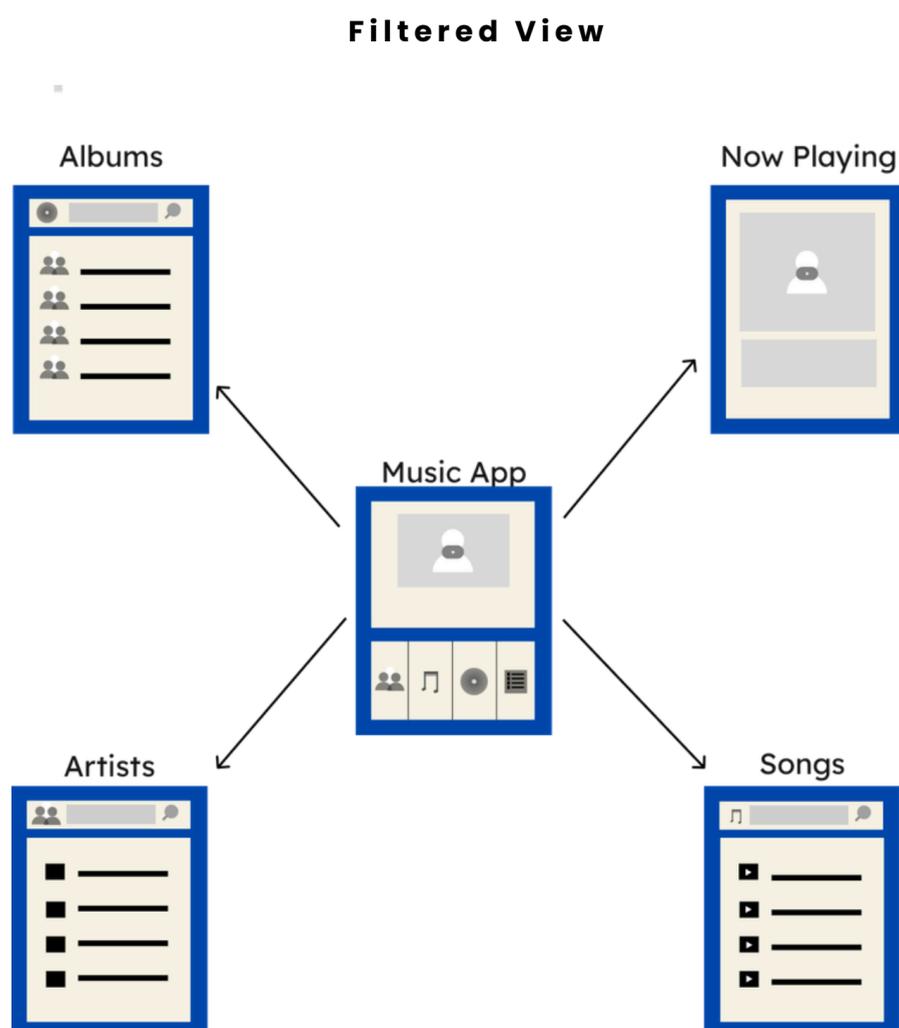
- Filtered View systems deal with a single data set.
- Information can be explored from multiple views.
- Variety of user controlled views & sorting options.

NAVIGATION DESIGN

The user expectation to find the information and the outcome of prediction is based on,

- Where am I?
- How did I get here?
- What can I do here?
- Where do I go from here?

This increases the information scent and it helps in validating the navigation approach during the user journey. A user always find information as expected based on what they see first and how much useful its for them and likely to take the path of the journey. Next, users will compare and predict the outcome based on the expectation to happen.

NAVIGATION TYPES

Primary Navigation - the most important content the users want.

Secondary or Local Navigation - the content that does not serve the primary goal but interests the User.

Importance Is related and specific to each individual site and site audience. For Ex: For complex products or service offering, FAQ might be the first place people go. So let have FAQ in Primary Nav Menu. And importance changes according to what people need most and what organization needs to communicate.

Global Navigation - appears on every page of website and serves two primary function. First, It allows users to switch between top-level categories easily from any location. Second, Users who do not enter through homepage can quickly get a sense of what's available on the website.

NAVIGATION BASED ON USER TYPES AND KEY NAVIGATION TO THE PATHS

Based on user types like for ex: admin, super users, customer and contractor the navigation changes. The nav menu changes and may be displayed differently.

How many user levels exist? Based on that we need to design the navigation levels separately. Focus on the context of use and differentiate the content, based on which user logged has into the system.

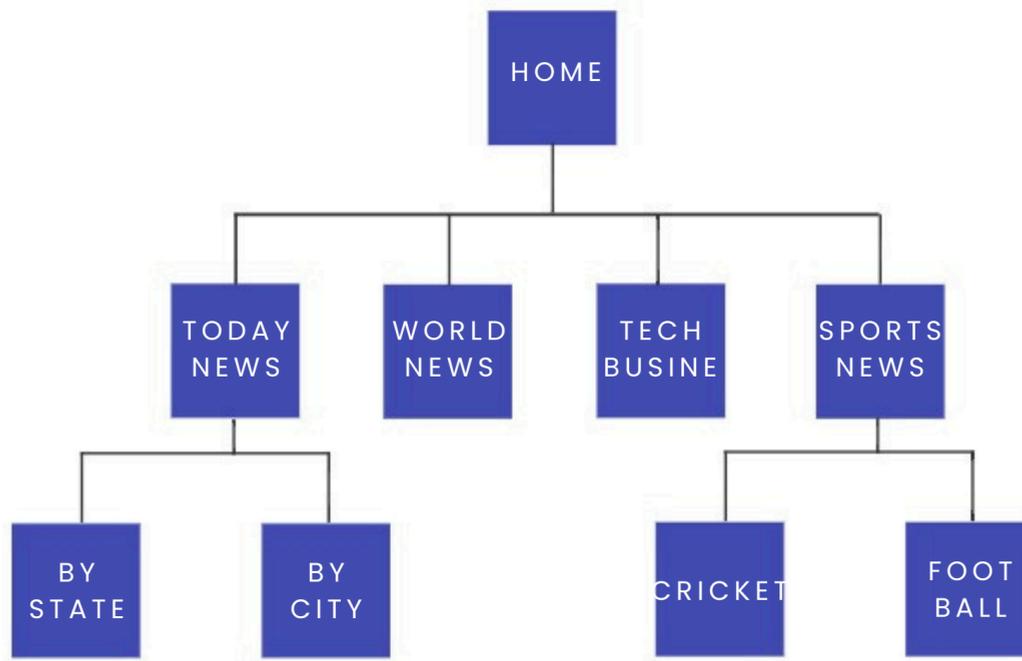**Key Navigation paths** should be designed identifying valuable outcomes,
- What value proposition?
- Is it clear people should login to access specific information.
- What users want to happen or What business or you want to happen.
- How important is the path?
- Which path the user takes often?
- Which should path should he take?
- From home page can user reach the goal? or
- Is the path Very Obvious and Visible?
- Does the path answer the questions "Where am I?" "How did I get here? "What can I do here?" "Where do I go from here?".
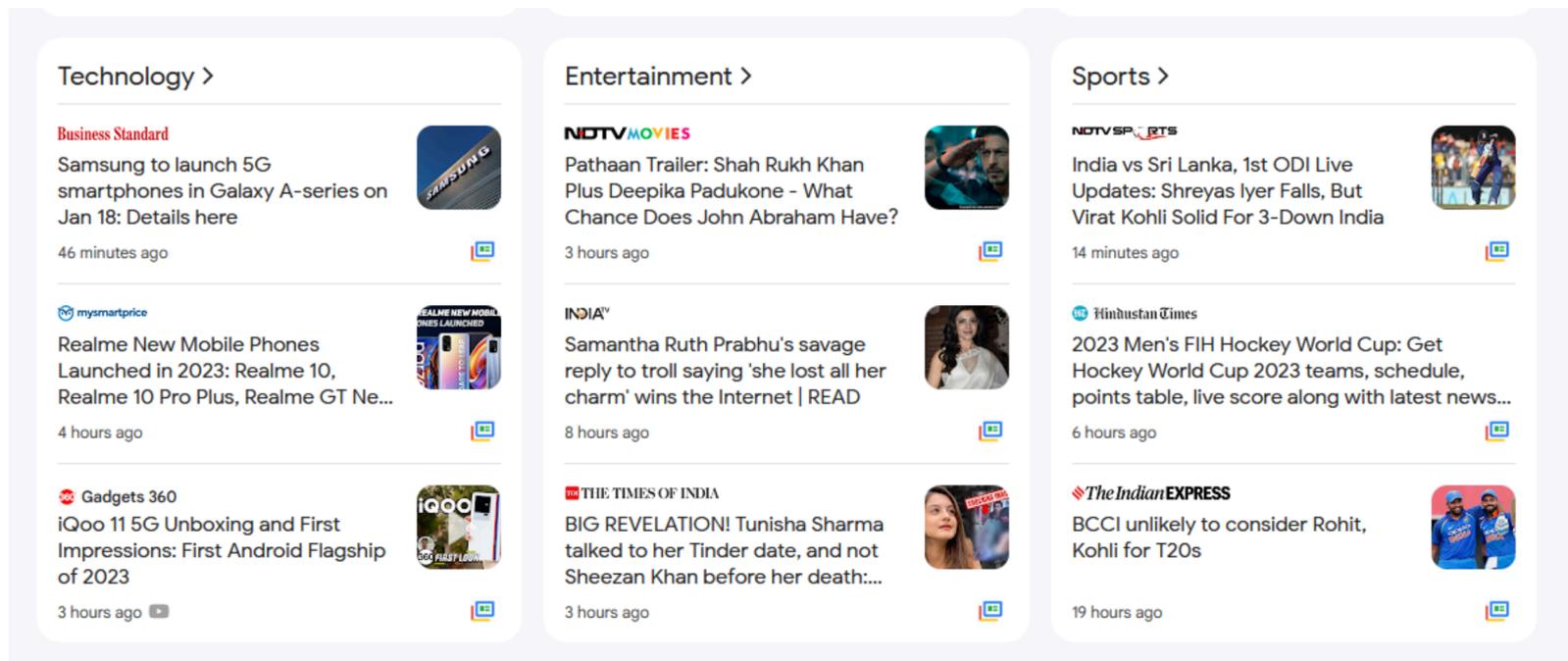- Re-prioritize the Nav and expose the path in UI Design.

Single and Multiple Hierarchies Nav: News site (content heavy site)

- Hierarchy Navigation systems are mostly modal.(Step-by-Step).
- Hierarchy menus are designed based on the Hierarchical model.

```
                        HOME

     TODAY      WORLD      TECH      SPORTS
     NEWS       NEWS       BUSINE    NEWS

   BY            BY                CRICKET    FOOT
   STATE         CITY                         BALL
```

Single - Level Hierarchies: Out and back Navigation. No "Skip" Level navigation.

Technology >	Entertainment >	Sports >
Business Standard Samsung to launch 5G smartphones in Galaxy A-series on Jan 18: Details here 46 minutes ago	**NDTV MOVIES** Pathaan Trailer: Shah Rukh Khan Plus Deepika Padukone - What Chance Does John Abraham Have? 3 hours ago	**NDTV SPORTS** India vs Sri Lanka, 1st ODI Live Updates: Shreyas Iyer Falls, But Virat Kohli Solid For 3-Down India 14 minutes ago
mysmartprice Realme New Mobile Phones Launched in 2023: Realme 10, Realme 10 Pro Plus, Realme GT Ne... 4 hours ago	**INDIA TV** Samantha Ruth Prabhu's savage reply to troll saying 'she lost all her charm' wins the Internet	READ 8 hours ago	**Hindustan Times** 2023 Men's FIH Hockey World Cup: Get Hockey World Cup 2023 teams, schedule, points table, live score along with latest news... 6 hours ago
Gadgets 360 iQoo 11 5G Unboxing and First Impressions: First Android Flagship of 2023 3 hours ago	**THE TIMES OF INDIA** BIG REVELATION! Tunisha Sharma talked to her Tinder date, and not Sheezan Khan before her death:... 3 hours ago	**The Indian EXPRESS** BCCI unlikely to consider Rohit, Kohli for T20s 19 hours ago

Multiple-Level Hierarchies: The second level links or depth of Hierarchy can be accessed from a single page and skip to lower level of the hierarchy.

Windows	Microsoft 365	Office	Applications
Windows	Microsoft 365	Office 365	Word
Windows 365	Microsoft 365 for home	Office for students & teachers	Excel
Get Windows 10	Microsoft 365 for business	Office for schools	PowerPoint
Apps	Microsoft 365 for Mac	Office for Mobile	Outlook
Windows for business	Microsoft 365 support	Office Templates	Access
Windows insider programme		Office support	Exchange
Games for Windows			OneDrive for Business
Internet Explorer			Project
Microsoft Edge			SharePoint
			Skype for Business
			Microsoft Teams
			Visio

Persistent Navigation: Notebook Tabs, Button Bars, List Menus with/without tree Views, Cascading menus.

- Random, non-modal access (can be clicked anywhere no step by step)
- Always visible/available to the user.
- Can be used when there are few choices or when users need to frequently switch between the choices.
- Need to be highlighted to show the prominence of the nav items.

Notebook Tabs:
- Random, non-modal access (can be clicked anywhere no step by step)
- Always visible/available to the user.
- Can be used when there are few choices or when users need to frequently switch between the choices and when design space is limited.
- Need to be highlighted to show the prominence of the nav items.

Button Bars:
- Random, non-modal access (can be clicked anywhere no step by step)
- Can be used when design space is limited.
- Users are presented with closely associated tasks.

List Menu with/without tree view:
- Stays in the same order and number of menu items can be many.
- Random access possible.
- Both non-modal and modal.
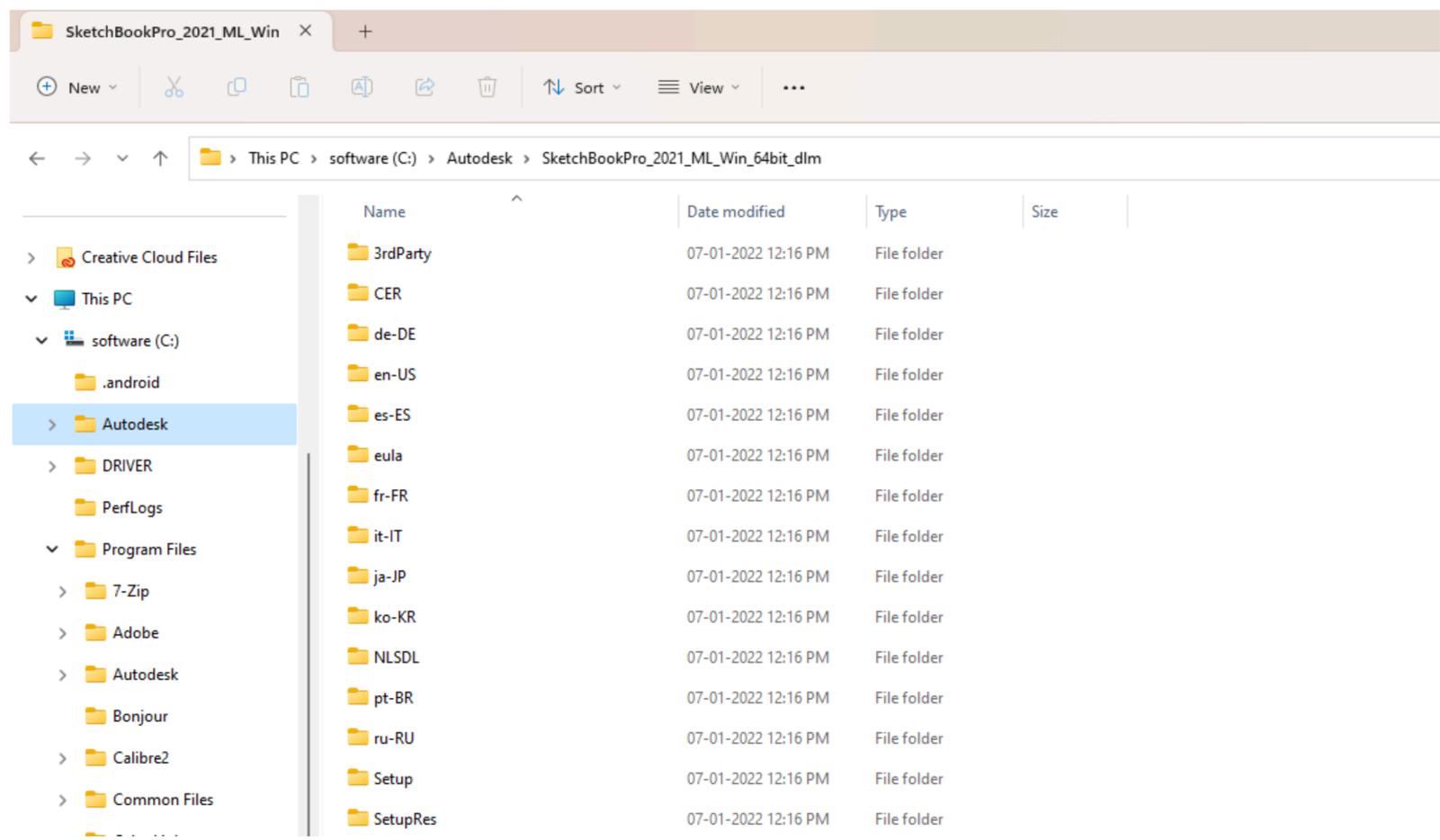
Cascading Menus:
- Can be used to reduce the space of page or window space
- Reduce it two level of navigation.
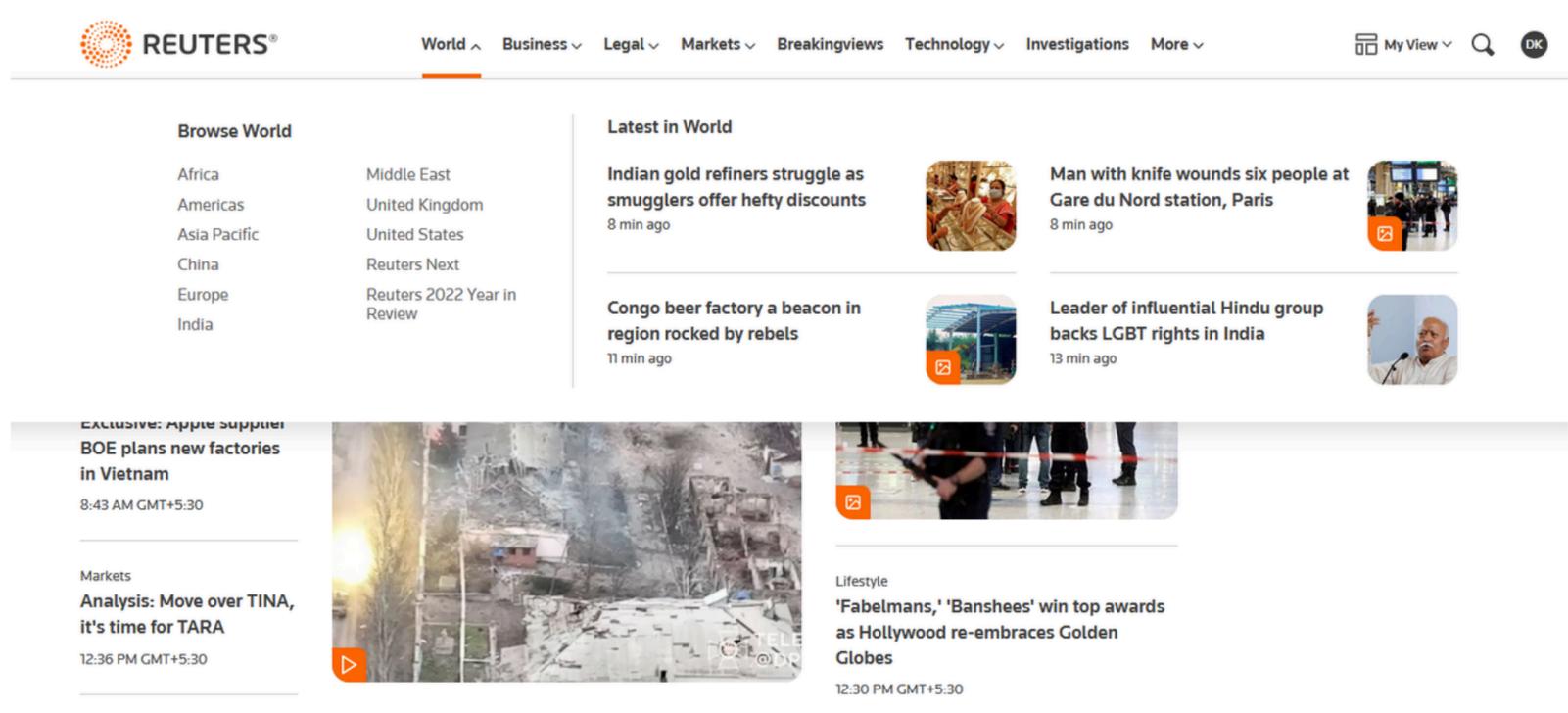
Sequential Navigation, Wizard
- Used during Process level task (orders, checkout).
- Both non-modal and modal.
- Entry level errors are reduced and makes navigation path explicit
- Need to break the wizard into logical steps.
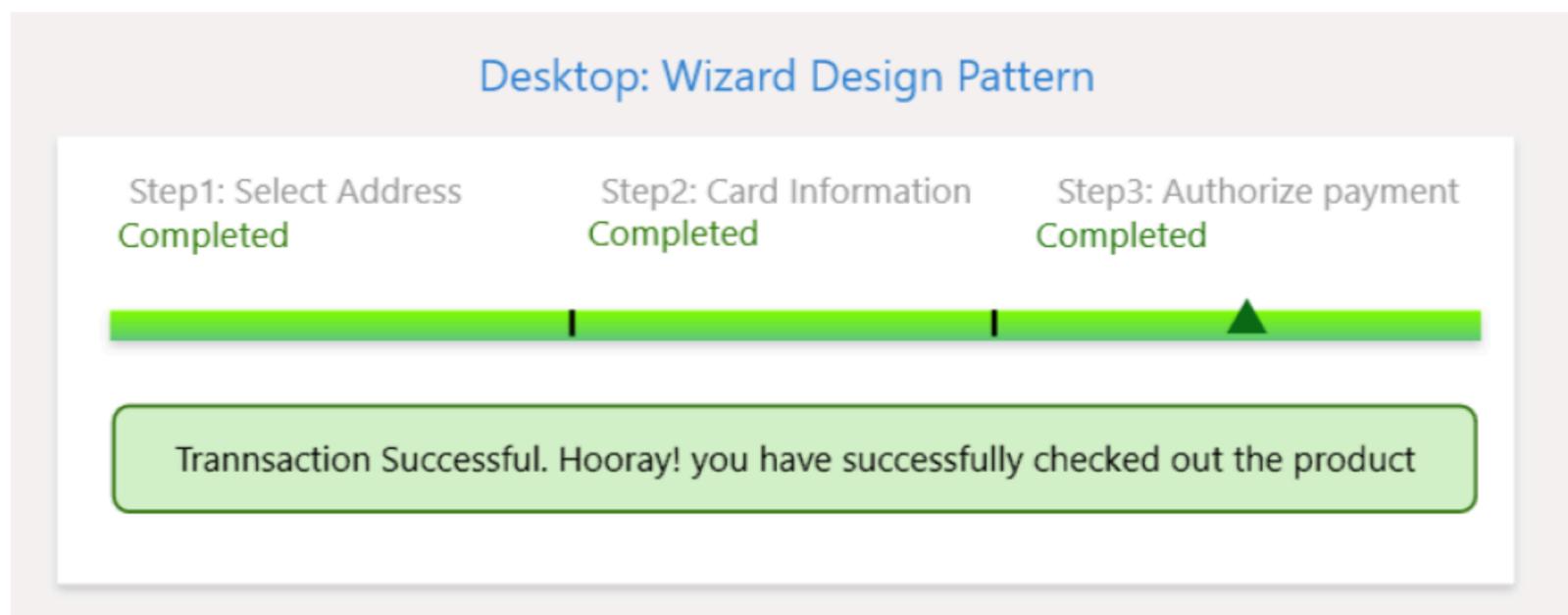
Search System
- Provide direct access to results based on the search criteria.
- Speed access to content when combined with filter.
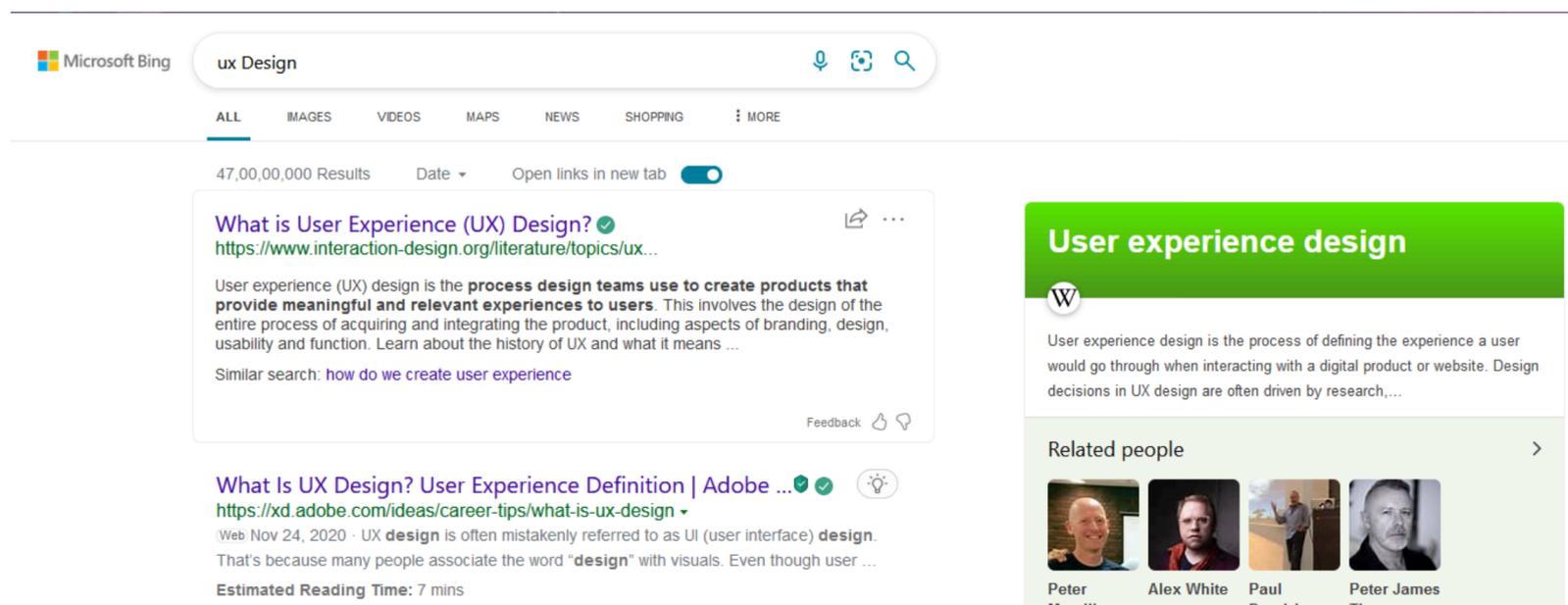
Supplemental Navigation System
- Table of contents(Used for Static content and for constant Viewing)
- Index Pages(To access large body of information - Like A-to-Z definition)
- Breadcrumbs(Used to mimic static or dynamic navigation path)
- Quick Links(Other than main links)
- Windows and Browsers(Modal window to perform secondary task)

4) Tree Testing and Card Sorting

TREE TESTING

- Similar to card sorting users are asked to sort a pile of content cards into pre-defined category "buckets"
- When user place the new cards in buckets, then those buckets should perform well in the IA.
- Closed Card sorting is used to find how users may place a particular item of content. But, Tree testing is used how users find information in a website or System because people start with a task, not a document.
- It also measures IA effectiveness against what they're trying to accomplish, instead of what content is available

HOW TO MODEL THE SITE STRUCTURE ON INDEX CARDS

- Create an index card for each level of categorization. This is called "Tree" The top categories are the main limbs of the tree. The sub-category and items are the branches.

The first card, for example would contain 7 categories

Now the second and subsequent card should contain sub-categories for each of the **Top level category**

Top Level Category

Clothing
Electronics
Gaming
Music
Sports
Toys and Hobbies

Sub-Category for Sports

Cricket
Football
Badminton
Table Tennis
Baseball
Hockey

Create additional sub-categories, until all the category, sub category & item in your proposed IA

Sub-Category for cricket

Cricket Bats
Cricket Balls
Throwball
Stumps
Hand Gear
Leg Gear
Body Gear
Shoes

And so on...

- Participants are given "find it" scenarios. EX: "Your boy asks for a new cricket bat" & show them the top-level category index card.
- Participants chooses a topic from the cards leading to another card with subtopics and moving down the tree until they find their answer.
- They can go back and up if it does not satisfy them. If they don't find what they are looking for they can give up and move to next task.
- Record the participants path they take and find if they choose correct topic or hesitated or backtracked. And you you can find which parts of the tree makes sense to the users and validate how IA performs.

CARD SORTING

- Card sorting is used to find the mental model about groupings and categories the users or the participant has in his mind. It can be used to layout navigation or group the content for each screen or pages and the labels for each category. There are three different types of card sorting,

- Closed card sorting - The labels or the names of each category is specified in cards and the user has to group the cards under each of the main category based on their mental model.

- Open Card sorting - Here the participant will be given blank cards. The user or the participant has to write labels for each category and group the sub-category under each main category based on their mental model.

- Reverse Card Sorting - Once the site is published or its live and users are facing issues because of the navigation or content grouping, a test can be conducted with users by giving the cards to them and arrange or group the cards for the live site and make changes to the site.

5) IA Principles

- The content you or your client chooses to be three things, relevant, appropriate and useful.

- Identify content and socialize IA early.

- While designing IA, consider context, content and must be user-centered

- The external factors that influence how people interact with your content, navigation and IA structure

- File names matches the IA Category labels so everyone has a shared understanding.

- People start with a task in website or App, not a document.

- Make the paths to value. Paths are obvious and clear in the navigation

- Talk to developers before wireframing. Share sketches to test the feasibility, interactions and functionality.

- Have real content in the wireframe.

- Need to include error and feedback in the wireframe about what happened, why it happened and what to do about it.

Chapter-6. Interaction Design

1) What is interaction design?

INTERACTION DESIGN

"INTERACTION DESIGN IS A FIELD WHICH TEACHES HOW HUMANS INTERACT WITH THE WORLD AND THE SURROUNDINGS AROUND THEM AND HOW TO DESIGN INTERACTIVE PRODUCTS."

"INTERACTION DESIGN IN DIGITAL WORLD IS HOW USERS INTERACT WITH TECHNOLOGY LIKE SOFTWARE AND HARDWARE LIKE, MOBILE, DESKTOP, KIOSK, WASHING MACHINE OR APPLIANCES WITH TOUCH SCREEN OR BUTTONS TO PERFORM A TASK."

"USERS USE MOUSE(CLICK) OR FINGERS(TAP) TO INTERACT WITH THE TOUCH SCREEN OR BUTTONS TO PERFORM INTENDED ACTION AND HAVE EXPECTATION HOW SOMETHING WILL WORK(MENTAL MODEL) OR SOMETHING TO WORK (CONCEPTUAL MODEL - UX DESIGNER MORE OFTEN USE IT TO CREATE EXPERIENCES BASED ON MENTAL MODEL), WHILE EMOTIONS(HAPPY, ANGER, FRUSTRATION, SAD) AND COGNITION(THINK, FEEL, MEMORY, LEARNING, WRITING, MOTOR FUNCTION) PLAYS A IMPORTANT ROLE DURING INTERACTION WITH THE PRODUCTS."

"INTERACTION DESIGN TEACHES HOW HUMANS INTERACT USING KNOWLEDGE IN WORLD AND KNOWLEDGE IN THE MIND AND FIND THE BEHAVIOUR OF THE PEOPLE"

Designers need to:
- Envision how real-life users will interact with their UIs
- Create models to plan interactions in advance
- Revise designs based on user feedback.
- The goal is to create interactions that are maximally user-friendly

5 PILLARS OF INTERACTION DESIGN

- **Goal-driven Design**, the goals of interaction design becomes very people-centric, especially the target user. We need to use fundamental tactics like Personas, User Scenarios and Experience Map Note: Experience Map is Different from Customer Journey Map(CJM). Experience Map shows the journey every customer goes through when interacting with brand at multiple channels. CJM focuses on the experience the customer gets when interacting with one specific product/service.
- **Usability**, A system's usability should be effortless. The less attention the user pays to figuring out how to use the system, the more they can accomplish the task at hand.
- **Affordances & Signifiers**, the concept of **affordances** is that a function should speak for itself, and suggest its own use (i.e., a road affords walking). **Signifiers** are what hint at the affordance (i.e., the road's flat surface signals you to walk with your feet). Without signifiers, users won't be able to perceive the affordance. The play button on a video invites you to watch it, whereas a video with no play button might be mistaken for a static photograph.
- **Learnability**, In an ideal world, a user would remember every function after only a single use, but we do not live in idealism. The reality is that familiarity and intuition must be consciously designed into the interface. Successful interaction design boils down this complexity into the most comprehensible manner through consistency and predictability. Learnability encourages people to use products.

- **Feedback & Response Time,**
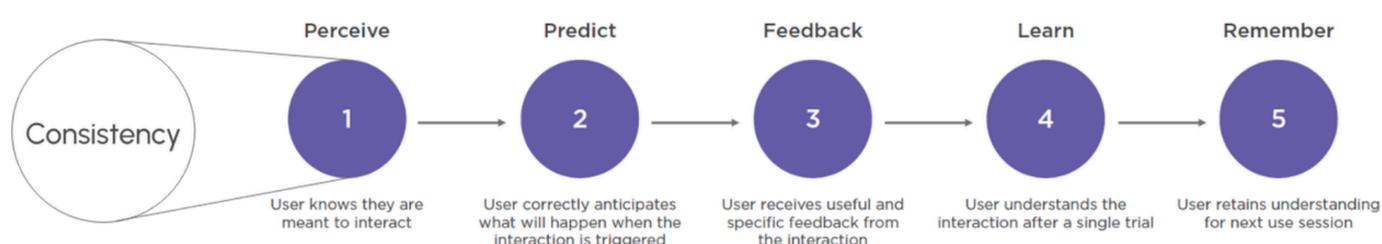
2) How people interact in real world

## INTERACTION IN REAL WORLD: KNOWLEDGE IN THE WORLD AND HEAD

The Knowledge in the world is how we perceive and interact with the objects present in the world around us. The picture in the left below shows chair, table, kettle, door handle and water jug / pitcher, which has perceived affordance's(what actions are possible) and signifier's(where the action takes place) to help us interact with the objects. This works at subconscious level which is called Visceral Processing inside our human brain (Human cognition and emotion).

Knowledge in the head is memory. The skills we learn and practice are stored in our memory. This too works at subconscious level which is called Behavioral level processing. Once we learn and practice for more number of hours it's stored in our memory and we do tasks effortlessly.

APPLYING THE ABOVE PRINCIPLES TO APPS AND WEB APPLICATION

A good design is about discoverability, understanding and having a good conceptual model(something to work). Users spend lot of time with the objects around the world and have a mental model(something will work) in their mind. The expectation the user's have while interacting with a product is based on the knowledge they have. Its important that we design the conceptual model based on this principle.

Knowledge in the world and head   Translate the Knowledge to web and mobile apps
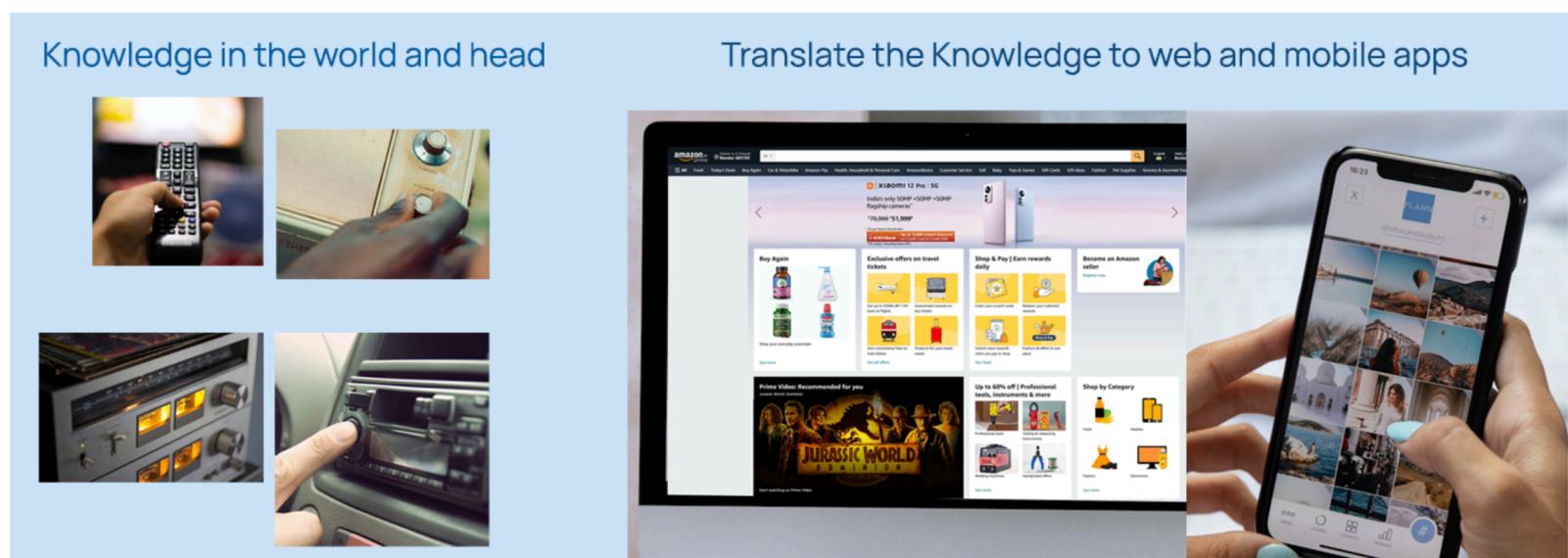
PEOPLE USE A PRODUCT AND EXPECT HOW IT SHOULD WORK.

Based on past experience and mental model, people while interacting with a product have expectation how something will work. Discoverability, based on affordances and signifiers like buttons, labels, pictures and links people start interacting using click or swipe gestures to complete the task. Understanding, what does the settings mean?, how to use it?, what each functionalities mean? and how to accomplish the task?

When the expectations do not match users get frustrated and they are unlikely to visit or use the product. Users go elsewhere like other website or apps to get the task completed. User's who try to use conscious (Reflective Processing) effort to complete a task use lot of mental resources which make them feel uncomfortable in real world by comparing what has happened and with previous experience or

reasoning the outcome. Knowledge in the world and head creates a behavior pattern in users. When user confronts a task to be completed, if it is done without much mental effort(subconsciously), the task is easy to accomplish.

KNOWLEDGE OF AND KNOWLEDGE HOW

Knowledge of, is declarative knowledge (rules and facts). Like, 'Capital city is Delhi'. 'There are Seven days in a Week'. 'Earth Revolves around Sun'. 'We cross the road using Zebra Crossing'. People use this knowledge to understand what is true and what is not true. And rules are not followed everywhere in the world.

Knowledge how, is procedural knowledge. Learning to play a music instrument, catching a ball when it is thrown at you, answering questions when your skills (be it mathematics, science) is tested with much ease. Procedural knowledge is stored at subconscious Level.

Knowledge in the World, is signifiers, affordances and actions takes that place based on physical constraints. Knowledge in the head, is conceptual model, logical constraints and similarities between what has happened and previous experience. We need both, it's ineffective when one is left out.

3) Human Cognition and Emotion

HUMAN COGINITION (USES MENTAL RESOURCES)

Some of the Human cognition types,

- **Learning**, How does learning occur? In digital space when user uses a product for certain amount of time and is motivated to perform the task with much ease with reduced cognitive load with consistency, ease of discoverability and good amount of understanding how the product works, learning becomes easy for the users and if there is any hindrance during the task learning becomes difficult.

- **Thinking**, How and when people think? When users are given a task to complete using a website or app and people are forced to think or pause during the task and find difficult or unable to complete the task. When you make people think confidence erodes and the website is considered not useful. Ex: What is the meaning of button text?

- **Reasoning**, When do people reason? People have expectations from previous experiences when they perform a task and start comparing the result or outcome with the expectations they have in mind. When the outcome does not matches the expectations, people start reasoning and feel the product does not work as expected.

- **Remembering**, How do people remember things? We cannot think that user will remember the task after the first time. To help the user to remember the task, is to apply consistency in user interface, usage of colors which aids user during the task, placement of UI Elements with proper constraints, mapping and feedback. And also chunking the information(short term memory), display default values(recognition is better than recall) and using progressive disclosure.

- **Problem solving**, How good are people in problem solving in digital products? Generally people are not good at complex problem solving when there is an error or some problem arises during a task. As designers we need to provide appropriate constraint, mapping and feedback in the product to the users, or reverse the errors by providing cues in form of help, how to diagnose and recover from errors or design the UI to avoid errors by providing constraint that can encourage user to solve the problem.

- **Decision making**, How do people decide? When there are more number of choices, decision making becomes difficult. When there are less choices, decision making is easier. The Designers and Product owners should decide which information should user choose to select or how much information or products should be displayed to user to make a decision. Ex: Pricing Table or Vacation suggestions.

- **Attention,** How to get user attention provided on the website or app content or services? The user attention can be focused to the website or app content or service by providing Visual Hierarchy, display the content which is necessary, show enlarged or a specific color on the call-to-action button. Avoid distraction by showing unnecessary pop ups and use wizards in form of progressive disclosure during a complex task.

- **Motor cognition**, The above seven cognition acts on the brain. But motor cognition is the movement of how body reacts as the result of brain cognition(learning, thinking, reasoning, remembering .. ..) triggering the finger in hands perform click, gesture, tap to complete a task. The UI Elements such as call-to-action buttons, form fields, links should be easy to click while performing a task. The Design System should specify appropriate target size for any click, tap and gestures while using fingers or mouse and clearly differentiate primary and secondary actions to avoid errors while performing a task.

EMOTIONS

Human emotions like Happy, Sad, Anger, Frustrated, Anxiety and etc are all are results of the interaction with the products.

Cognition and Emotional processing act in Visceral, Behavioral and Reflective.

Visceral processing, happens at subconscious level and responds quickly making quick decisions whether the situation is good or bad and safe or dangerous. It happens without conscious and control.

Behavioral processing, happens at subconscious level. Its the home of learned skills and acts based on expectations. Playing a sport or playing a music instrument all these happens with expectation based on the outcome that can be positive or negative. The positive and negative outcome brings out the Happiness, Frustration or anxiety within humans.
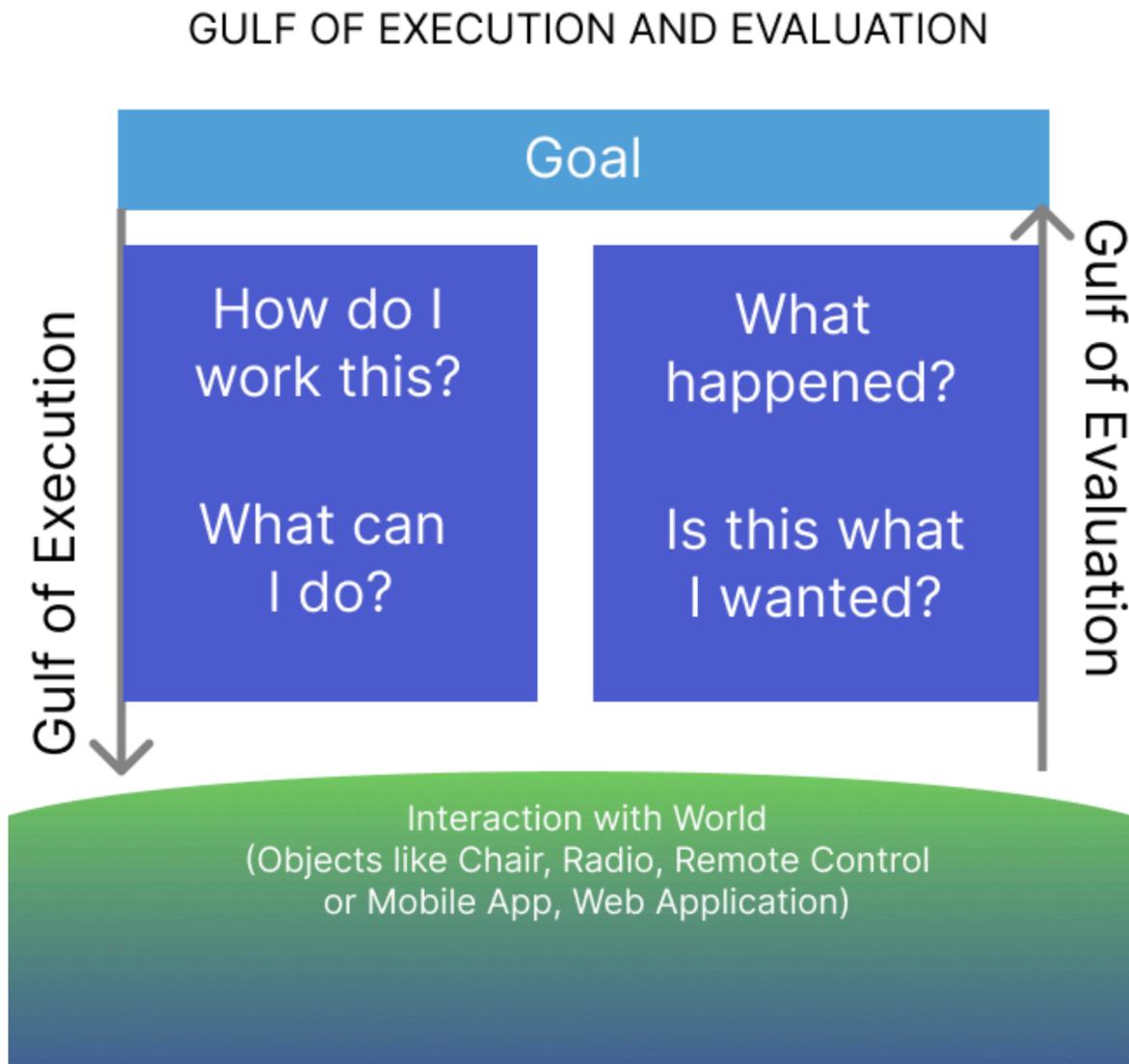
Reflective processing, happens at conscious level. Its where when you start reasoning when learning a new skill so that you try to understand deeply what you have learnt and evaluate the outcome. Reflective processing is where emotions and cognition are so high and relate to each other at the highest point.

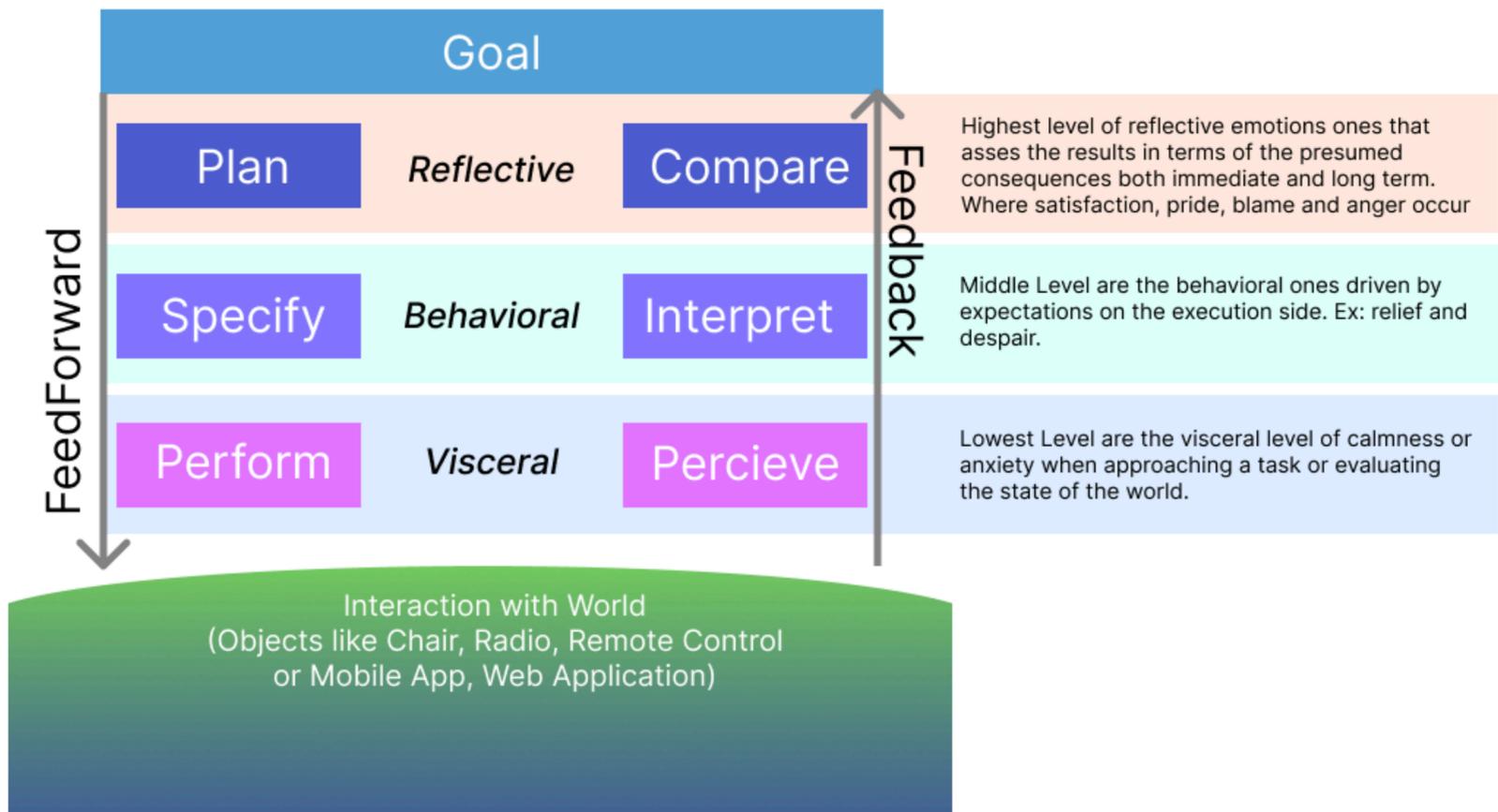Let's see all the three in detail in the next chapter.

4) Three Levels of Processing and Seven Stages of Action

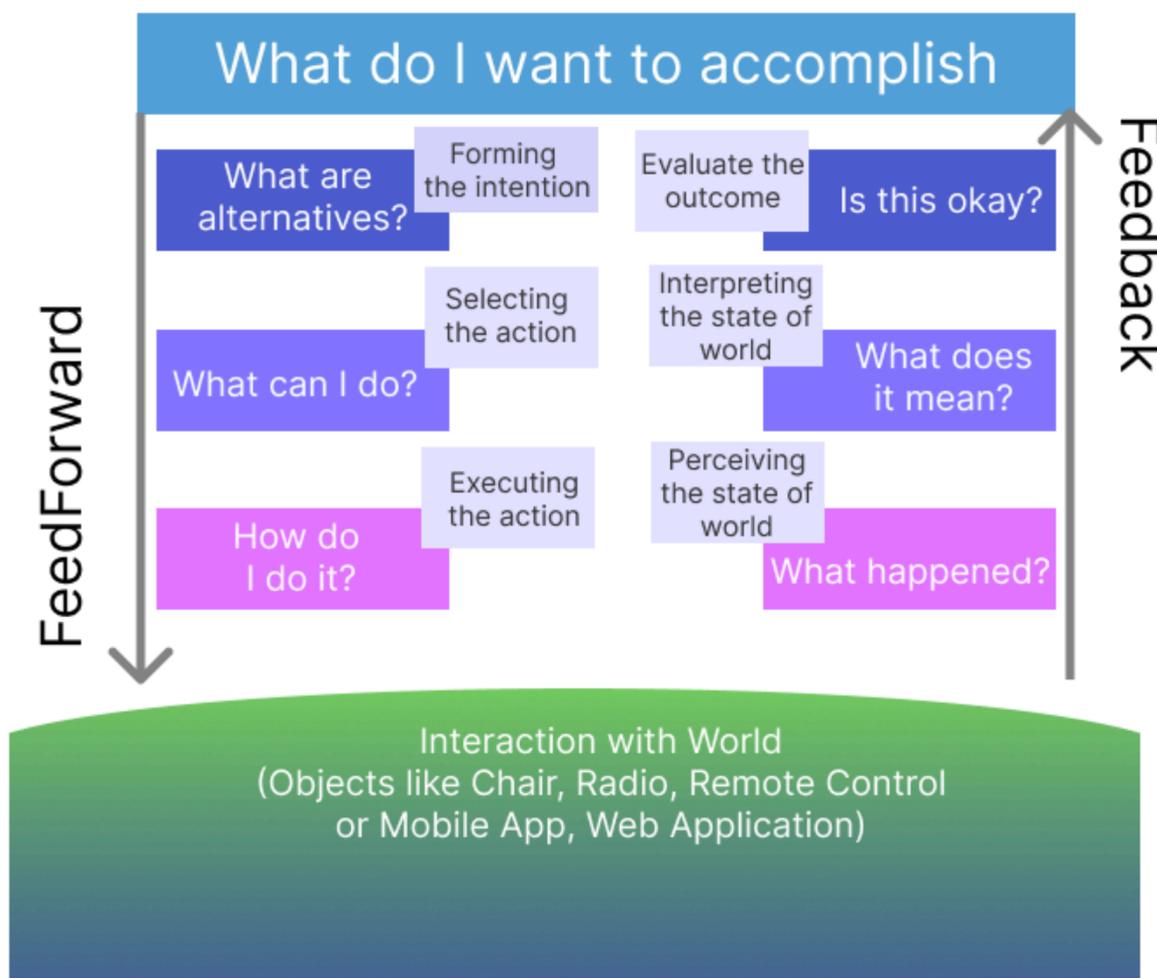Excerpt from the book Donald Norman "The Design of Everyday Things"

How people Execute actions and evaluate the outcome of a digital product. All the four images convey the actions and how users process the information at each stage.

GULF OF EXECUTION AND EVALUATION

Goal

Gulf of Execution

How do I work this?

What can I do?

Gulf of Evaluation

What happened?

Is this what I wanted?

Interaction with World
(Objects like Chair, Radio, Remote Control or Mobile App, Web Application)

THE SEVEN STAGES OF ACTION

Goal(form the goal)

Bridge of Execution

Plan (the action)

Specify (an action sequence)

Perform (the action sequence)

Bridge of Evaluation

Compare(goal outcome)

Interpret(the perception)

Percieve (the state of world)

Interaction with World
(Objects like Chair, Radio, Remote Control or Mobile App, Web Application)

THREE LEVELS OF PROCESSING & THE SEVEN STAGES OF ACTION

Goal

FeedForward				Feedback
	Plan	*Reflective*	Compare	Highest level of reflective emotions ones that asses the results in terms of the presumed consequences both immediate and long term. Where satisfaction, pride, blame and anger occur
	Specify	*Behavioral*	Interpret	Middle Level are the behavioral ones driven by expectations on the execution side. Ex: relief and despair.
	Perform	*Visceral*	Percieve	Lowest Level are the visceral level of calmness or anxiety when approaching a task or evaluating the state of the world.

Interaction with World
(Objects like Chair, Radio, Remote Control
or Mobile App, Web Application)

CHECKLIST OF QUESTIONS PEOPLE THINK WHILE INTERACTING THE PRODUCT & ANSWER AND HENCEFORTH DESIGNER NEED TO PROVIDE INFORMATION TO ANSWER THE QUESTIONS

What do I want to accomplish

FeedForward

Feedback

What are alternatives? — Forming the intention

Evaluate the outcome — Is this okay?

What can I do? — Selecting the action

Interpreting the state of world — What does it mean?

How do I do it? — Executing the action

Perceiving the state of world — What happened?

Interaction with World
(Objects like Chair, Radio, Remote Control
or Mobile App, Web Application)

5) Six Principles of Interaction Design.

SIX PRINCIPLES OF INTERACTION DESIGN.

As a designer when user interacts with any product we need to understand the actions for the questions from user prespective like, What do I want to accomplish?, What are the alternate action sequences?, What action can i do now?, How do I do it? What happened? What does it mean? and Have I accomplished the goal?. The below design principles when applied answer the user's question while designing a product.
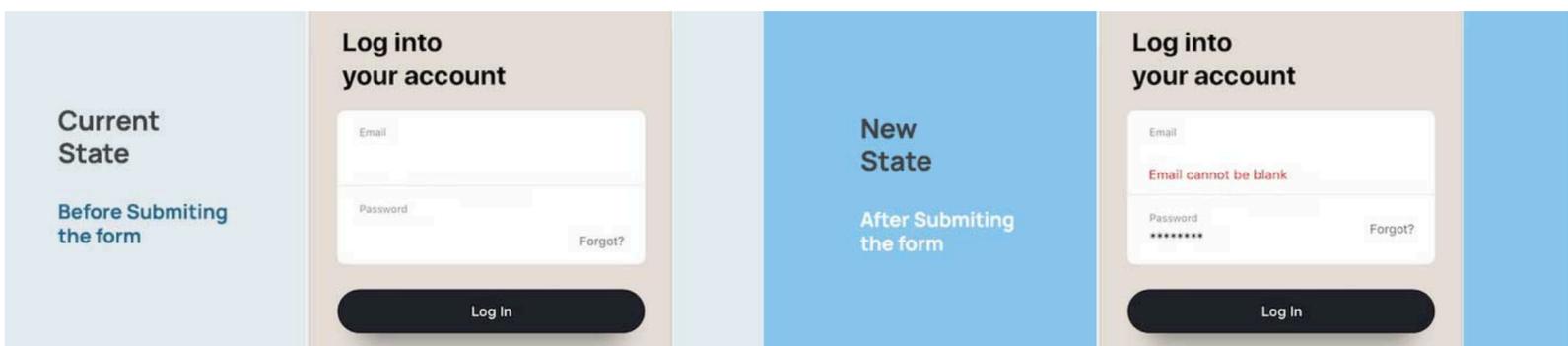
Discoverability
When the user sees a Mobile app or Website can he determine what actions are possible and understand the current state of the app.
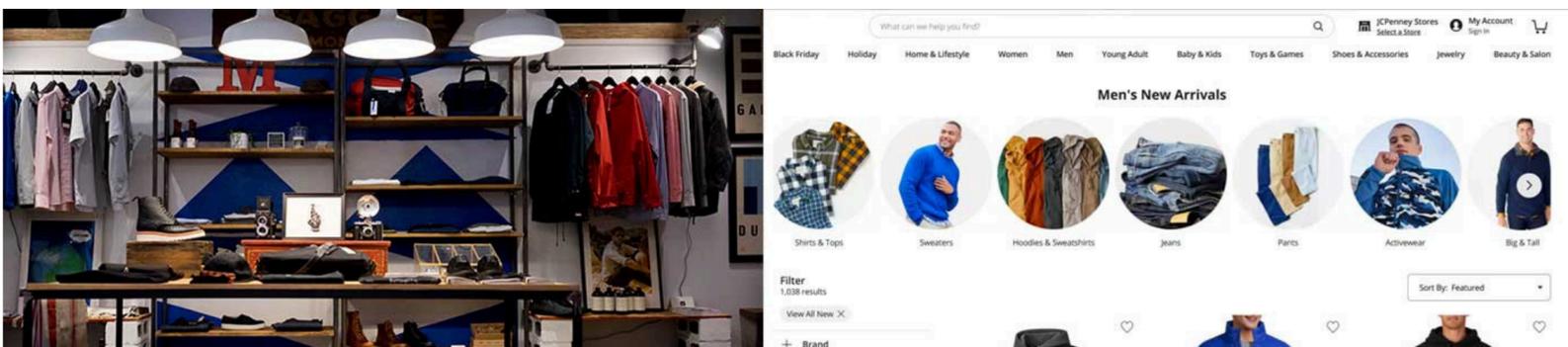
Feedback
Feedback should inform the user about the current state of the app and the new state after executing the action of a task performed by user.

Conceptual Model
All the information needed to create a good conceptual model should be taken care while designing a app leading to discoverability, understanding, feeling of control and evaluate the results based on expectations.

Affordances and Signifiers
Affordances: What are the proper Affordances exist to make desired actions possible within the app?. A button in the app. Signifiers: This ensures discoverability of what to do and where to do. Like label in the button.

Mappings

The relationship between controls and their actions follows the principles of Good mapping with enhanced layout and placing UI elements near intended actions.

Gas Stove

Natural mapping

UI Mapping

Selecting or Removing font
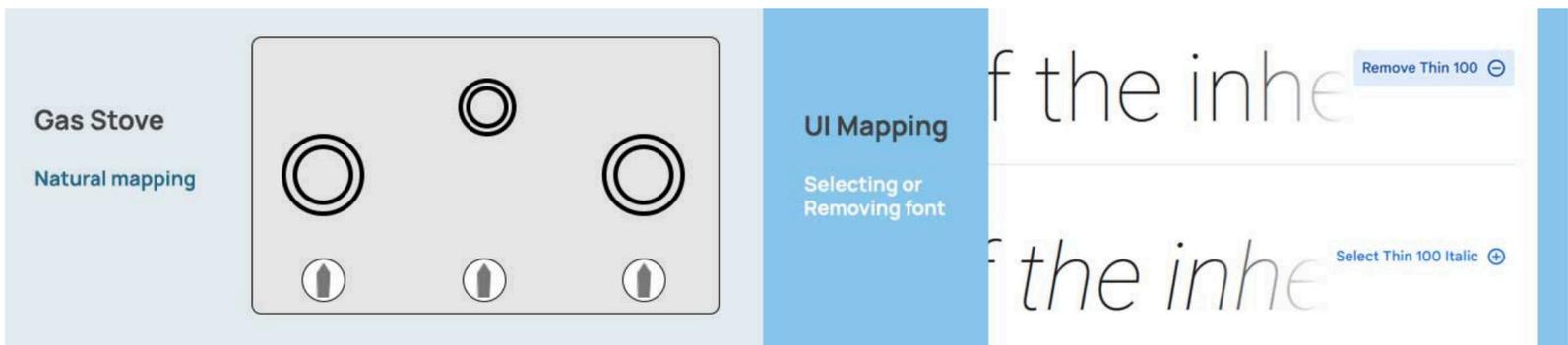
Constraints

Constraints can be physical(projections of screw or rock or chair), logical(specific action needed for the specific context), semantic(arranged in order), and cultural(manners observed while in lift - being quiet or shouting) constraints. While designing for apps we should provide constraints which guides actions and eases interpretation

Screw and Rock

Physical Constraints

UI Constraint

Form with disabled button, only enabled until the form is filled.
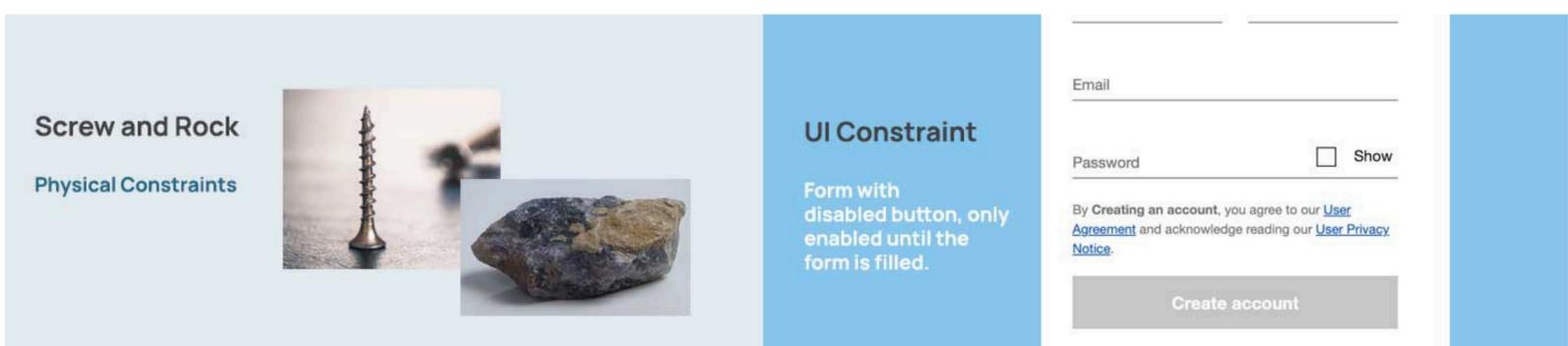
6) More on Human Psychology

PSYCHOLOGY OF HUMAN BRAIN (SOME EXCERPTS FROM SUSAN WEINSCHENK BOOK)

HOW PEOPLE SEE?
Vision trumps all the senses. Most of the brains resources are dedicated to seeing and interpreting what we see. It may seem that we see the world around us and some of the information is passed to brain. But, your brain is constantly interpreting everything what you see.
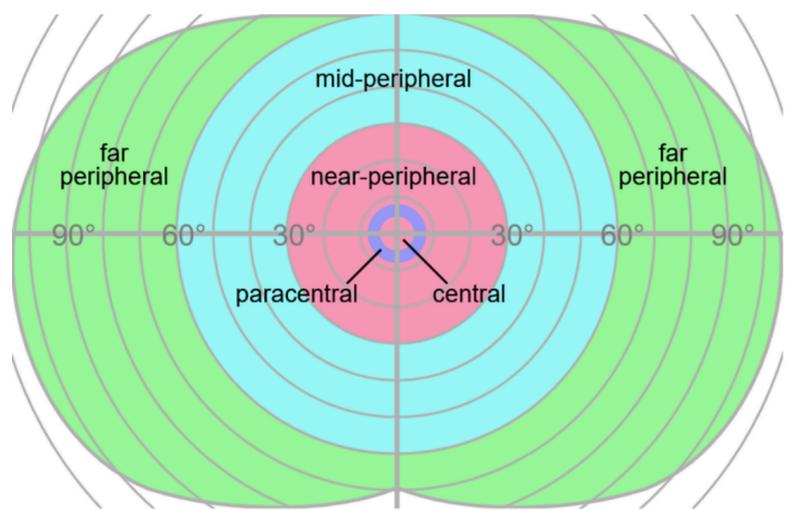

WHAT DO YOU SEE?
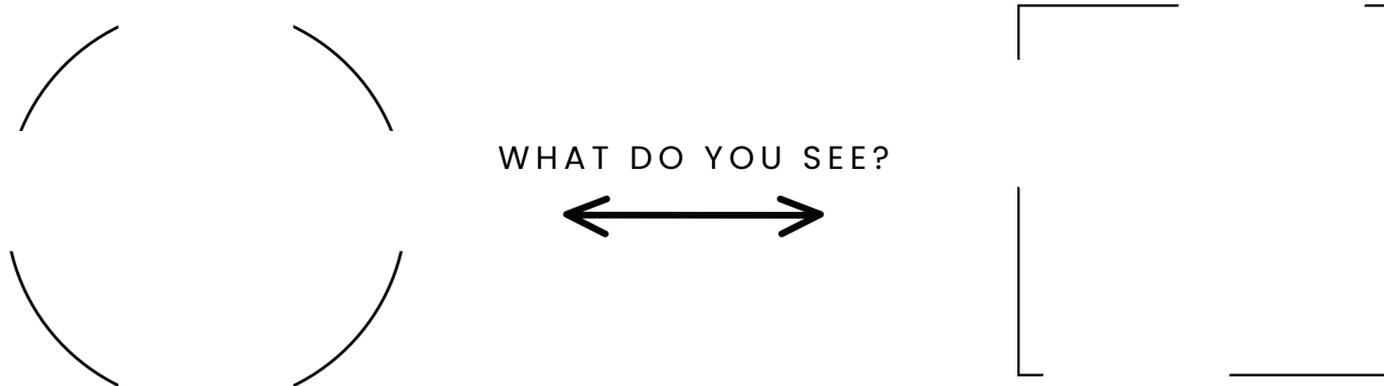
Peripheral Vision is used more than central vision
There are two visions. Central vision, what you see directly. Peripheral vision, areas were rest of the visual field are visible.
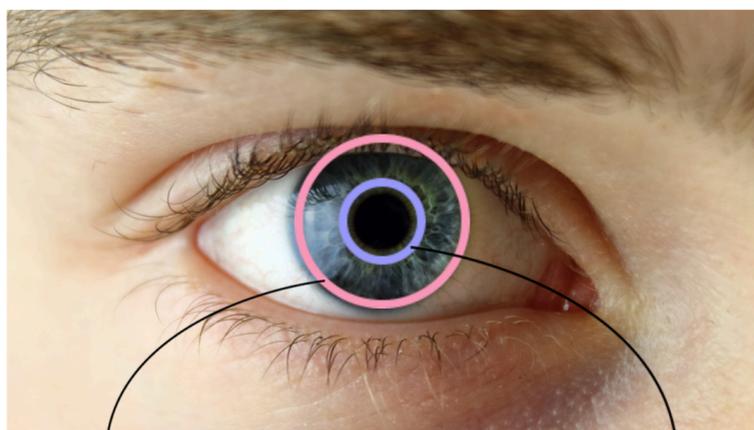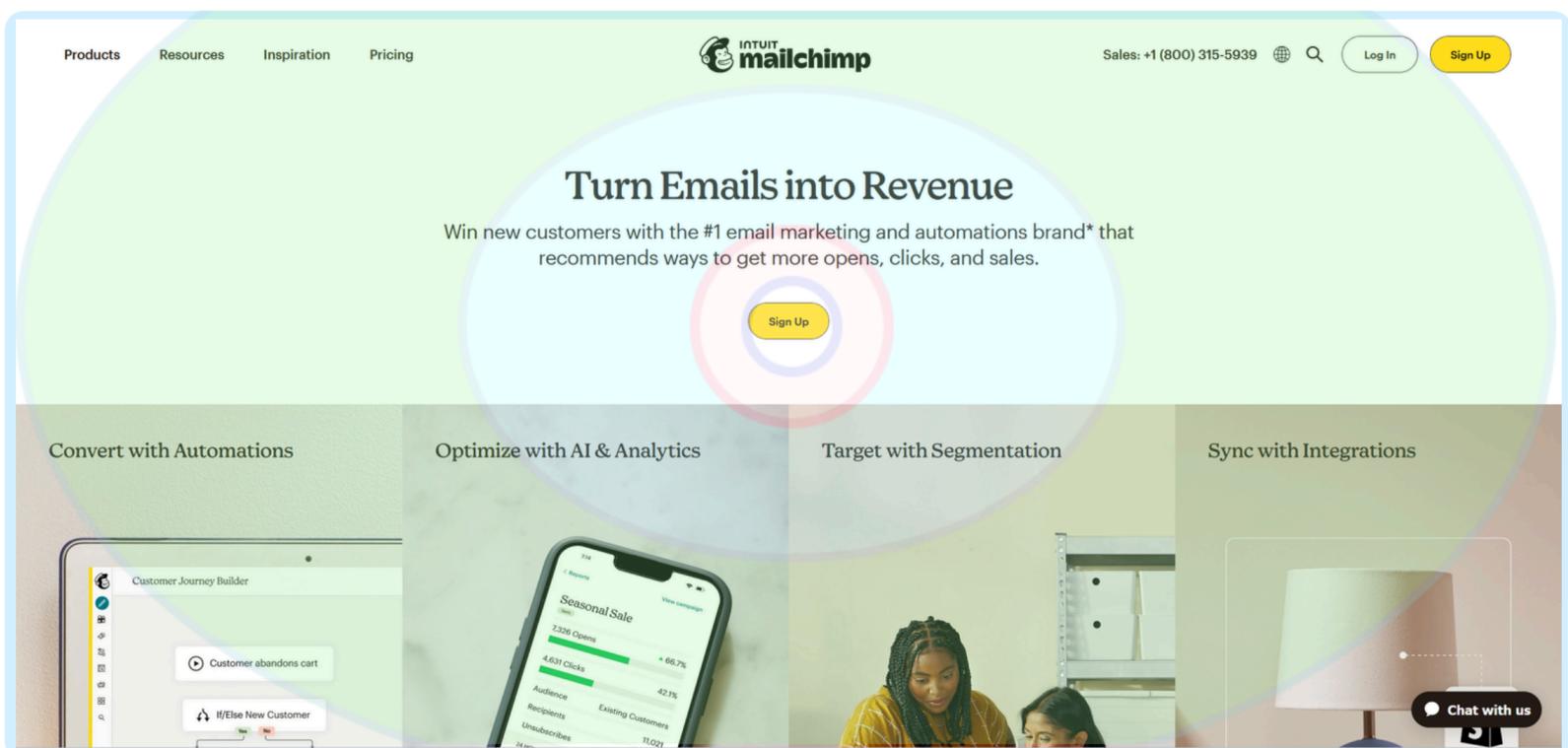
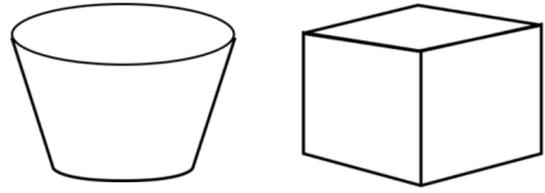near peripheral   central
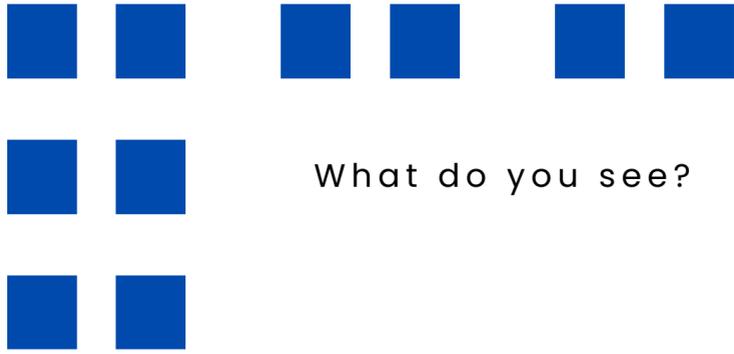
From wikipedia

The Sign up button in the above site brings user focus/attention which is captured by central vision. The rest of the visual field is viewed by peripheral vision. If you want important information to be viewed, place the content that can be viewed using central vision. Do not place blinking ads or bright colors in peripheral vision, it distracts the user. Use content that serves purpose for the web app or site that is understood by users quickly by using peripheral vision.

People identify objects by recognizing patterns and imagine objects tilted
People recognize patterns to make quick sense of the sensory input that comes to their mind. The visuals around the world we see is passed to the brain and the brain makes patterns.
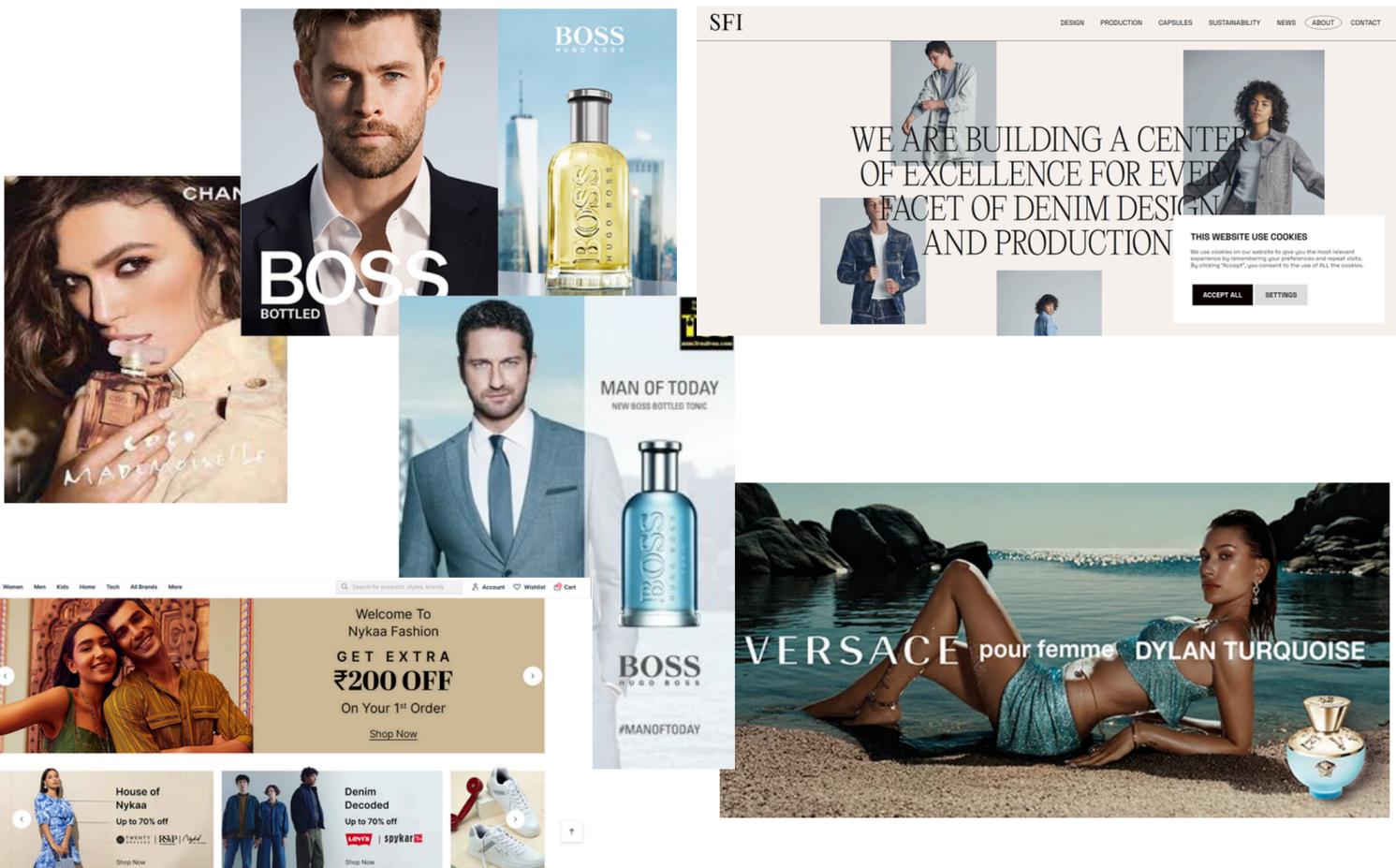

What do you see?

People identify objects fast using canonical perspective slightly tilted position(icons created in canonical is easy to understand)

There is a special part in our brain that recognize faces
There is a special part in brain called fusiform area(FFA) which is present near amygdala(brain's emotional center) which recognize faces faster. That's why you remember you family, relatives and people in our office when you see faces. In UX Design and product design, designers use faces of celebrity or normal people to attract or buy the product or use the product because it has great emotional impact in web page. And the faces in web page should have contact or faces with eye looking at the user because eyes are most important part of the face. People are born to recognize faces. But, Autistic people cannot recognize face easily.

People scan screens based on past experience and expectations and look for cues
People look at computer screen based on culture reading pattern, read left to right, top to bottom, where logo should be, navigation, space, movement(animation) and photo. People come with expectations or have mental model when they scan a screen in computer or mobile.

People always look for cues that's called affordance what action(tap, swipe, click) are possible and signifiers (submit, upload, delete, move up, down, left or right) signify what to do and where to do. Ex: skeuomorphic button, beveled button or flat button. And the name of the button text which signifies what to do and where to do.

People scan screens based on past experience and expectations and look for cues
People look at computer screen based on culture reading pattern, read left to right, top to bottom, where logo should be, navigation, space, movement(animation) and photo. People come with expectations or have mental model when they scan a screen in computer or mobile.

People always look for cues that's called affordance what action is possible and signifiers which action can be performed in the specific place. Ex: skeuomorphic button, beveled button or flat button. And the name of the button text which signifies which action is possible.

Color theory and Colors vary by culture
Bright colors bring lot of attention to users. Mild colors bring less attention to users. And mixing the colors or placing text on the background has impact on ones visual field or cannot be read by some people. Green text on red background cannot be read easily.

And each and every color has cultural constraint or has its own meaning. Red, Green, Blue, Brown, White, Yellow, purple, pink, orange or Black has significant meaning in each and every country. Use colors in website or app based on Culture, Country, People, Age and meaning associated with the color.

HOW PEOPLE READ?
During print medium(like newspaper or books) the information in form of text was not shared to great extent. But, arrival of computer, internet and mobile has increased the information consumption or reading has become an daily activity in our part of life.

Capital Letters and small letters
During the print revolution all the headings were printed in capital (uppercase) letters and the body text were printed in small (lowercase) letters. And serif and typeface were used mostly in all the newspapers.

Research says people tend to read capital letters slowly because from beginning of the print medium all the body text were in small letters and only heading was printed in capital letters. If the body text were printed in capital letters during invention of print medium people would read capital letters fast.

These days using Capital Letters in digital format tends that we shout at users. Use capital letter for headers and small letters for body text based on the reading pattern and age of the person. Because reading in computer screen(based on pixel resolution) or mobile is hard than reading newspaper.

Reading and Comprehension

People read and understand the paragraph based on what they know or based on past experience. A person who can understand or has knowledge in computers when given a paragraph about development structure of notochord (meant for biologist professionals),

"The notochord is an embryonic midline structure common to all members of the phylum Chordata. In higher vertebrates, the notochord exists transiently and has at least two important functions. First, the notochord is positioned centrally in the embryo with respect to both the dorsal-ventral (DV) and left-right (LR) axes."

Its difficult for the computer person to understand while reading, he has to search or research on the internet. New words or new information is understood when plugged into existing cognitive structures. A biologist can read the above paragraph and understand the meaning of the words in the paragraph because he has knowledge about biology.

Again when you scramble words like "Peopel raed adn undetsnadt teh paragprah baesd on wtah teyh kown" You still be able to read because you know the words and meaning of it.

Always tailor the level of text based on the users or audience. Use simple words and few syllables to make people understand. Use headings and don't assume people will remember everything they read.

A saccade is the rapid eye movement between fixations to move the eye-gaze from one point to another. A fixation is the point between two saccades, during which the eyes are relatively stationary and virtually all visual input occurs. Make sure Saccade and fixation is maintained in text.

Pattern recognition, Font size

Serif and sans font are both equal in terms of readability. People recognize patterns in each font to understand the letters. Do not use stylized fonts like "Display, Handwriting and Monospace" Use it sparingly.

Use a font size that is large enough for people to read in computer and mobile or any digital devices. Use a font that has good amount of x-height for readability.
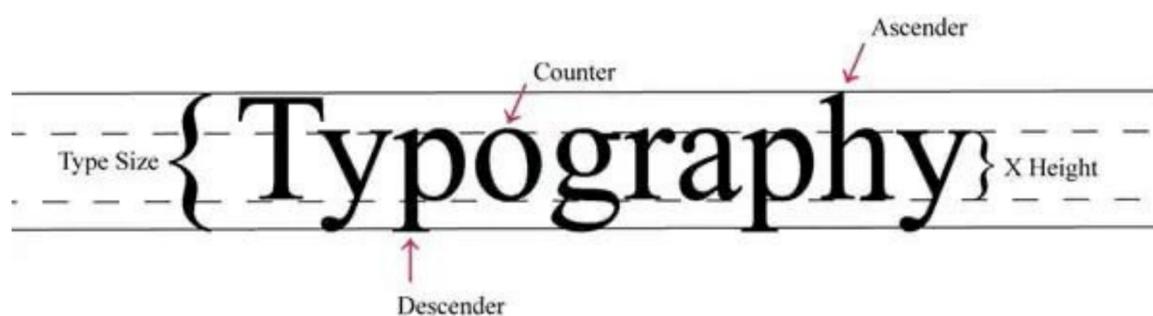
Length of the text.

If you are going to place a long line of text, keep it has 100 characters per line to read. But people prefer less words to 72 characters per line in digital devices. Based on reading speed (if its an issue set - 100 characters) and criticality (speed is not an issue set - 72 characters) vary your text line length.

For multiple article, set Multiple columns and short line length (42 characters)

HOW PEOPLE REMEMBER

Remembering things takes up most of the mental resources. Human use load differently when it comes to mental resources. The order in which mental resources are taken more is,

Cognitive, (when asked to think or remember or mental math calculation)
Visual, (when asked to look and find info on the screen)
Motor, (when asked to tap or click)

Working Memory or Short Term Memory (STM) is limited.
Working Memory or short term memory is, when your asked to take note of address with out pen and paper over phone and someone interfered with the task by talking to you. You tend to forget the address you have stored in you memory. You try to recall again and again the address that stored in your memory. Its not reliable.

Same thing happens when you place your house keys or car keys in some place at home and move on to next task like cooking or taking care of you child or moving to another activity. Placing the keys was stored in your working memory and interfered by another activity. So you try recall your keys again and again when your not able to find it. And remember Stress also impacts working memory. You will forget everything when your stressed. Kid's who are brought up in stressed environment have low Short Term memory.

There's only so much people to remember or hold in working memory everything before they forget it. To maintain information in working memory, your attention must be focused on it. People who have good working memories are better able to screen out or tune out all the sensory stimuli around them and focus their attention on one thing in their working memory will remember better than others.

Working memory or Short term memory(STM) equals better performance in school. Teachers should ask children questions during the teaching hours or any instructions that was given and test STM what they have understood or learned or the instructions is remembered, can be used for analyzing and predict how well they perform in academic. If the score is low teachers and parents can be used to tackle those problems early on. And Remembering words or number will activate left hemisphere and finding something on map(spatial) activates right hemisphere.

For digital devices make sure users while performing a task is not interfered and you cannot expect users to remember what they typed or information from one screen to another screen. In that case make sure you use "Recognition is better than recall" rule. Show default values for online form filling were ever possible or information which users do not have to recall during a task.

People remember only four items at once
In digital devices if chunking is done to four items memory will improve a lot. Instead of following Miller's 7+2 or 7-2 chunking or grouping items to four like phone numbers 1111 2222 33 will improve memory a lot. Then add more pieces of information to the group or chunks.

We need to be aware while observing users during Usability Session or contextual inquiry during the task, people use notes, lists, calendars then they are not relying on memory.

Compare desktop and mobile patterns. Since the mobile screen size is small, people see less information in chunks or groups which is easy to remember or choices to select or easy to scroll and it's completely different behavior's while using desktop.

People have to use information to make it stick.
People move things from working memory to long-term memory by,

i) repeating it a lot - Listening to same music again and again. Reading same book again and again. Playing same sport again and again. Practicing subjects again and again. Ex: If you work in programming for 20yrs you will be better programmer. If you work in design for 20yrs then you will be better designer. If a user uses checkout in a shopping site to buy products overtime the task of adding products, checking and paying will become easier (the entire checkout process)

ii) connect it to something they already know - People connect new knowledge or new information to something they already know then its easier to make it stick or stay as long-term memory and easier to retrieve it.

Experts and some People store information as Schemata. During user or customer research we should identify and understand the schema the target audience has. Head is a schema which has nose, ears, eyes, brain and.... When people store information as schemata they can easily remember things, connect information and can retrieve it easily.

If people have a schema that relates to information provided make sure you point out what that schema is, it will be easier to learn and remember the information and plug into an existing schema.

Recognize information than recall it

Recall of Information Test
If you were asked to take a test(Desktop Schema) to remember words and write without seeing, > RAM, FLASH MEMORY, CAMERA, CD DRIVE, USB SLOT, HDMI SLOT, MONITOR, KEYBOARD, MOUSE, SPEAKER, OPERATING SYSTEM

Adults may write with inclusion errors(extra items not present in the list) with conscious or sub-consciously you write Power cord, Motherboard, CPU (Microprocessor). But kids do not make inclusion errors they will try to remember most of them what they saw and write it. Because kids schemata is not developed like adults. The test is Recalling information what you remembered. This test would be harder for adult users.

Recognition of Information Test
If someone takes you for a ride in office campus and you visit most of the places in the campus and before leaving, the admin gives a form with list of places to be ticked that you visited inside office campus. The test is called Recognition of information what you visited. This test would be easier for adults.

Always stick to the rule "Recognition is better than recall" if your designing for adults.

Memory takes a lot of Mental Resources
Research says when your in a meeting without any intervention you remember the discussions. If, you were not interfered your likely to remember all the meeting discussion points. Its called "recency" effect. But, when you are interfered like taking a call or replying to a mail. You forget the discussion points during the period of interference. When asked "what was discussed" you may forget few discussion points during the period of interference. Its called "suffix" effect.

Concrete words like table, chair stored in long-term memory easily than abstract words like Justice, democracy. And you can remember things what you see (visual memory) better than words.

People reconstruct memories each time they remember them and most memories are vivid and wrong. It's good thing that people forget.

Memories are reconstructed
People reconstruct memories because memories keep changing. For Example: You went to a birthday party 5years before, when you are trying to re-collect you will remember the family members, friends, what you wear or people from the party. Our brain is not like hard drive or movie clip that keeps running in our mind. Its the nerve pathways that fire each time when you try to recall. These memories change after 10yrs, 15yrs and 20yrs without you realizing it. The memory will include new connections that the weather was not good or some new memories added to the Birthday event which is not true.

In Digital space people using your products may call service line because not everyone remembers the product features or service overtime or errors that occur due to slippage while performing the task after a longtime. We are Humans not machines.

Memories are Vivid and Wrong
Emotions are processed in the amygdala(mother of all emotions) which is close to hippocampus in our brain. Emotionally laden memories might be strong and remembered more vividly. These are called flashbulb memories which are vivid and full of errors. Which can be more inaccurate and what we may believe to be true.

Its good thing that people forget
Just think about you hold all the sensory inputs and experiences you have every minute, every day, every year and throughout your lifetime. If you remember everything you will be unable to function it equals to over cognition load. To able to function you should forget some things. Your brain is constantly deciding what to remember and what to forget. Which is brain's decision to forget unconsciously to keep you alive.

In digital products, if some information is really important don't rely people to remember it. Need to provide in design a way to look for the information (search, FAQ.)

HOW PEOPLE THINK
The brain has 15-23 billion neurons(rough estimate). That's a lot of capacity for mental processing. If we are going to design for users or people we need to understand how people think? There are Visual Illusions and there are also thinking illusions. Let see what brain does as it makes sense of the world.

People process information better in bit-size chunks
The brain can only process small amount of information at a time - consciously, that is when you can handle 10billion pieces of information every second but only 10 of those make it to your conscious brain. So, too much information all at once in design cannot be processed better by users. And also understand the culture and geography your designing for. (I read an article in LinkedIn, some countries in Asia having more information all at once is fine because of less letters present in a word)

Use Progressive Disclosure, means of providing only the information people need at the moment(context of use). Progressive disclosure requires multiple clicks and number of clicks is not important. People are very willing to click multiple times and they won't even notice going down the path when they are getting the right amount of information at each click. Think Progressive disclosure don't count clicks.

Progressive Disclosure is great technique but works when you make sure you've done research and know what most people want and when they want it. Otherwise you end up with a frustrating site.

Some types of mental processing are more challenging than others.
Imagine your handling a grocery store and your presented with a task of handling inventory like taking note of stock items, billing, total sales, items to be ordered, payments using inventory handling website. As you do this, there are things you're thinking about and remembering (cognitive), things you're looking at screen (visual) and buttons you are pressing, mouse movements, and typing (motor). In Human factors (HF) or Human Computer Interaction(HCI) terminology these are called loads. The theory is that there are three kinds of demands or loads that you can make on a person, cognitive(including memory), visual and motor.

All Loads are not equal, each load uses up a different amount of mental resources. You use up more by asking them to think or do a mental calculation(cognitive); than when you ask them to look at something on a screen(visual); than when you ask them to press a button or move a mouse(motor); So from Human factors (HF) or Human Computer Interaction(HCI) point of view, the order of loads(mental processing) from most expensive to least is,
- Cognitive(including memory),
- Visual,
- Motor (Use Fitts law for target size, movement time and distance of UI placed).

So when people say there are too many clicks, remember we can make trade-offs when creating website, product or applications. If we add few clicks more and each step presented logically and what was expected by the user then people are fine to get a task done. Because clicking is less of a load than thinking. So, most of the time consider to reduce the loads especially cognitive and visual to make product easier to use. Try to reduce cognitive load by increasing a visual or motor load.

Sometimes you need to increase loads, to grab someone's attention you might add visual information(pictures, animation, video) and thereby increase the visual load of the product. And best example of purposely increasing loads is gaming. A game interface where one or more of the loads have been intentionally increased. Some to provide challenge with high cognitive load to figure out what's going on and some have high visual loads, where you have to find things on the screen. Some have high motor loads, where you have to use the keyboard or a separate device to move or shoot the villains.

Minds wander 30 percent of the time.
According to psychologists, mind wandering and daydreaming are different.

Daydreaming, refers to any stray thoughts, or stories you imagine like "going out with a celebrity for a party", "flying in air with wings", "dreaming on a date with a beautiful actress", "travelling in a jungle with animals like Tarzan" or thinking of an activity like fighting, dancing, you have seen in movies. All these are imaginary, fantasies and which are not possible.

Mind Wandering is more specific. It refers to doing one task and then fading about something unrelated to that task like, You're at work reading a report that your manager asked to go through and get ready for company meeting and you realize that you have just read the same sentence about three times. Instead of thinking about what you were reading, your mind wandered. During everyday activities your minds wander up to 30 percent of the time, and in some cases, such as driving on an uncrowded highway on you motorcycle or car it might be as high as 70 percent.

<u>Advantage of Mind Wandering,</u> is, it allows one part of the brain to focus on the task at hand, and another part of the brain to keep higher goal in mind. For Ex: while driving you're paying attention to the road, but you're also thinking about when to stop to fill your petrol tank. Or your reading an article about stones and pain in gall bladder or kidney and thinking of a appointment with your doctor for a diagnosis, but your mind wanders to the idea you should also put an appointment for your parents or one of your family member who is also sick.

Mind wandering might be the closest thing we have to multitasking. But, multitasking does not exist in reality. But, mind wandering does allow you to switch from one idea to another, and then back again quickly. And more mind wandering equals more creativity and better problem solvers. Their brains have them working on the task at hand, but are simultaneously processing other information and making connections.

<u>Disadvantage of Mind Wandering,</u> Much of the time when your mind wanders, you're unaware of it. More "Zoning out" than mind wandering, this means that you can miss important information. You're at work reading a report that your manager asked to go through and get ready for company meeting but you instead think what to eat or make for dinner, that may just mean you are being unproductive. You aren't usually aware when you're zoning out.

<u>Where does Multitasking fit?</u>
- When your doing some physical work very, very, often that you are very good at it, then you can do physical work along some mental task or listening to music when you are tired because of the physical activity.
- When you walk you also talk on your phone only when you have done this behavior again and again. And adults can excel in this activity than young ones. Sometimes this situation does not work well.
- When you listen to music, you work on a computer or sketch or draw on a canvas very, very, very often(20 or 25 years). Here, your listening to music to bring focus but you are doing only one activity. It's not multitasking. Multitasking is doing two activity at same time with precision and without errors with mental resources used.

How many people have you seen talking on a phone and running into people or people who drive and talk have met with accident. Lot of errors can happen when you do multitasking. Multitasking needs practice for long time in years or decades to make it perfect. Research says not everyone can do multitasking. It does not exist.

Just look at the history of human evolution. Men were hunters and protectors who went for hunting, brought food, did farming, cut woods for fire and to build houses and protected their families wielding machetes or using bow and arrows. And women who did household chores like preparing food, washing clothes, taking care of children, helping in farming and other activities. Do all these were done at the same time. A big NO NO. Each and every activity was done separately and at separate time.

With advent of Technology humans have evolved. Washing machine washes clothes. Dishwasher washes dish. This can be considered as Multitasking. Anyone, men or women can put clothes in washing machine and put dish on dishwasher and finish the task at the same time. But when you ask them, they will say I washed clothes and cleaned the dish at the same time. But in reality it was was done by machines not humans. When people wash clothes and dish washing they do it as a separate activity. People cannot wash clothes and wash dishes manually at the same time. In fact, technology has reduced and takes care of multiple activities which human perform that too in quick time. Multitasking is complex and more research is going on. So when people say I am good at multitasking it means they are not or with some errors. You need to be

careful with your research. You can do one activity consciously better than multitasking or you need lot of training at multitasking with no errors.

In website, people will focus on a task for a limited time. You can assume their minds are wandering often so use hyperlinks to grab onto the option switching from topic to topic and feedback about where people are if they wander. Do check some entertainment, news or big corporate sites they have lot of hyperlinks for easy web surfing.

The more uncertain people are, the more they defend their ideas
Due to Cognitive Dissonance, people feel uncomfortable when two ideas conflict with each other. People don't like the feeling and get rid of the dissonance. People either change their belief or deny one of the ideas.

In UX Design Cognitive Dissonance is, when a person clicks on a button or submit a online form or checks out on a shopping site have a belief what will happen next and ignore the website or App when the outcome is unexpected what they believed or ideas conflict. Or some times people change their belief and accept the idea. Cognitive Dissonance in UX/UI can be fixed with small incremental changes in UX/UI by understanding the way people interact(behavior) with products and expectations they have.

When forced, people will change their beliefs
When people were forced to defend an opinion that they did not believe in, people tended to change their beliefs to fit the new idea. Example: In social media apps when people do not like specific service of a company or a product or a movie or restaurant food but, for personal reasons they post lot of review comments that the service(company influence) or movie(likes the actor or actress) or restaurant's food(the owner's influence) was great or good, others who do not like will start believing and forced to change their beliefs its great or good.

When not forced, people dig in
When people believe something and not forced to change their beliefs and instead information is presented that opposes the beliefs and not forced to follow a new belief. In these situations the tendency of people is to deny information instead of changing your belief to fit.

If Uncertain, people will argue harder
There are two groups of people one who are Certain of their choice and others who are uncertain of their choice. When you ask people choice about PC and Apple. People who are uncertain of their choice would argue a lot. People who are certain about choice do not argue too much.

PC was more affordable than Apple Mac in early days. PC was meant for common man and price was less. Windows started the Personal Computer revolution. Apple was meant for artistic people and was more expensive. Some people slowly moved to MAC due to small increments of persuasion by Apple targeting users other than artists, like people from music industry, programmers, common users with performance, CPU power, Quality, Reliable(free from hackers), and products like IPOD, IPHONE, IPAD, new IOS which attracted first time user and made them loyal users even though price is high.

Note: Do not spend a lot of time trying to change someone's ingrained beliefs and best way to change a belief should be small and incremental. Do not give evidence that their belief is not logical or tenable or a not a good choice. It will back fire.

Ex: A son from a family who had lot of trouble in life but believed in god went to his aging parents and spoke to them about his troubles. The parents hearing his story came to know that the son was not doing any work to change/improve his life and believed in god to change his life. The parents gave him a small plant in a mud pot and asked him to keep it in a place which does not have sunlight and not to water the plant and instead pray which ever god he likes so that the plant can grow. The son did as instructed by his parents. The plant did not grow but died without sunlight and water(which is needed for growth of plant). The son went to his parents and told them what happened. The parents told the son, god helps a person who works to change/improve his life and avoid procrastination. The son understood the advice of his wise parents and put effort and started to work a lot and got rid of all his troubles.

This is called small and incremental persuasion to change one's belief about importance of work and god, whether people deny or accept it.

People process Information Best in Story Form. Stories Change Humans.

Did you read the story of the wise parents and their son in the previous slide. Did you get the moral of the story. It should have been easy to process the information from the story.

Stories can change humans and even education in form of stories are easy to process the concepts and information when taught in schools. Even in meetings tell a story to the audience in form of story with beginning, middle and end when you want to convey the message to the audience. Its powerful and grabs attention and audience can process the information easily.

Stories' aren't just for fun. No matter how dry you think your information is, using stories will make it understandable, interesting and memorable.

Just check this link below how stories are used in websites,
https://www.medtronic.com/in-en/about/patient-stories.html
https://www.apple.com/in/business/success-stories/transportation/

People create Mental Models and interact with Conceptual Models

Users spend lot of time with the objects around the world and create a mental model(something will work or how something works) for each and specific objects in their mind. The expectation the user's have while interacting with a product is based on the knowledge they have. As Designers, its important that we design the conceptual model(something to work) based on the mental model people have created in their mind.

All the users who interact with any object or products like mobile apps or websites from experiences would have created a mental model how it works. When they use a new app they interact based on the previous expectations or the mental model they have in mind. And not everyone has same mental model. So we need to do research and understand the mental models of the target audience.

So designers who design a app should try to figure out the mental model of the users and based on mental model create the conceptual model to work and then design the app around it. Make sure the conceptual model matches the mental model of the targeted audience to create great user experience. If the product is very new and not used by anyone then we need to educate the users in form of training how to use the app.

Do you find interesting reading the Human psychology above to design great experiences.?

Please grab the below books,

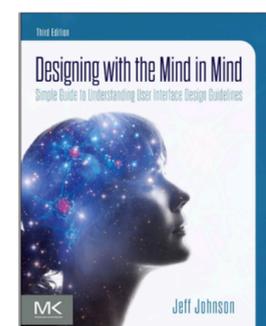100 Things Every Designer needs to know about people

100 MORE Things Every Designer needs to know about people

Written by Susan M. Weinchenk, Ph.D.

Designing with the Mind in Mind

Written by Jeff Johnson.

7) User Interface Design

USER INTERFACE(UI) DESIGN
- User Interface needs appropriate visual communication,
- Expectation are first formed Visually (branding colors, aesthetics)
- Audience Appropriate: Users, Readers and Viewers(target audience)
- Clear Interaction cues. (Affordance and Signifiers)
- Visual Brand Differentiation.(Fun, Friendly, Corporate)

USER INTERFACE(UI) DESIGN SHOULD HAVE,
- Information (Text, images, video, audio invites interaction and its the signifier- what to do and where to do)
- Interaction (visual cues - Affordance - What actions are possible for Buttons, Link, Input Fields, Dropdown, Radio, Checkbox button)
- Interface (Designing appropriate UI Elements, Buttons - submit data, Link - takes to next screen, Input Fields - type little information, Dropdown - select any one of the option from data, Radio - choose single option like YES and NO, Checkbox - Multiple choice)

APPROPRIATE UI DESIGN
The most important role of the UI is to encourage the visitor to find out what's beyond the first screen. If you don't, you confuse and frustrate them. Appropriate UI Design enables visitors to a what they came to do, what they want to do. Ensure there is **discoverability** and **understanding** in the UI layout.

Make sure the UI cannot be generic and has to be informed by the type of audience who will use the website. It should represent you (or your clients) brand identity - Fun or Friendly or Corporate.

DIFFERNTIATE YOUR UI DESIGN
- Cannot be generic, Thousand of apps that are all essentially variation on a single idea. It makes your site unmemorable.
- Responsive websites that all use the same basic visual template.
- Social media sites all essentially providing the same service while it different
- Do not imitate the design, instead innovate based on the users and business needs and problems. But, don't be different just to be different. Be different when it makes something better.

AUDIENCE FIRST
- Trying to design for everyone rarely works. Is it entertaining blog, corporate site or its a sales brochure.?
- The web isn't software or TV or Print but it functions in similar ways. That function and from depends entirely on who its for Users, Viewers or Readers.
- **Users,** People who have needs, perform tasks, to get benefited from the business. Provide clear navigation and text; things present in UI should be plainly marked and easily understood. Users have no patience for consume lot of information until and unless its needed. Users expect the site to load quickly and accommodate any kind of device or connection & to use the most broadly compatible web technologies.
- **Viewers,** Even when the subject is business, the audience may be made up of viewers. People who do not buy your service but instead interested in the business.
- **Readers**: Readers turn to a web site as they might turn to a novel or magazine article and invest time to enrich knowledge or know facts. Ex: Blog.

BRAND MATTERS
- Your UI has to be as unique as it can be. In content, presentation and navigation.
- Building a unique, memorable visual brand identify is one way smaller organization get larger.
- Website, in form of content & function must communicate your brand identify.
- Does it stand out? What is the strength? Why should anyone care about my website

We will look at some Principles like, Affordance, Signifiers, Consistency, Depth of Processing, Forgiveness, Reversibility, Warning, Feedback, Signal-to-noise ratio, Progressive Disclosure, Alignment, and Gestalt's Law (Proximity, Similarity, Figure-Ground Relationship, Continuation, Closure), Visual Hierarchy

AFFORDANCE, SIGNIFIERS

Affordance(click, tap, swipe) - What actions are possible for Buttons, Link, Input Fields, Dropdown, Radio, Checkbox button. For Swipe actions in Mobile UI, show previews that action is possible. Its hidden.

Text, images, icon, video, audio invites interaction and its the **Signifier** - what to do and where to do, Ex: Button with text (submit, delete, edit, save).

FLAT DESIGN

<div align="center">

Submit

</div>

Flat Design has poor affordances until you place a text label as Signifier
But, the trend of using flat design is trending more than ever.

GRADIENT DESIGN

<div align="center">

Submit

</div>

Gradient Design has better affordances and provide cues, But, still you need to place a text label as Signifier what to do and where to do

SKEUOMORPHISIM ICON DESIGN IS CLOSLEY RELATED TO REAL WORLD OBJECTS AND ITS HAS MORE AFFORDNANCE TO CLICK AND TEXT LABEL AS SIGNIFIER ENHANCES THE USER TAKES LESS TIME TO TO UNDERSTAND AND TAKE ACTION

SKEUOMORPHISIM
DESIGN

FLAT
DESIGN

CONSISTENCY

Consistency in placing UI Elements, UI patterns, colors, heading, across the website or app. It increases learning and also increases familiarity in action and simplify user behaviors.

DEPTH OF PROCESSING

Information analyzed deeply is better recalled than information that is analyzed superficially.

Imagine you want to remember your phone number, you have to repeat it back to yourself to make it remember which is called Maintenance rehearsal.

Elaborative rehearsal: deeper, more meaningful analysis e.g reading a text passage & then answering questions about its meaning.

How our Brain Process computer screen,

Text > Low processing

Text with Medium > Medium

Text + image + video > High.

And even complex theories when presented in simplified format in form of image or video is processed easily.

Ex: Use of multiple presentation media or Activities that engage users in elaborative rehersal. (e.g interactive Q&A, first person role playing), first person role playing games with high emotional forgive are huge success.

FORGIVENESS

UI Design should help people to avoid errors & minimizing negative consequences. Confirmation require verification of intent, or confirm prior action/task completion. Too much confirmation or warnings increase the likelihood they'll be ignored.

Help, Assistance with basic operations, troubleshooting and error recovery.

Reversibility, Undo action is the most widely used forgiveness principle in software. Reverse the actions if error occurs or intent changes.

Warnings, Communicate consequence of actions Ex: Dialog box.

SIGNAL-TO-NOISE RATIO

This is the ratio of relevant info(signal) to irrelevant info(noise) in the UI. Noise reduces clarity by diluting useful information with useless information. Minimize or simplifying representation if necessary elements.

PROGRESSIVE DISCLOSURE

Only necessary or required information is displayed at any given time. Information presented to a person who isn't interested or ready to process the noise. (context of use to be followed)

Crucial Question: What's required to take the very next step? In each and every step information is broken logically and based on necessity. Or Information is showed based on,

1) Simplicity to completeness. > Most important to less important or vice versa.
2) Prioritize according to user needs and business goal.

ALIGNMENT

Alignment is aligning the text or organizing the content or UI elements across the layout of the screen or page for ease of access and reduce eye strain. Even used to provide visual relationship and stability. For Example, Placing the labels to left, right or top of a form and paragraph with line height, good letter spacing and paragraph spacing along with alignment of text left, right and center.

VISUAL HIERARCHY

A page layout or screen has visual elements like line, shapes (regular or irregular shapes) images, text, color, video, audio. If you need to guide the user to click on any information or make notice of particular visual element that is more important you can achieve it using Visual Hierarchy using size, scale and color.

Visual hierarchy can be achieved using Visual Patterns or UI Patterns or even using colors. And shapes which are irregular stands out from the rest of shapes and gets most attention.

GESTALT'S PSYCHOLOGY

Gestalt's psychology has been derived based on how human brain perceives information(perception) when they are visually close, grouped, or how information is perceived a whole, information repeated, or contrast.

Some principles are,

Proximity, When elements are placed nearby they are tend to be related to each other. Ex: Email Apps Edit, Delete, Save, Cancel buttons on top.

Closure, Closure can be found in Logos or Icons like IBM logo which has lines with gaps which fill the logo. Still we perceive it as IBM

Repetition, When the Visual Elements are repeated it creates a visual Hierarchy and visual consistency. EX: Carousel with cards.

Contrast, can be created by shapes, size, color or scaling the elements. EX: Bubble Chart is best example for Contrast

Figure Ground, When you need the foreground or background to be focused for the user you can rely on this principle. Ex: Light box Modal window.

These are few principles for UI Design. You can read from the below book or links for more UI design principles.

https://lawsofux.com/
https://www.interaction-design.org/literature/topics/gestalt-principles

Book: The Non-Designers Design Book by Robin Williams.
(For UI, Visual or Graphic Design)

Please make sure the UI interface follows the Interaction Design Principles,
- Consistency - Consistent in using Visual Elements
- Visibility - The UI is visible to the user. EX: No actions are hidden. Discoverable.
- Learnability - Whether the user can perform the action for second time. No high cognition load.
- Predictability - The user can predict the out come based on this expectation.
- Feedback - The UI has proper feedback when any action is performed.

as mentioned in Interaction Design Chapter.

DESIGN SYSTEM

We have learnt principles but what UI elements and UI patterns that exist that can be used in User Interface Design for Web and Mobile App.

Let's begin with HTML Form elements, which are part of W3C standards (https://www.w3.org/) and some UI patterns used for web or mobile apps.

Please look at the below image to know which elements are part of HTML Standards. The combination of Html elements are called components in User Interface. While designing apps we use the components like buttons, input fields, radio, checkbox button and etc along with text or image (img html tag) to create reusable UI patterns cards, carousel, tooltip, Html Input forms, modal window.

Html Elements
(Html Element + Html Element = UI components)

UI Components with Visual style(style guide) >

UI Patterns(cards, carousel, tooltip, Html Input forms, modal window.)
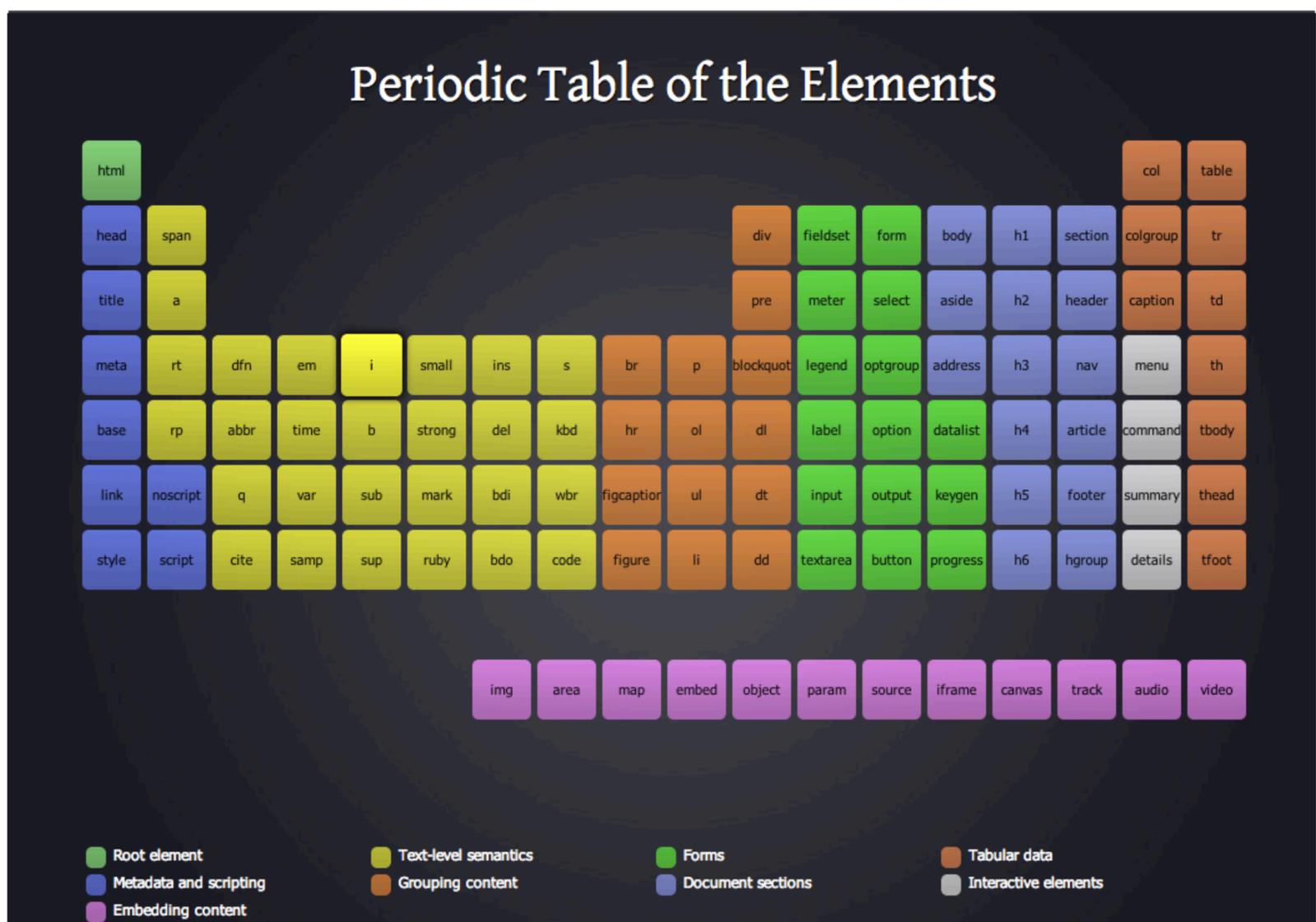
Ok now we know what is UI Patterns, What about template, layout? So we can see Design System and how it is used for Web and Mobile Apps.

A design system consists of
Style Guide (Guide for colors, typography and visual elements like image, line shapes, and ...)
Component Library (HTML UI Components)
Pattern Library (cards, carousel, tooltip, Html Input forms, modal window.)

Lets learn Atomic Design System in this chapter which covers all the above topics. There are lot of Design system to follow. Google Material Design System. Apple Human Interface, Atlassian Design System, Uber Design System, Shopify Design System, IBM Carbon Design system. I am using Atomic design system to teach how design system works.

Design System, Style Guide

A style Guide consists of Colors, Typography, Image specifications, Pixel Specifications for page/grid layout and patterns, and rules for Iconography. Before creating a style guide or branding guidelines, finalize the theme like the app should be fun, casual, corporate or cool.. and create your style guide. Below is a sample style guide. Before Starting with your design system have your style guide ready.

Primary Colors

Secondary Colors

Neutral Colors

Font

I am IBM Plex Sans

I AM IBM PLEX SANS   uppercase for button text

I AM IBM PLEX SANS   16px for body text

I am IBM plex sans   h6 - 16px

I am IBM plex sans   h5 - 20px

I am IBM plex sans   h4 - 24px

I am IBM plex sans   h3 - 28px

I am IBM plex sans   h2 - 32px

I am IBM plex sans   h1 - 36px

Follow 4point pixel font for Mobile and Desktop
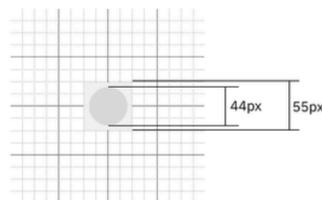
4, 8, 12, 16, 20, 24, 28, 32, 36
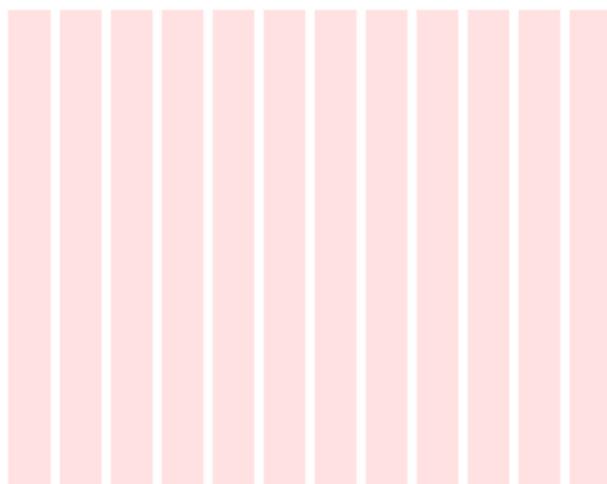
Image Treatment

Use Happy face images looking at the user or customer who is using the site.

And pictures with people in groups having fun to create a feeling that the site is fun.

Iconography

44px   55px

Grid Layout

The Grid layout width is 1320px. The column width is 1080px and the gutter is 20px

ATOMIC DESIGN SYSTEM

Atomic design is not a linear process, but rather a mental model to help us think of our user interfaces as both a cohesive whole and a collection of parts at the same time.

Atomic Design System consists of,
1. Atoms (Html UI Elements)
2. Molecules (groups of UI elements functioning together as a unit, reusable components)
3. Organisms (complex UI components composed of groups of molecules and/or atoms and/or other organisms, reusable patterns)
4. Templates (page-level objects that place components into a layout and articulate the design's underlying content structure)
5. Pages (specific instances of templates that show what a UI looks like with real representative content in place)

1. Atoms (Individual Html UI Elements)

Before looking at the Html Elements individually, I will give you brief introduction on Html along with CSS and JavaScript which will be easy for you to talk to UI Developers because you need to understand technology constraints before designing app which is discussed in Design Thinking chapter.
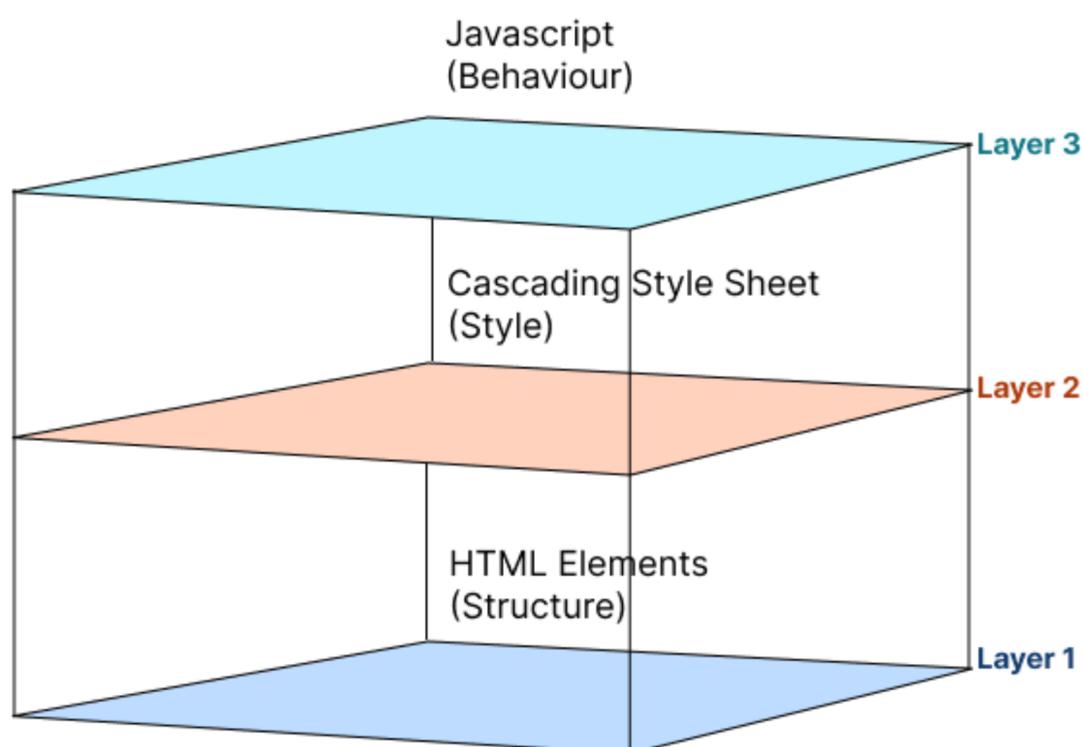
Html:

After the start of Internet by pentagon military or Stanford, the first version of HTML was written by Tim Berners-Lee in 1993 who helped to invent the web. And the first bowser used was Mosaic.

Basic Structure of HTML,

```
<!doctype html> ----- refers to document type and html version
<html> ----- Start of html document
<head></head> ----- All meta information and scripting goes here
<body></body> ----- All the body or main content of the Html Document
</html> ----- End of html document
```

All the HTML Tags(in the image above) or elements have their own attributes. Know the purpose of each Html tags based on.
- Root Element
- Metadata and Scripting
- Embedded Content
- Text Level Semantics
- Grouping Content
- Forms
- Document Sections,
- Tabular Data, Interactive Elements

Html versions,
There are five versions of HTML. From Version1 to Version5. In between xhtml was introduced to have semantic in the HTML Structure. The current version Html5 has introduced lot of semantics html elements like <nav> <figure> <aside> <footer> for strict structure and easy accessibility. Some people use readers to navigate the site

Cascading style sheet (CSS)
As the name says cascading style sheet, the styles are used in a cascading manner within html document to style the HTML Elements and the Structure of the document.

What are tags, HTML Element, Html Document?
I have explained the concept in the image.

Why the name Cascading?
Have you heard the river Cascades down the path. Its derived from it. Remember river cascades in front not backwards. So the people in W3C (https://www.w3.org/standards/webdesign/htmlcss.html#whatcss) named it as Cascading style sheet because the style sheets which are embedded last in the head tag takes precedence than the above style sheet. I will explain the concept with an image.

HTML TAG
<a>, <p>, <div>,
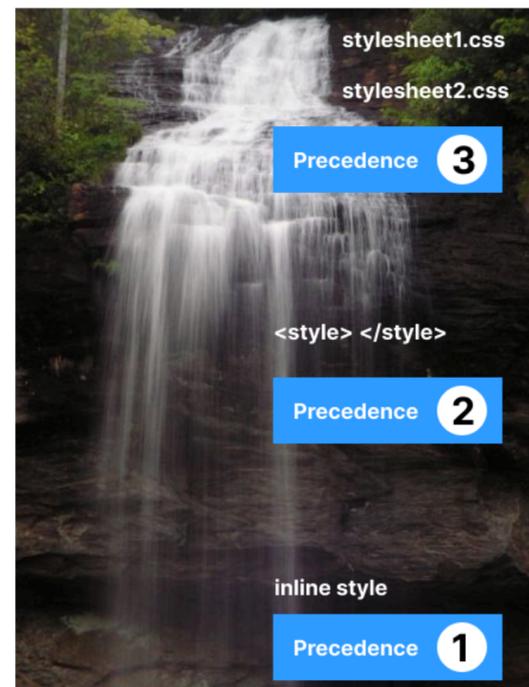
HTML ELEMENT
product
<p>I am paragraph</p>

HTML DOCUMENT
All the html element within a html page forms a Html document.

An HTML page may contain Doctype, Comments, Elements or Tags, Attributes, Frames–which may contain other HTML pages

stylesheet1.css
stylesheet2.css
Precedence 3

<style> </style>
Precedence 2

inline style
Precedence 1

Css Rule in stylesheet1.css

```
<head>

    <!-- style sheet1 -- >

    <link rel="stylesheet" href="css/stylesheet1.css">


    <!-- inline styles -- >

    <style>

    .headerTxt {
margin: 20px 0;
padding: 10px;
font-family: 'Poppins', sans-serif;
font-size: 25px;
color: #555555;
}

    </style>


<head>


<body>
<div>


<h1  class="headerTxt" style="font-size: 30px;">I am the header text for
        the this  content </h1>

</div>
</body>
```

```
.headerTxt {
margin: 20px 0;
padding: 10px;
font-family: 'Poppins', sans-serif;
font-size: 16px;
color: #555555;
}
```
Precedence 3

CSS rule written in style tag and placed within head section.
Precedence 2

Inline Style. Takes the first precedence
font-size: 30px
Precedence 1

```
<head>

    <!-- style sheet1 -- >

    <link rel="stylesheet" href="css/stylesheet1.css">
```

Css Rule in stylesheet1.css

```
.headerTxt {
margin: 20px 0;
padding: 10px;
font-family: 'Poppins', sans-serif;
font-size: 16px;
color: #555555;
}
```

Precedence **2**

```
    <!-- style sheet2 -- >

    <link rel="stylesheet" href="css/stylesheet2.css">

<head>

<body>
<div>

<h1 class="headerTxt"> I am the header text for
      the this  content </h1>

</div>
</body>
```

Same Css Rule with same classname in stylesheet2.css

```
.headerTxt {
margin: 20px 0;
padding: 10px;
font-family: 'Poppins', sans-serif;
font-size: 25px;
color: #555555;
}
```
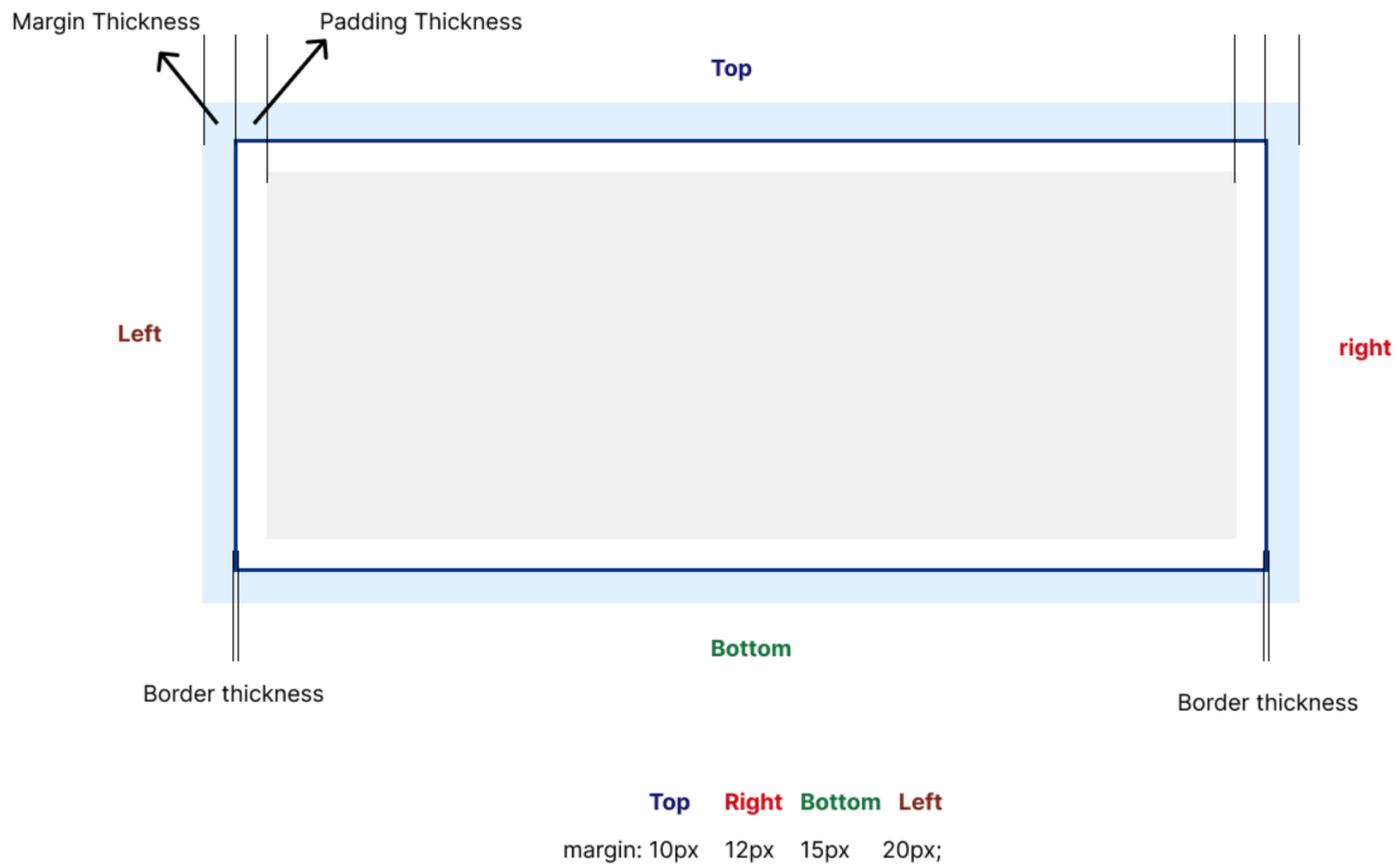
Precedence **1**

Considering two stylesheets, same CSS rule is written in stylesheet1.css and stylesheet2.css. The CSS rule written in stylesheet2.css will take precedence over the stylesheet1.css. So, **the header text font will be 25px;** You don't have to use !important in stylesheet everywhere. Use !important when you do want to change the value when someone writes the same class name in another stylesheet. Better !important is to be avoided

CSS Box Model

Margin Thickness   Padding Thickness

Top

Left

right

Bottom

Border thickness   Border thickness

Top   Right   Bottom   Left
margin: 10px   12px   15px   20px;

You can learn CSS selectors, Specificity, Inheritance, CSS Attributes and values, write Short form of CSS and Media Queries from the following resources,

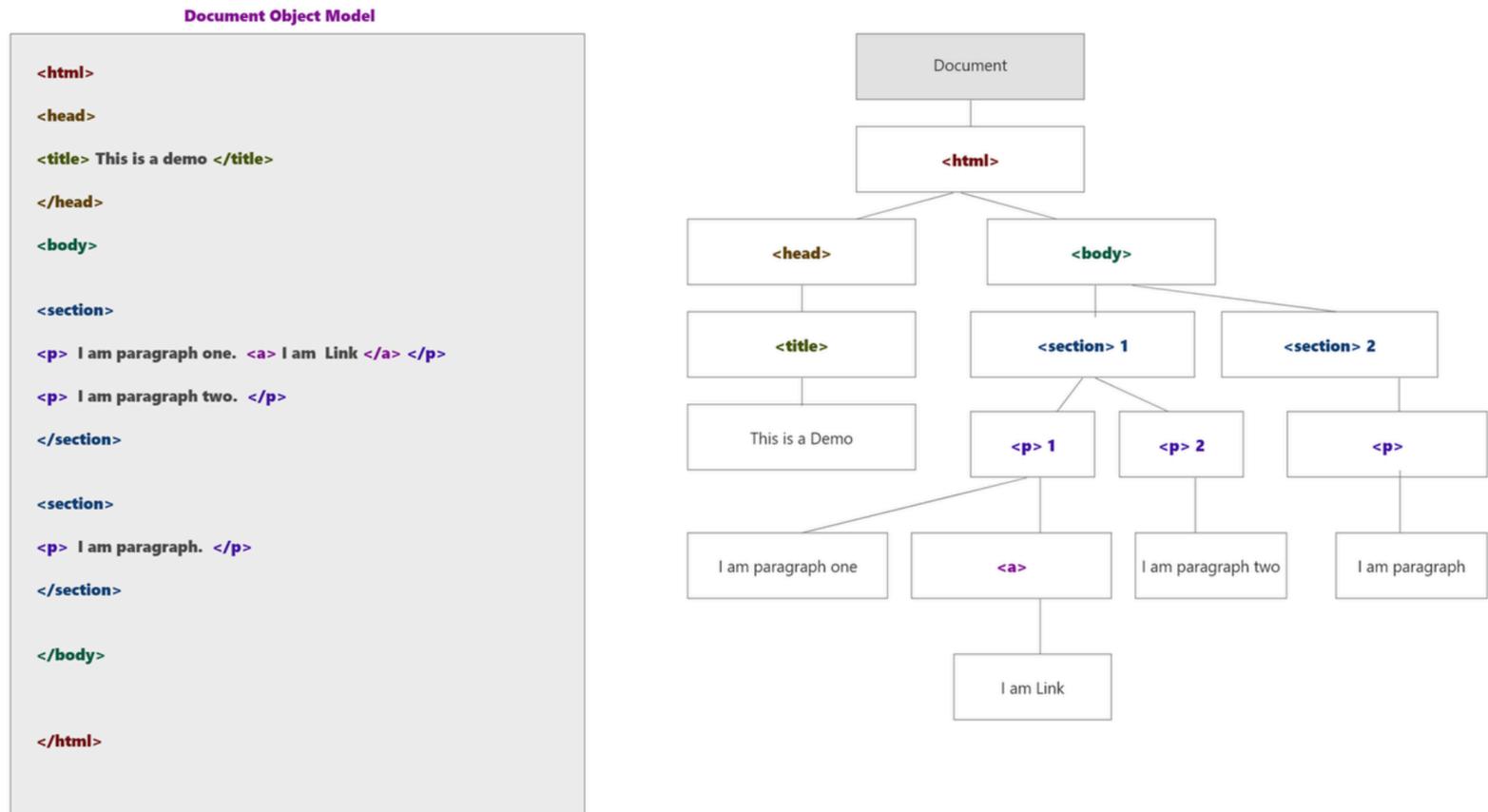https://www.w3schools.com/ (good one to start)

Books:
Head First Html and CSS (I read the first release. Good One) For Beginners.
CSS Definitive Guide and CSS cookbook(for reference) O'Reilly publication

I will teach some of the CSS Concepts in Bootstrap chapter.

JavaScript

JavaScript is used for creating interactions or behavior for the Html UI elements.

As a designer you need to know how JavaScript works and what are the actions possible with each HTML UI components. As a designer please know JavaScript Foundations and Dom(Document Object model). Incase you want to learn more about JavaScript, start from ES6 release of JavaScript.

Document Object Model

```
<html>

<head>

<title> This is a demo </title>

</head>

<body>


<section>

<p>  I am paragraph one.  <a> I am  Link </a> </p>

<p>  I am paragraph two.  </p>

</section>


<section>

<p>  I am paragraph.  </p>

</section>


</body>


</html>
```

Document
<html>
<head> <body>
<title> <section> 1 <section> 2
This is a Demo <p> 1 <p> 2 <p>
I am paragraph one <a> I am paragraph two I am paragraph
I am Link

The above diagram represents how JavaScript can be used to manipulate the Html tags and the content by traversing through the HTML structure using Document Object Model(DOM). Each and every tag(<html>, <head>, ..) is called as an element in DOM.

You can learn JavaScript from,

https://www.w3schools.com/ (good one to start)

Books:
Head First JavaScript Programming by Eric Freeman and Elisabeth.

Html Form Elements

Lets see the complete list of HTML Components and how to use it, how to style it, and what interactions are possible.

Label

Labels are used for all the form elements. Its the signifier for the user what to type or which data to select and where to type/select from the UI like FirstName, LastName, Country and ..

Inputfield

FirstName

LastName

Address , Door Street

Address Area

InputField gets the information from the users and saves the data

Eye Fixation when using Top, Left and Right Labels

Top Aligned Labels

FirstName

LastName

Address , Door Street

Address Area

Eye Fixation for the label and Input is at single line and reduces eye strain

Preferred for Mobile and Desktop (when form length is small or lengthy - too much scroll).

Time to complete form

Very Less

Left Aligned Labels

FirstName

LastName

Address , Door Street

Address Area

Eye Fixation for the label and Input is more zig zag Increases eye strain.

Preferred for Desktop only (frustrates user when the form is long)

Time to complete form

Takes more time

Right Aligned Labels

FirstName

LastName

Address , Door Street

Address Area

Eye Fixation for the label and Input is little zig zag. Less eye strain

Preferred for Desktop (when form is lengthy).

Time to complete form

Less

Note: Time difference is not that huge. But still affects the duration while filling the data - How much time does the user take to complete the Task - Usability
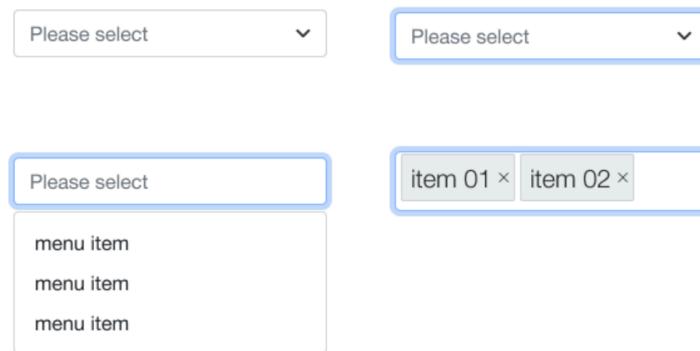
InputBox/TextField Variations

Top Aligned Labels

FirstName

LastName

Address , Door Street

Address Area

This is default placement of label and textfield. The border around the box in the textfield is perceived by users that they can type.

This pattern when used in mobile, scroll is more

Inline and Top Labels (position changes) with border

Default State (inline Text)

FirstName

LastName

Address, Door Street

Address Area

OnClick/OnFocus/Tap

FirstName

LastName

Address, Door Street

Address Area

The inline text in the textfield will move up as overlay when the user clicks on the text field.

This pattern reduces the scroll in Mobile.

Top label with border

Static

FirstName

LastName

Address, Door Street

Address Area

This is default placement of label as overlay and textfield. No position change from inline text to overlay text.

This pattern reduces the scroll in Mobile.

Inline and Top(position changes) with border-bottom line

Default State (inline Text)

FirstName

LastName

Address, Door Street

Address Area

OnClick/OnFocus/Tap

FirstName

LastName

Address, Door Street

Address Area

Labels(static) with border-bottom line

FirstName

LastName

Address, Door Street

Address Area

The inline text in the text field will move up as overlay when the user clicks on the text field. But user perception when the border is not present and only bottom line is present for the textfield makes the user think whether its textfield or not. Use it based on the target aduience. But, this pattern is used in Mobile these days.

This pattern reduces the scroll in Mobile.

Inline Labels (Labels disappear when clicked) with border bottom and cursor changes

Default State (inline Text)

FirstName

LastName

Address, Door Street

Address Area

OnClick/OnFocus/Tap

LastName

Address, Door Street

Address Area

The inline label in the textfield will disappear when user starts typing the text.

This sometimes makes the user to forget the label for the input field.

Note: As a designer please take a look at all the JavaScript Frameworks. I am not saying you have to code. Understand what the UI components are available in frameworks like React JS, Angular, Vue and many more. Generally UI Developers plug the UI components available in the projects to create screens fast.

So its better before designing any variations for Input Field or any UI components, check the library and try to use the variations available in the JavaScript Framework.
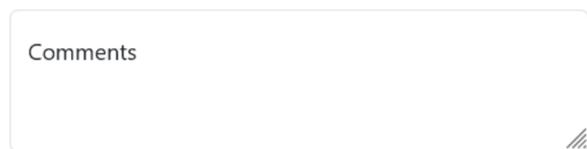
Select

When you have Multiple options and User wants to select one option like Country Name and multi select options as shown below
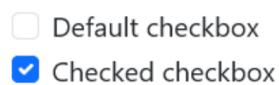
| Please select ▾ |

| Please select ▾ |

| Please select |
| menu item |
| menu item |
| menu item |

| item 01 × item 02 × |

Other UI Elements

Other UI Elements that are part of Html Form UI Elements
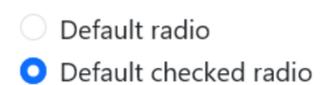
Comments

Text Area
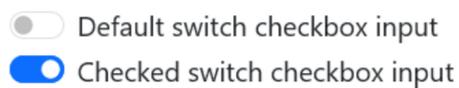If you need users to enter comments we need to use TextArea

☐ Default checkbox
☑ Checked checkbox

Checkbox
If you need multiple options to select. Use Checkbox

○ Default radio
⦿ Default checked radio
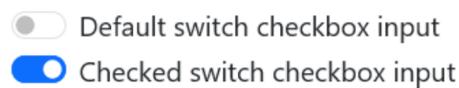
Radio button
When user wants to select Single option from the choices

⬤ Default switch checkbox input
🔵 Checked switch checkbox input

Switches
Unlike Radio buttons which is part of a form, you have to select one option and press submit to send the data. In Switch control once it **switched on** the corresponding settings is activated. **Switched Off** the corresponding settings is de-activated the action is immediate

⬤ Default switch checkbox input
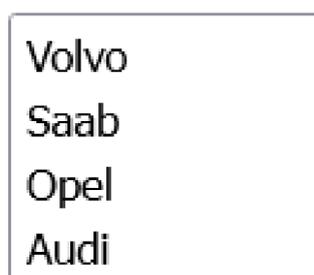🔵 Checked switch checkbox input

Switches
Unlike Radio buttons you have to select one option and press submit to send the data. In Switch control once it **switched on** the settings is activated. **Switched Off** the settings is de-activated

Search

Buttons
Button is the cue which provide affordance for the user to click actions with the label or text as signifier what(edit, delete, save, cancel,) and where(location) the action can take place

Volvo
Saab
Opel
Audi

Multiple List Selection
It can be used to select multiple options present in the list

With all these HTML Form Elements we can create Molecules
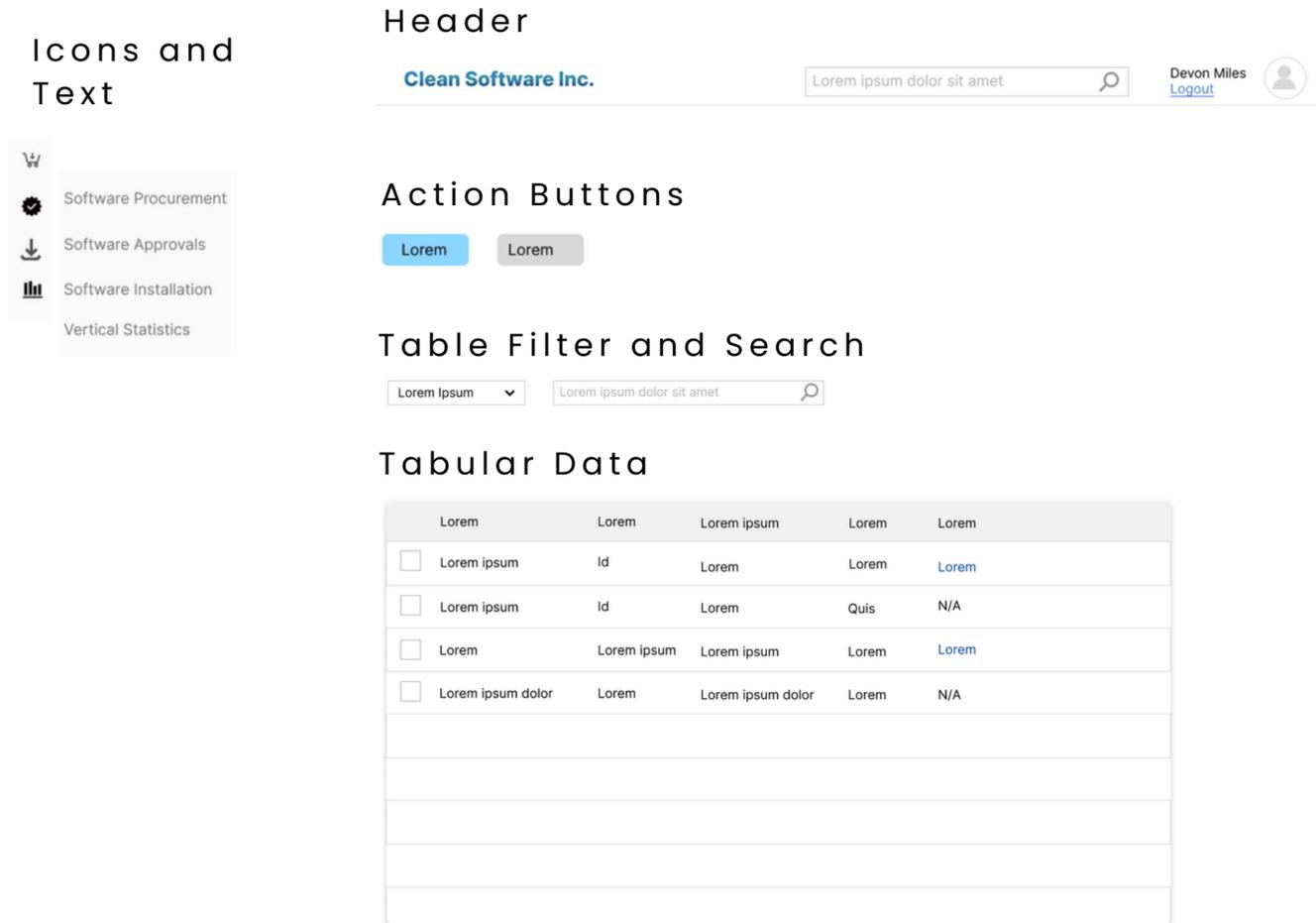
Atoms > Molecules
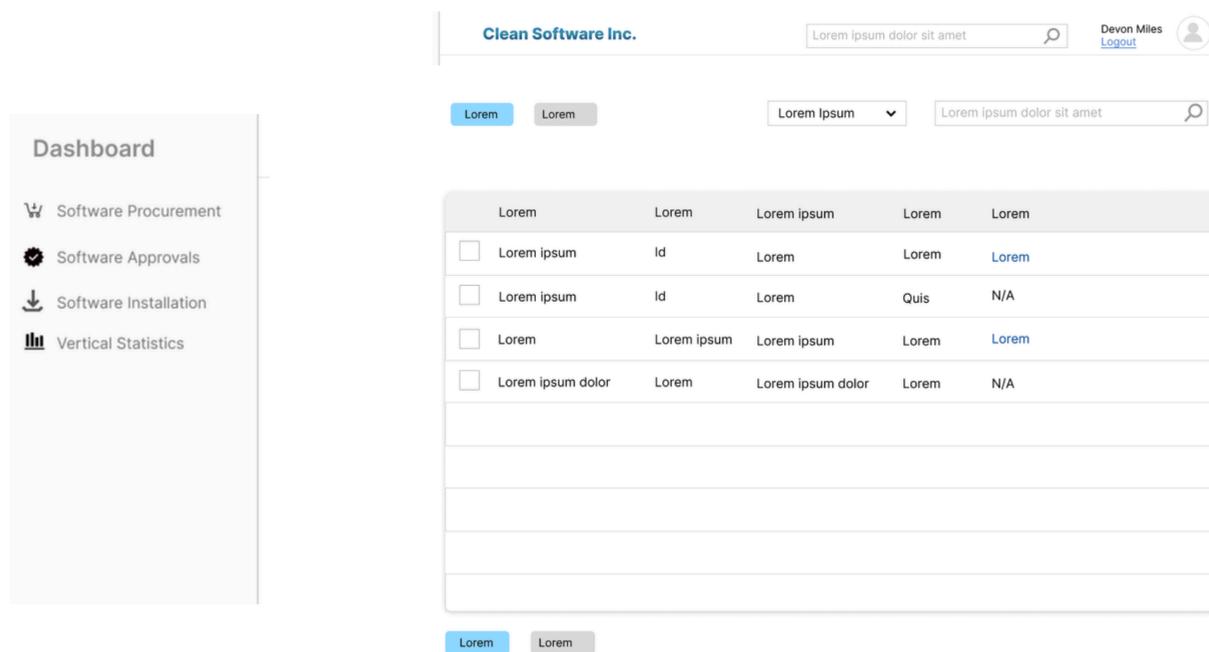
TextField

Button

Search

2.Molecules (Reusable Components)

When you combine two or more individual HTML Elements you have molecules, reusable components. Here you need to specify the code for the components so that developer can reuse the code.

Icons and Text

Header

Clean Software Inc.

Lorem ipsum dolor sit amet 🔍

Devon Miles
Logout

W
Software Procurement
Software Approvals
Software Installation
Vertical Statistics

Action Buttons

Lorem   Lorem

Table Filter and Search

Lorem Ipsum ▾   Lorem ipsum dolor sit amet 🔍

Tabular Data

|	Lorem	Lorem	Lorem ipsum	Lorem	Lorem
☐	Lorem ipsum	Id	Lorem	Lorem	Lorem
☐	Lorem ipsum	Id	Lorem	Quis	N/A
☐	Lorem	Lorem ipsum	Lorem ipsum	Lorem	Lorem
☐	Lorem ipsum dolor	Lorem	Lorem ipsum dolor	Lorem	N/A

3.Organisims (Reusable Patterns)

Complex UI components composed of groups of molecules and/or atoms and/or other organisms and they are discrete, stand out each other. (cards, chips, Dialogs, Lists, Menu, Progress Indicator, Sliders, Tabs, Tooltips, Image lists, Date pickers)
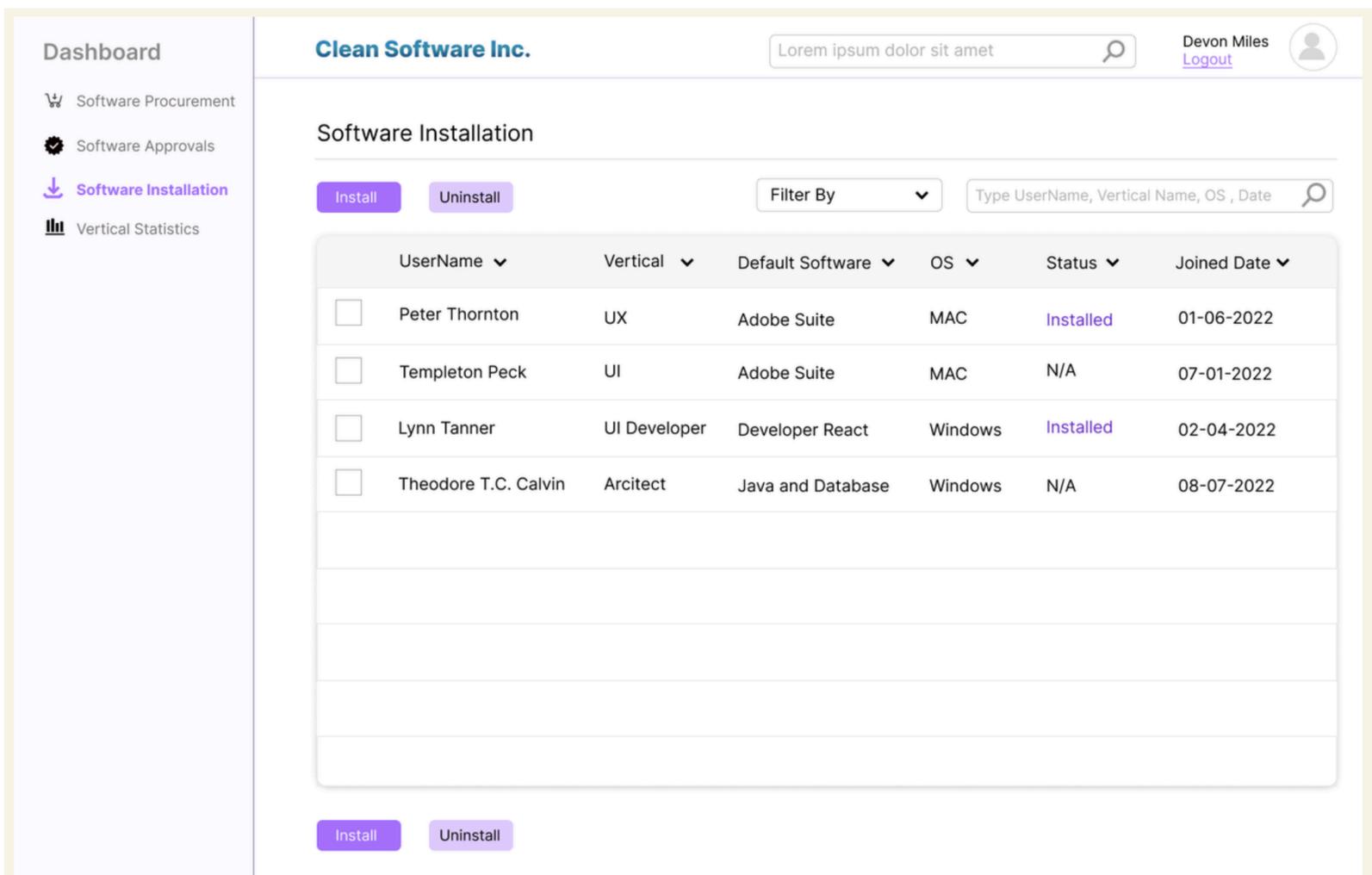
Clean Software Inc.

Lorem ipsum dolor sit amet 🔍

Devon Miles
Logout

Lorem   Lorem

Lorem Ipsum ▾   Lorem ipsum dolor sit amet 🔍

Dashboard

W Software Procurement
Software Approvals
Software Installation
Vertical Statistics

	Lorem	Lorem	Lorem ipsum	Lorem	Lorem
☐	Lorem ipsum	Id	Lorem	Lorem	Lorem
☐	Lorem ipsum	Id	Lorem	Quis	N/A
☐	Lorem	Lorem ipsum	Lorem ipsum	Lorem	Lorem
☐	Lorem ipsum dolor	Lorem	Lorem ipsum dolor	Lorem	N/A

Lorem   Lorem

4.Pages

Page-level objects that place components into a layout and articulate the design's underlying content structure.

Dashboard

Dashboard						
W Lorem Ipsum	**Clean Software Inc.**		Lorem ipsum dolor sit amet 🔍		Devon Miles	Logout

Lorem Ipsum Lorem Ipsum

`Lorem` `Lorem`   `Lorem Ipsum ▾`   `Lorem ipsum dolor sit amet 🔍`

	Lorem	Lorem	Lorem ipsum	Lorem	Lorem
☐	Lorem ipsum	Id	Lorem	Lorem	Lorem
☐	Lorem ipsum	Id	Lorem	Quis	N/A
☐	Lorem	Lorem ipsum	Lorem ipsum	Lorem	Lorem
☐	Lorem ipsum dolor	Lorem	Lorem ipsum dolor	Lorem	N/A

`Lorem` `Lorem`
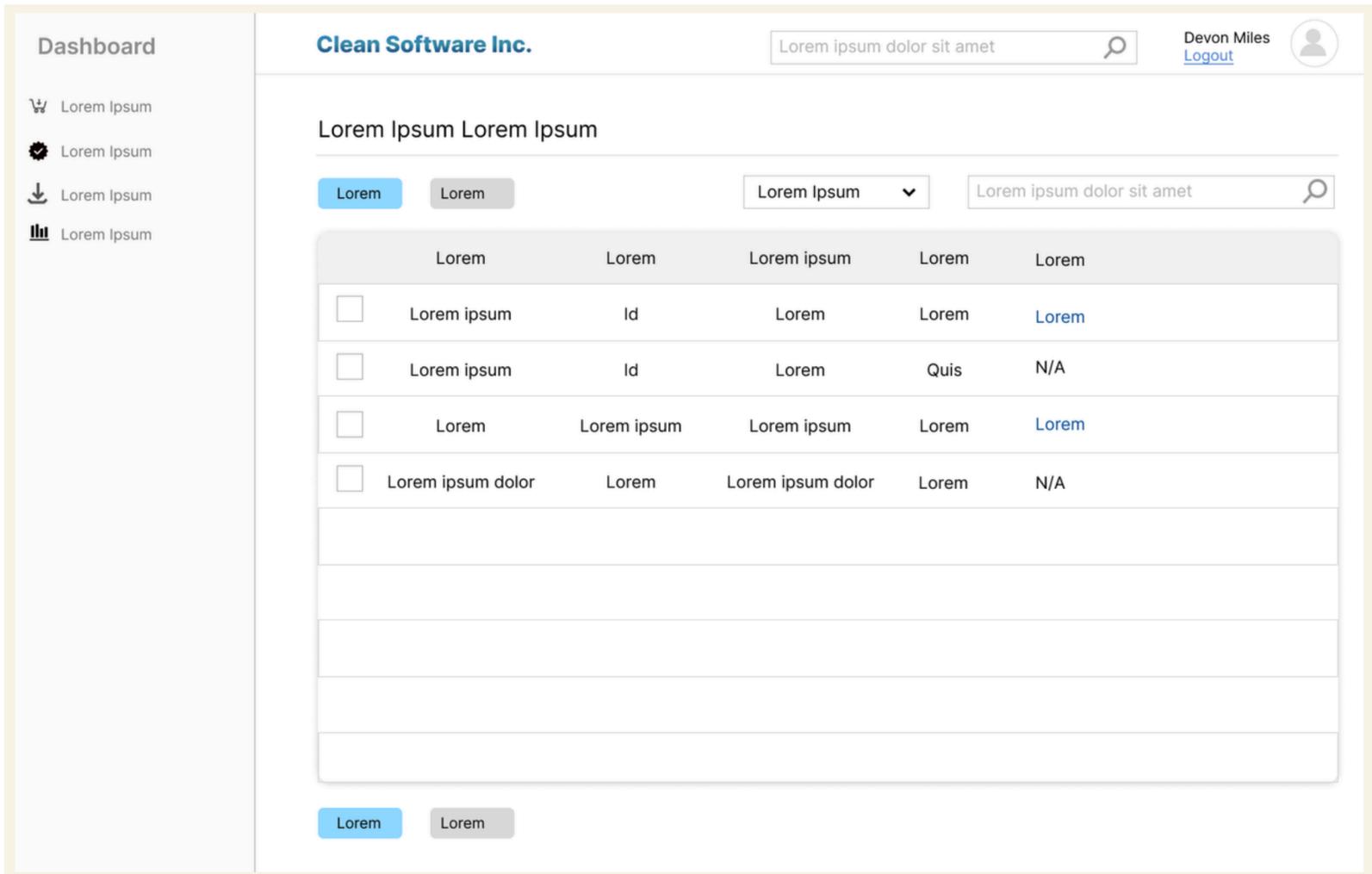
5.Templates

Specific instances of templates that show what a UI looks like with real representative content(color, text, icons, images) in place.

Dashboard

Dashboard						
W Software Procurement	**Clean Software Inc.**		Lorem ipsum dolor sit amet 🔍		Devon Miles	Logout
✔ Software Approvals						
⬇ **Software Installation**						
▥ Vertical Statistics						

Software Installation

`Install` `Uninstall`   `Filter By ▾`   `Type UserName, Vertical Name, OS , Date 🔍`

	UserName ▾	Vertical ▾	Default Software ▾	OS ▾	Status ▾	Joined Date ▾
☐	Peter Thornton	UX	Adobe Suite	MAC	Installed	01-06-2022
☐	Templeton Peck	UI	Adobe Suite	MAC	N/A	07-01-2022
☐	Lynn Tanner	UI Developer	Developer React	Windows	Installed	02-04-2022
☐	Theodore T.C. Calvin	Arcitect	Java and Database	Windows	N/A	08-07-2022

`Install` `Uninstall`

Note: Companies have different themes (colors and styles) for internet (corporate) and intranet portals(HR, ticket, leave). You can just change the color in CSS code but still maintain the Design System. That's the good use of design system. Consistency with the patterns across all the digital apps or website.

What I haven't Covered

Reusable Components document should have,
- Component name: a specific and unique UI component name, to avoid miscommunication between designers and developers
- Description: a clear explanation for what this element is and how it is typically used, occasionally accompanied by do's and don'ts for context and clarification
- Attributes: variables or adjustments that can be made to customize or adapt the component for specific needs (i.e., color, size, shape, copy)
- State: recommended defaults and the subsequent changes in appearance
- Code snippets: the actual code excerpt for the element (some design systems go as far as sharing multiple examples and offering a "sandbox" environment to try out different component customizations)
- Front-end & backend frameworks to implement the library (if applicable), to avoid painful and unnecessary debugging

Inline Validation and form field length,
- For forms, show Inline validation (error/success) feedback instead of showing the errors and what to fix after submitting the form. It helps the user to fix the error at form field level while typing and do not have to scroll back and forth.
- Field width for each form elements like Textfield, Textarea, Dropdown for Firstname, Lastname, country, address should be determined based on the text length. Do not give the same length for all the form elements.

VALIDATE THE UI BEHAVIOR

Let see how to validate your UI and check whether the user will be able to complete a task,

Create a table with one column as User and another as System,

Use Case/Task: User adds a product and checkout the cart

USER	SYSTEM
Types the url in the browser	Fetch the website based on url.
Search the product name	Display the products based on the search
Scans the products and clicks on one of the product.	Shows the product description, cost along with Add to cart or Buy Now Button.
Views the description, cost and reviews by other customers and clicks on "Buy Now" button	Displays the checkout page with wizard to fill address, delivery type, payment and success.
Reviews the total amount and Fills the address, type of delivery(one day delivery/normal delivery), input the payment information and click on Submit button.	Verifies all the data and process the payment, when product will be delivered and display the order confirmation was successful and send SMS and email confirming the order
Receives SMS or Email confirming the order.	

Chapter-7. Visual Design

1) What is Visual Design?

Visual Design

"THE ELEMENTS OF DESIGN CONSISTS OF LINE, SHAPES, COLOR, SPACE, FORM, TEXTURE AND VALUE. WHEN YOU COMBINE ALL THESE ELEMENTS IN DESIGN ITS CALLED VISUAL DESIGN."

Line: An element of art defined by a point moving in space. Line may be two-or three-dimensional, descriptive, implied, or abstract.

Shape: An element of art that is two-dimensional, flat, or limited to height and width.

Form: An element of art that is three-dimensional and encloses volume; includes height, width and depth (as in a cube, a sphere, a pyramid, or a cylinder). Form may also be free flowing.

Value: The lightness or darkness of tones or colors. White is the lightest value; black is the darkest. The value halfway between these extremes is called middle gray. Tints is white added to Hues. Shade is black added to Hues. Tone is gray added to HUE's

Space: An element of art by which positive and negative areas are defined or a sense of depth achieved in a work of art .

Color: An element of art made up of three properties: hue, value, and intensity. Hue: name of color • Value: hue's lightness and darkness (a color's value changes when white or black is added) • Intensity: quality of brightness and purity (high intensity= color is strong and bright; low intensity= color is faint and dull)

Texture: An element of art that refers to the way things feel, or look as if they might feel if touched. Texture has more Weight than solid color.

2) Visual Design Principles?

Balance, emphasis, movement, proportion, rhythm, unity, and variety; the means an designer uses to organize elements within a work of Mobile App or Desktop App. The same principles are applied in Graphic Design and Art.

Rhythm: A principle of design that indicates movement, created by the careful placement of repeated elements in a work of art to cause a visual tempo or beat.

Balance: A way of combining elements to add a feeling of equilibrium or stability to a work of art. Major types are symmetrical and asymmetrical.

Emphasis (contrast): A way of combining elements to stress the differences between those elements.

Proportion: A principle of design that refers to the relationship of certain elements to the whole and to each other.

Gradation: A way of combining elements by using a series of gradual changes in those elements. (large shapes to small shapes, dark hue to light hue, etc)

Harmony: A way of combining similar elements in an artwork to accent their similarities (achieved through use of repetitions and subtle gradual changes)

Variety: A principle of design concerned with diversity or contrast. Variety is achieved by using different shapes, sizes, and/or colors in a work of art.

Movement: A principle of design used to create the look and feeling of action and to guide the viewer's eye throughout the work of art.

As Mentioned earlier, the principles of Gestalt Theory Psychology applies to all form of design. Please go through some of the Gestalt Principles like Similarity, Proximity, Closure, Contrast, Repetition, Common Fate,
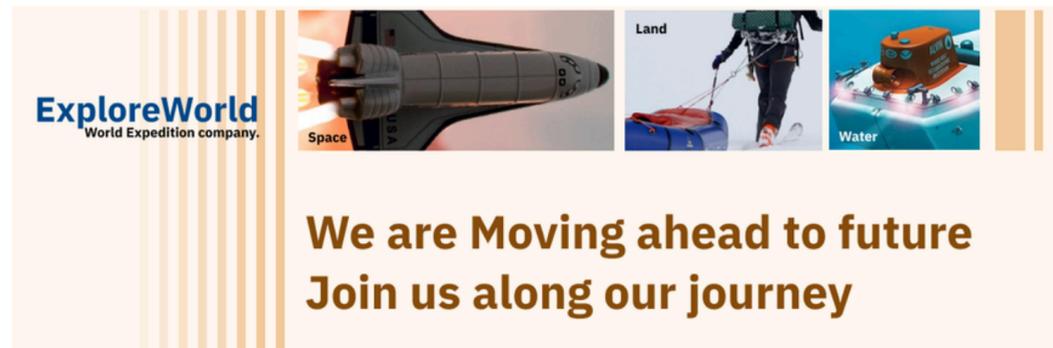

Similarity

Proximity

Closure

Contrast
by color, size
and shape
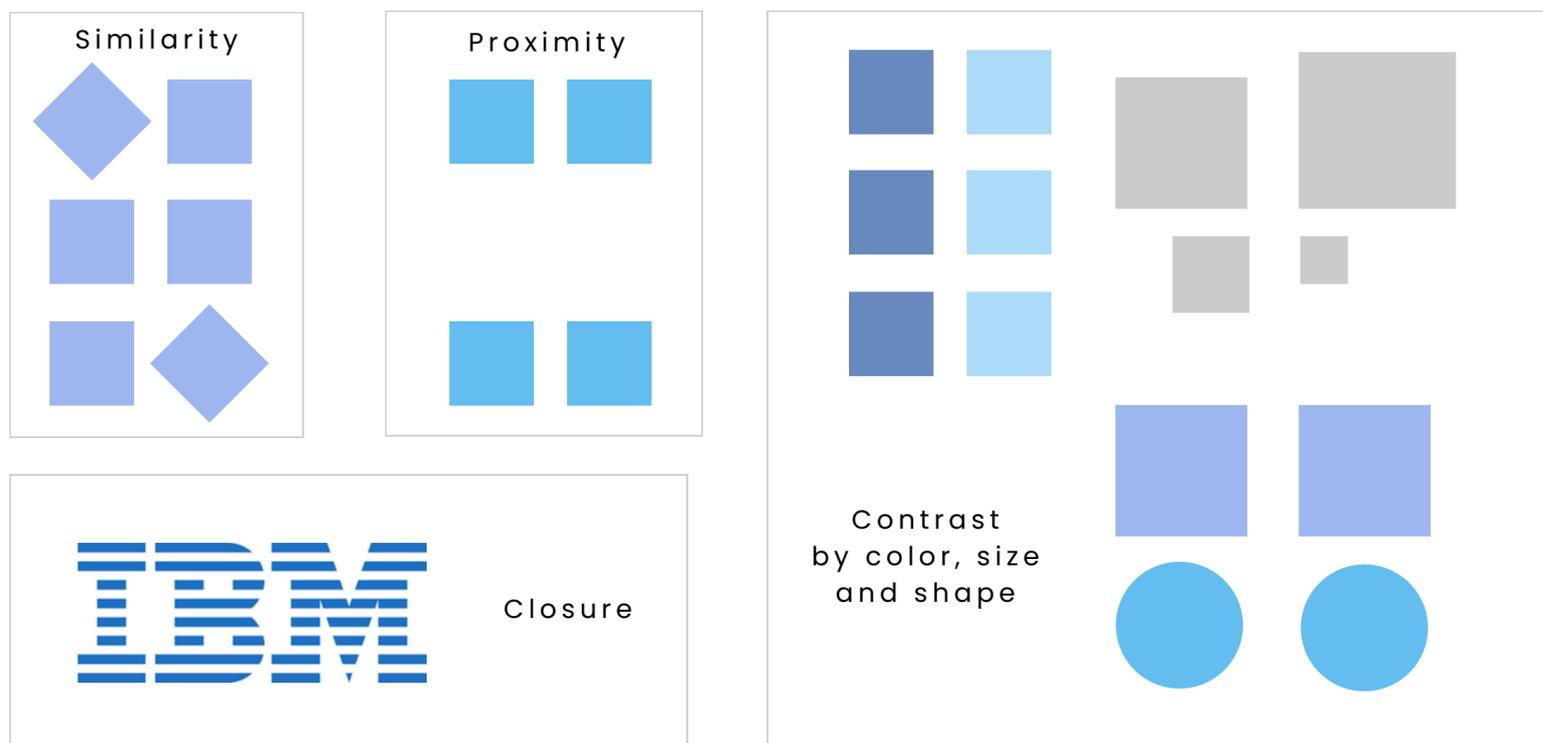
3) Applying Visual Design Principles

Gradation

Rhythm / Movement / Harmony

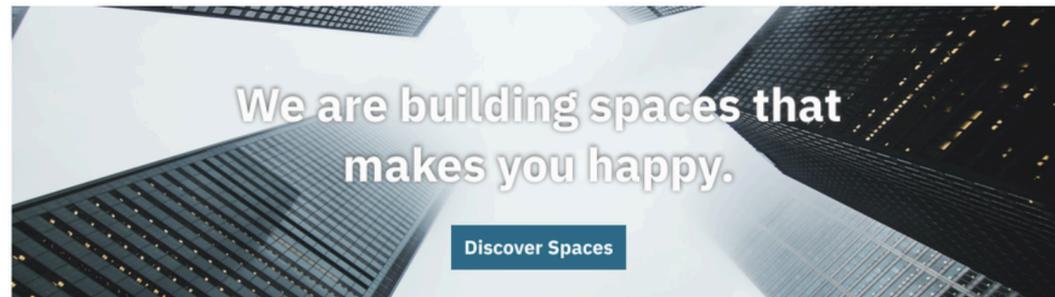**ExploreWorld**
World Expedition company.

Space

Land

Water

We are Moving ahead to future
Join us along our journey

The vertical lines when repeated provides a sense of Rhythm, images which provides movement and provides Harmony

Balance

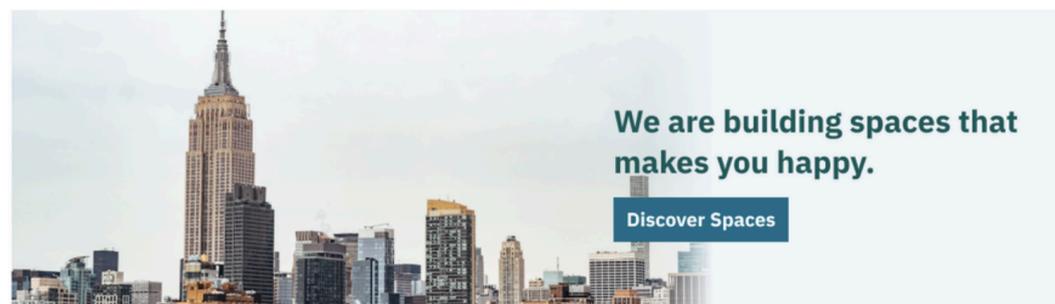**The Spaces Architects**

About US   Our Spaces   Contact US

We are building spaces that makes you happy.

Discover Spaces

Symmetrical Design

The Spaces Architects

About US   Our Spaces   Contact US

We are building spaces that makes you happy.

Discover Spaces

Asymmetrical Design

Emphasis(Contrast) / Variety

Quarterly Plan	Half Yearly Plan	Monthly Plan	Annual Plan
Rs 1700	**Rs 3000**	**Rs 250**	**Rs 10000**

Quarterly Plan
Rs 1700
Subscribe

- Rent Books
- Deliver Books
- 30 Books
- Collect Books
- Online Book Access
- Online Notification
- Download Online

Half Yearly Plan
Rs 3000
Subscribe

- Rent Books
- Deliver Books
- 90 Books
- Collect Books
- Online Book Access
- Online Notification
- Download Online

Most Affordable Plan & most value
Monthly Plan
Rs 250
Subscribe

- 10 Books
- Online Book Access
- Online Notification
- Online Reading

Annual Plan
Rs 10000
Subscribe

- Rent Books
- Deliver Books
- 180 Books
- Collect Books
- Online Book Access
- Online Notification
- Download Online

Proportion

Most Affordable Plan & most value
Monthly Plan
Rs 250
Subscribe

- 10 Books
- Online Book Access
- Online Notification
- Online Reading

Analysis on daily basis and book recommendation

The UI Pattern Card holds the other elements. All the other UI elements are part of the Card and elements to the whole and to each other in form of symmetry and visual weight.

Visual Designer is also repssonbile for creating the style guide,

Primary Colors

Secondary Colors

Neutral Colors

Font

I am IBM Plex Sans
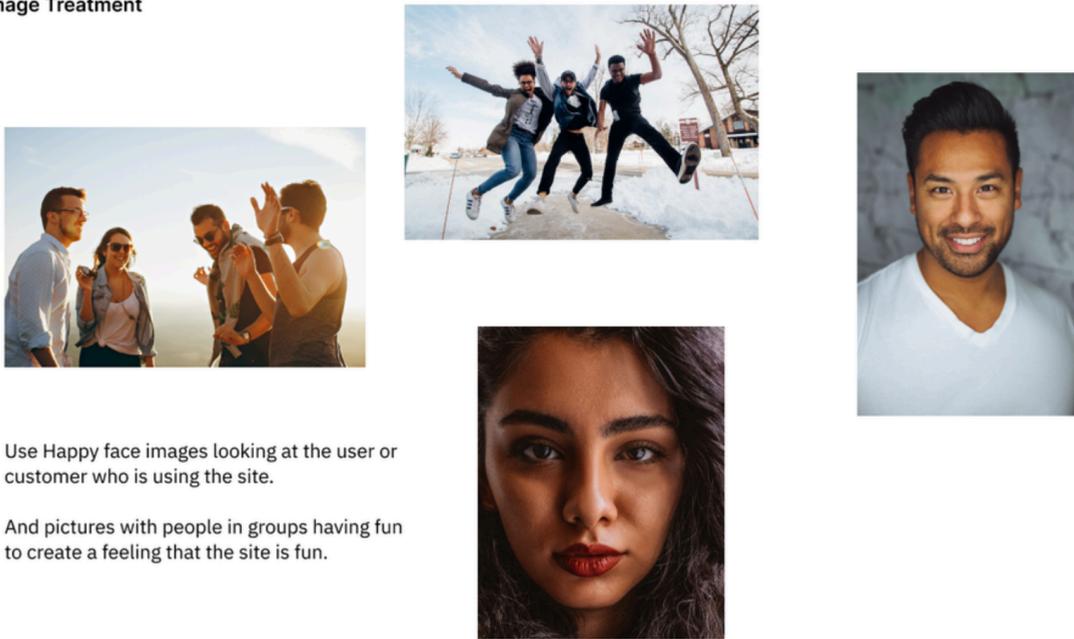
I AM IBM PLEX SANS   uppercase for button text

I AM IBM PLEX SANS   16px for body text

I am IBM plex sans   h6 - 16px

I am IBM plex sans   h5 - 20px

I am IBM plex sans   h4 - 24px

I am IBM plex sans   h3 - 28px

I am IBM plex sans   h2 - 32px

I am IBM plex sans   h1 - 36px

Follow 4point pixel font for Mobile and Desktop

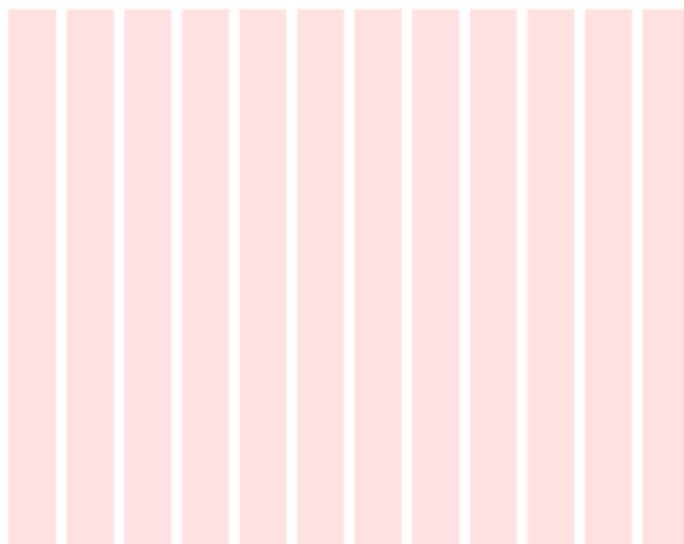4, 8, 12, 16, 20, 24, 28, 32, 36

Image Treatment

Use Happy face images looking at the user or customer who is using the site.

And pictures with people in groups having fun to create a feeling that the site is fun.

Iconography

44px   55px
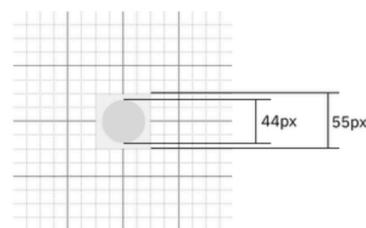
Grid Layout

Chapter-8. Usability

1) What is Usability?

"USABILITY REFERS TO WHEN PEOPLE USE A PRODUCT ARE THEY ABLE TO USE IT EFFICIENTLY, EFFECTIVELY, FIND IT USEFUL , MEMORABLE, DESIRABLE, DELIGHTFUL AND LEARN TO USE THE PRODUCT WITHOUT MUCH TROUBLE "

"USABILITY IS, THE PRODUCT YOU ARE USING SHOULD BE USABLE AND EVEN A PERSON BELOW AVERAGE AND EXPERIENCE SHOULD BE ABLE TO USE IT"

Efficient, are you able to complete the job with reasonable time and effort while using the product.?

Effective, are you able to complete the Job or does it get the job done by using the product?

Useful, Do people needs are met or done?

Memorable, Do people have to re-learn each and every time they use it?.

Desirable, Do people want it?

Delightful, Is it enjoyable or fun and aesthetically pleasing?

Learning, Can people figure out how to use it for the first time?

2) Usability Principles

Do not make me think. When you make people think while using your product your taking lot of mental resources of the user. EX: The text of a button says "Job apply" "Apply for job" Which will be easy for the user to understand?. So the UI or the text should be easy to understand, Obvious, Self Evident and sometimes Self Explanatory.

Users Don't Read pages, Users Scan them, People come with tasks. If you have lot of features in the website, users will try to find out the one feature or link or button to complete the task. So make it available to the user easily so that they can complete it.

- Use Convention as possible, the widely used or standardized design patterns EX: Red color for error message, Green for Success Message. Only when there is a need for innovate do it.
- Create Effective Visual Hierarchies
- Break pages up into clearly defined areas.
- Make it obvious what's clickable (cues affordance and signifiers)
- Eliminate distractions.
- Format Content to support scanning
- If you want significantly clearer by making it slightly inconsistent, choose in favor of clarity.
- Sometimes "Clarity trumps consistency"

Users do not make optimal choices and muddle through, People try to find a reasonable option and click it so that it leads to what they are looking for. Its called Satisficing (Satisficing is a decision-making strategy that aims for a satisfactory or adequate result, rather than the optimal solution.)

Why people make people optimal choice?
People are in hurry, no penalty for guessing wrong- you can use back button to go back, weighing options may not improve chances - effort for best choice do not work and first guess is fine in poorly designed web sites and guessing is more fun - guessing is faster instead of weighing option.

Why people muddle through?
When you ask people what is web browser. Some say "I use it for search" "Its search engine". But for designers a web browser is a web application that is used to browse web pages.

1) For some people, things or products not important to them like how things work or how to use them. Its not lack of intelligence, but for lack of caring. Its just not important to us.

2) And lastly, If users find something that works, users stick to it. People tend not to look for a better way unless they find a better one.

Three Mindless, Unambiguous clicks equal one click that requires thought. 3clicks = one click(lot of thoughts). Even when there is more number of clicks to get what users want and requires the amount of thought and the amount of uncertainty the user's don't mind the number of clicks as long as each click is painless and they have continued confidence that they are in right track which is called "scent of information".

Some assistance may be required when some choices really aren't simple. When there is difficult choice, you need to go out your way and provide some guidance. The guidance should be,

Brief**:** The smallest amount information that helps the user.
Timely**:** Placed so when the user needs it
Unavoidable**:** Formatted in a way that users will notice it.

Example: Placing Tooltips adjacent to form fields. Like "What's this" or "?"

Omit needless words. Writing in concise with no unnecessary words, sentences, lines reduces the noise level of the page, makes the useful content more prominent, pages shorter allowing users to see more of each page at a glance without scrolling. Ex: Instructions and comments how users fill the form or use the product.

Just read this story why people remember useful things. In book called, A study in Scarlet where Dr.Watson is shocked to learn that Sherlock Holmes doesn't know that the earth travels around the sun. Given the finite capacity of the human brain. Holmes explains, he can't afford to have useless facts elbowing out the useful ones.

"What the deuce is it to me? You say that we go round the sun. If we went round the moon it would not make a pennyworth of difference to me or to my work"

Itapplies for Usability principles, the most valuable contributions designers make to each project always from keeping just a few key Usability principles in mind. Instead of lot of do's and dont's.

EXPERTS FROM BOOK "DONT MAKE ME THINK" BY STEVE KRUG, USABILITY EXPERT.

3) Usability for Desktop and Mobile

Usability for Desktop

After the release of PC and Mac users all around the world interact with Web Apps or web pages on their browser run applications like Office 360 and due to the size of the monitor screen or laptop screen or real estate people use applications to create design, for programming and gaming.

Today in the year 2023, the Operating System(OS) has improved, productivity has improved and people are still using desktop applications. Desktop or PC is not going anywhere soon until a new way of creating apps without use of PC an Laptop. Even to write and view AI algorithm you need a PC . Lets see some usability guidelines for Desktop applications and Web App,

1. Navigation - Which should be primary navigation and which should be persistent navigation. Do users understand the navigation labels and understand it. When to have persistent navigation and change nav options based on users login.
2. Do they know How did they get a web page or screen, where they are, what to do, where to go. Ex: Bread crumbs
3. If they are navigating to a page does it provide value or the information they are looking for?
4. Are the sections and groups is clearly defined. Its easy to process and helps users to complete task.
5. Are they able to complete the task with less time and effort and able to complete the Job.
6. Do people learn how to use or re-learn to use it.
7. Do people discover, understand the cues present in the screen. Which is clickable and not clickable.

Usability for Mobile

Mobile with touch screen became more popular after the invent of IPhone around 2007 by Steve Jobs. So designers need to design for touch, tap, pinch, zoom, swipe and other gestures. Let see some usability guidelines for Mobile.

1. Space - Usability should not be sacrificed because of space constraint.
2. Affordance and Signifiers should be obvious and self-evident.
3. Use colors based on context of use. Bright or Dark Environment, so its easy to view in the mobile under sunlight and dark places.
4. Responsive Design - Make sure which information or feature should be present to the user because of the screen size to ensure task completion and apps should be delightful, learnable and memorable.
5. Follow, Less information is more(To do List App or Notes App) or More Information is less(Banking APP or Food App) based on the context while designing apps.
6. UI elements target size is easy to tap, touch or swipe and other gestures can be performed with less motor cognition.
7. Use bottom to top approach. The UI elements present below the screen(bottom navigation) is easy to tap with fingers in one hand than the elements present on the top.

These are some of the guidelines for Desktop and mobile. If you follow the principles present in information architecture, interaction design and visual Design it will improve overall Usability issues.

4) Conducting a Usability Test

To test Mental model use Expectancy test,
To test Organization of content use Reverse card sort,
To test Navigation design use Performance test,
To check Affordance use Visual Affordance test
To test Brand message use Brand definition test.

Usability Testing

A usability session happens in a Usability Lab. Usability sessions are pre-planned by people who are part of the session. Observer, Interviewer, and the participant are required in the sessions with final prototypes. The sessions will be recorded.

Observer: He is the person who observes the entire session what the interviewer and the participant do during the usability session and takes notes during the session.

Interviewer: He is the person who gives a list of task to the participant and perform the task using prototypes or wireframes on PC or Mobile. He will ask open ended questions to the participant when they are stuck in the task.

Participants: The participants are screened for the sessions and they will be given task to perform and will be recorded.

The recorded session will be played by the people who are part of the project and re-iteration is done. Sometimes the participant is asked to fill the feedback form which is also taken into account by the design team..

Guerilla Usability Testing

This testing does not require much cost, effort or participants. But, Guerilla testing should be conducted when you want feedback on discoverability, understanding like affordance and cues and what the application does overall. You cannot find all the errors in this testing.

You can conduct within your teams or from other vertical or clients or from business and explain them about the product and ask them do certain task and do they understand the product.

User Experience Form

When both of the above testing is not possible try sending a UX form with closed ended and open ended questions to the participants or people who have been using the product to find the problems, mental model, frustrations, frequent tasks they perform, what works and not works, happy path and unhappy path to understand and validate your assumptions.

Heuristic Principles

Usability Heuristics Every Designer Should Know from Norman Nielsen website when you want to do a expert review during the project or after the project or use it to review legacy product.
1. Visibility of system status
2. Match between system and the real world
3. User control and freedom
4. Consistency and standards
5. Error prevention
6. Recognition rather than recall
7. Flexibility and efficiency of use
8. Aesthetic and minimalist design
9. Help users recognize, diagnose, and recover from errors
10. Help and documentation

NOTE: I HAVE ATTENDED TWO LIVE USABILITY SESSIONS. MOST OF THE SESSIONS FEEDBACK IS GIVEN BY THE BUSINESS OR PROJECT MANAGER FROM DOMAIN VERTICALS I HAVE WORKED. IT VARIES DEPENDING ON THE PROJECT.

Chapter-9. Future of Design

1) My Take on Design

Let's see the various disciplines of design,
Graphic Design, Visual Design, UX/UI Design, 2D & 3D Design, Industrial Design, Package Design, Game Design, Fashion Design, Architecture Design and many more....

The designers who are part of the above disciplines make the design to work. Design is how it works. But to make the design work it has to connect with the users and it should be aesthetically pleasing for a delightful experience.

What is Design?
There are many definitions for Design. Some of them are,
- Design is not how it looks. But, How it works.
- Design is aesthetically pleasing.
- Design is how it look and feel.
- Design is combination of either text, lines, shapes, color, texture and images.
- Design is visual elements that aids to complete the task while using the product.

All of them are true. Graphic design as we know it today really started developing in the modern era, rest of the disciplines have branched out. I started as Web designer then worked as graphic designer, multimedia developer, UI Designer and now UX Designer. Graphic Designers while creating a poster or brochure make sure the designed artifact passes the message (information) to the user or people who are looking it. The user process the information and understands what's written in the poster or brochure.

There are lots of **Design Principles** for Graphic Design, UX, UI, Usability, Interaction. All these **principles were derived from years of research by people in Psychology, research about human brain to understand human behavior's like thinking, seeing, remember, decide, attention, motivation ,feel.** If you need to get better at design read a lot about Psychology on human behaviors. Do not read and just apply those principles, question the existing principles. You will be able to understand and have different perspective. Design is debatable. You need to have proper facts to backup your design decisions.

Questions like,

Why there is too much space in the screen or webpage?
Ans: Space in design is used to increase readability and findability to draw users focus on the UI while he is performing a task.

Why do you have text from left to right / right to left?
Ans: In some countries people read from left to right and have information start from left. In some cases people read right to left. Its cultural constraint.

Why do we have wizard?
Ans: The task is complex. Using Wizard (progress bar) show the sequence of steps that user has to perform 1/6, information broken logically and user do not have to process more information, the user can save the information and come back later to perform the task, steps broken from importance high to low, to show progress of the task and motivate the user to complete the task.

Why not the red color instead of orange or green color?
Ans: Around the world people perceive the color red signifies warm or warning, the color orange signifies creativity, wisdom. The color green signals success, fertility, healthy. Red attracts more attention. Even though it varies based on culture.

Why the specific feature is not shown in first place?
Ans: People have high cognition load(too much to process) when we display lot of information in the screen. In this present context we do not have to show the feature and user is not going to use it.

As discussed in Human Psychology chapter, design should consider Human Cognition and Emotions. As a designer spend lot of time reading Human Psychology books related to UX. Persuasion is another chapter which I haven't covered. Persuading people to buy your products or influencing the decision making.

https://www.usertesting.com/blog/9-behavioral-psychology-books-for-persuasive-ux-design

There are different types of designers in UX/UI Design, you need to decide what you want to learn or get specialized in one or more skills.
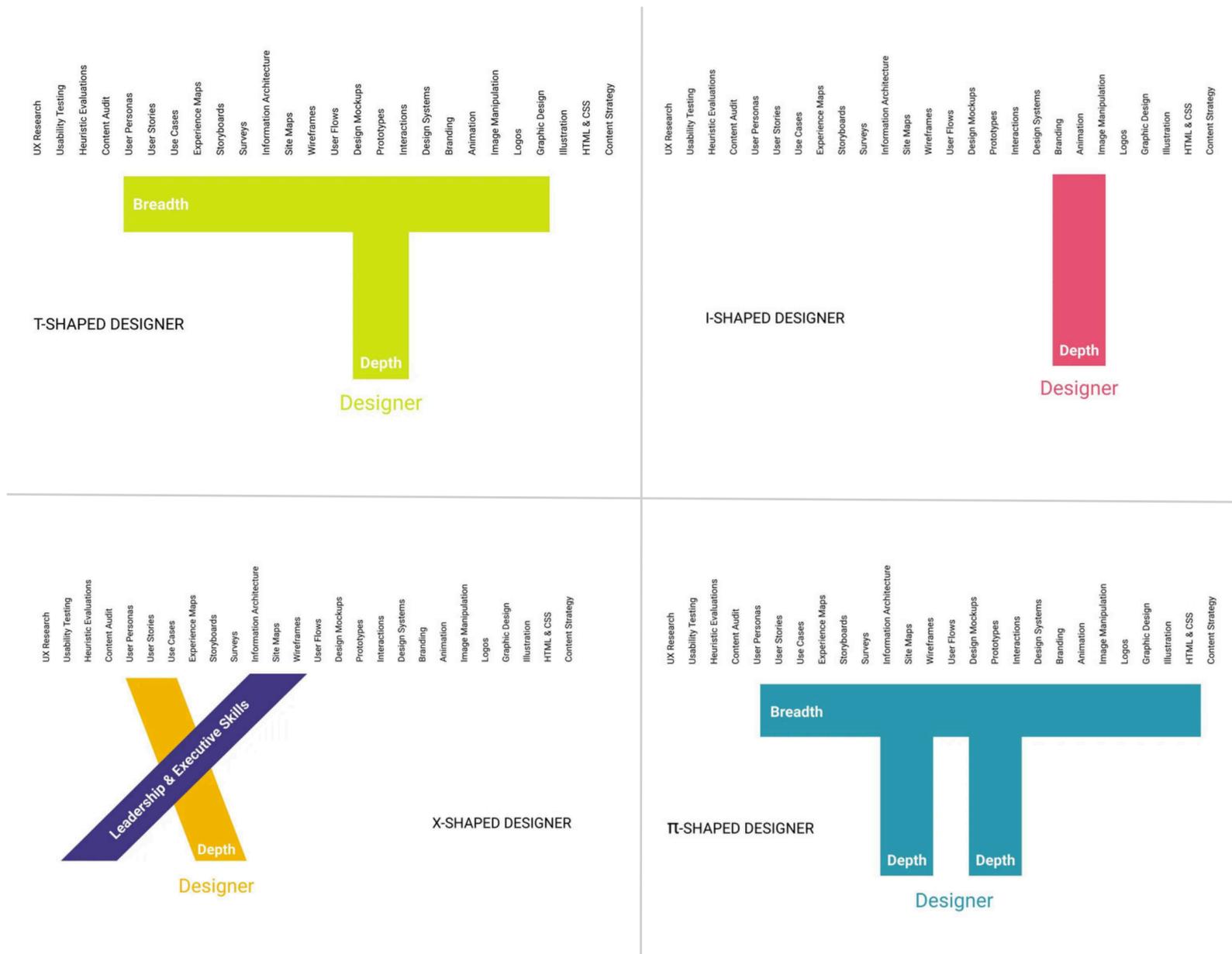
T-shaped designers are great for working cross-teams and i-shaped designers are experts in their field. X-shaped designers are highly desirable unicorns with leadership capabilities and pi-shaped designers are making the flow more efficient by making connections between two or more disciplines. And there are Generalist: A generalist has a broad number of responsibilities. A majority of UX design jobs are generalist positions, especially at companies with fewer UX designers.

For more reading, https://www.uxbeginner.com/i-x-and-t-shaped-designers/

What is the future of design?

Design has evolved significantly from graphic design and has branched into various fields. Today, UX/UI and product design play a crucial role in every company, focusing on creating better user experiences

With the invention of touchscreen mobile devices, the digital world became widely accessible. Today, we see advancements in 2D/3D graphics, audio/video consumption, voice recognition, AR/VR, haptic feedback, sensors (such as iris and fingerprint scanners), and AI—all of which are shaping the future of design. AI can generate images, poems, screen designs, and ideas. In hardware, people are exploring innovations beyond just mobile and laptop devices.

The Future of Design: Innovation in Digital Space

Innovation in the digital space is evolving rapidly. As mentioned earlier in human psychology, our cognitive load (including memory, visual processing, and motor skills) influences how we interact with products. Vision is the dominant sense when it comes to designing for humans. For effective design, the visual cues should be compelling enough to invite touch and interaction.

Consider how we interact with mobile apps: first, we see the UI, read the text, and then engage using simple gestures like tapping, swiping, or pinching. These actions are efficient and require fewer mental resources compared to voice commands or complex gestures.

However, when we look at AR/VR, interacting in 3D space with gestures or voice commands can be much more demanding. For instance, imagine ordering 10 products in AR/VR—constantly waving your hands to rotate, zoom, or move the objects, all while dealing with potential eye strain from reading descriptions through AR/VR lenses. Additionally, switching devices, adjusting voice feedback, or reconnecting your devices creates friction in the experience.

Now, compare that to using a mobile device: browsing is easy, you can add products to your cart, and checkout with a simple tap. There's no need for gestures or voice commands. Even when distractions arise, you can effortlessly return to where you left off. The simplicity of just using fingers and a touch screen makes mobile browsing a far more efficient solution.

The Case for Simplicity in Innovation

So, which is easier? A mobile device with minimal mental resources required, or AR/VR that demands much more cognitive effort, along with additional devices? The simplicity of using just a touch screen and minimal gestures is undoubtedly more efficient. Mobile devices allow users to interact with content seamlessly, without additional physical and mental strain.

Innovation in design should focus on simple solutions—those that don't complicate the user experience or overburden cognitive resources. Replacing existing tools for the sake of innovation isn't always the answer. Users will always seek alternatives unless the new solution offers clear, intuitive advantages that fit into their daily routines.

Can AI Replace Human Creativity?

Finally, a pressing question for the future: Can AI replace human experiences like daydreaming, mind-wandering, creativity, or even our senses of smell and taste? While AI can generate ideas, solutions, and even new designs based on available data, it remains uncertain whether it can replicate the richness of human experience. For now, we can only wait and watch as AI continues to evolve.

Innovating with design should look for simple solutions. Not complicated and not to use too much of mental resources. Do not just try to replace things for sake of it in name of innovation. Remember people will find alternative or consume only when there is a better solution which they use in day-to-day activities.

Many good products have failed and many bad products have succeeded in the market. While designing a product as said earlier think of this,

Efficient, are you able to complete the job with reasonable time and effort while using the product.?

Effective, are you able to complete the Job or does it get the job done by using the product?

Useful, Do people needs are met or done?.

Memorable, Do people have to re-learn each and every time they use it?.

Desirable, Do people want it? Do people throw it after first use or do not return to use it.

Delightful, Is it enjoyable or fun and aesthetically pleasing?

Learning, Can people figure out how to use it for the first time?

Chapter-10. Bootstrap (Responsive design)

1) Responsive Design

1) What is Responsive design?

Responsive Design is, your website layout should change and adapt based on the device width. When your designing the website make sure which feature needs to be present and which is not needed or hidden when the layout changes.

Responsive Design is also the elements like images, text or column in the layout should be fluid (automatically re-size) in nature and the column layout re-arranges based on the device width.

2) What is Bootstrap?

Bootstrap is a free and open-source CSS framework directed at responsive, mobile-first front-end web development. It contains HTML, CSS and JavaScript-based design templates for typography, forms, buttons, navigation, and other interface components.

3) Creating a prototype using BootStrap

Generally I use to create the design in Figma. For Demo purpose I have created in Html Page. You can keep it as a reference.

Go to the below link, https://getbootstrap.com/docs/5.3/getting-started/download/

Download the Compiled CSS and JS. And place the bootstrap.min.css in CSS Folder. Insert the code in header section. This will load the CSS when Html page is rendered. <link rel="stylesheet" href="css/bootstrap.min.css">

Add javascript.min.js in Javascript folder. Insert the code before body close tag. This will load the script at the end after the HTML Page is rendered fully. <script src="js/bootstrap.bundle.min.js"></script>

Do not change or touch any of the code in these two files. You can use the same color, component and forms as it is. If you need to create a new CSS file for layout or color changes create a file mynew.css file in CSS folder to write your own CSS. The bootstrap.min.css will have pre-defined css rules for layout , nav, and all the components.

You cannot remember every CSS rule present in the document and use it in you HTML page. Go to this link, https://bootstrap-cheatsheet.themeselection.com/   or https://getbootstrap.com/docs/5.0/examples/cheatsheet/

You will find all the CSS Rules.

Step 1

Create a HTml page with the following code,

```
<!doctype html>
<html lang="en">
<head>
<title>Homepage</title>
```

```html
<!-- UTF character and device width responsive (important for the file)-->
```

```
<meta charset="utf-8">
<meta content="width=device-width, initial-scale=1.0" name="viewport">
```

```html
<!-- font (import any font from google)-->
```

```
<link rel="preconnect" href="https://fonts.googleapis.com">
<link rel="preconnect" href="https://fonts.gstatic.com" crossorigin>
<link href="https://fonts.googleapis.com/css2?family=Poppins:wght@200;300;400;500&display=swap" rel="stylesheet">
```

```html
<!-- bootstrap css file (import any font from google)-->
```

```
 <link rel="stylesheet" href="css/bootstrap.min.css">
```

```html
  <!-- Bootstrap Icons (only if required) -->
```

```
  <link rel="stylesheet" href="https://cdn.jsdelivr.net/npm/bootstrap-icons@1.7.2/font/bootstrap-icons.css">
```

```html
  <!-- my style sheet (my own style sheet)-->
```

```
  <link rel="stylesheet" href="css/mynew.css">
</head>
```

In body tag write the following code before the </body> tag,

```
<body>
```

```
<script src="js/bootstrap.min.js"></script>
```

```
</body>
```

There are many css rule in Bootstrap. I am going to explain some of the rules along with HTML Tags. Others you can just copy the code and place it in html page. You can play around with all the CSS rule to get an idea how it works in the browser.

1) For <nav> Uses only the nav present in the Bootstrap. Just use the code from Bootstrap.

2)To separate the content as per semantic rules. Use <section> </section> tag,
<section><div class="row"> <p></p> </div> ....</section>

3) If you need to make a div fluid(stretch across the page) use <div class="container-fluid"></div> and if you need to make a div center and fix to 1320px in large device use <div class="container"></div>

4) To create rows use <div class=row></div>

And if you need to place equal column's inside rows,

<div class="container"><div class=row>
                        <div class="col-12 col-md-6 col-lg-6 col-xl-6 col-xxl-6"></div>
                        <div class="col-12 col-md-6 col-lg-6 col-xl-6 col-xxl-6"> </div>
</div>

There are 12 columns in the Bootstrap GRID. so you can specify Col-12 directly for one column

 or use col-3 for four columns. 3x4 = 12. or
 use col-4 for three columns 4x3 = 12. or
 combination of col-5, col-5, col-2, (5+5+2 =12)

You can use col-md-12, col-lg-12, col-xl-12, col-xxl-12 to target specific device.

First write col-12 and then which device you want to target. col-lg-6, col-xl-6, col-xxl-6. The rest of the device sm or md will stay col-12 for the divs and it will break based on the device-width.

6) Flex - Bootstrap uses flexbox layout. Refer https://css-tricks.com/snippets/css/a-guide-to-flexbox/ for flex CSS Rules in bootstrap.

7) CSS Selectors, Please use class selector in most of the scenarios like .headerContent. And only when you want to target one element use ID selector with #maincontent. And other selectors from W3Schools.
https://www.w3schools.com/css/css_selectors.asp

8) MediaQueries

You can target CSS rules based on the device width,
Min-width: 567px means device which has width >=567px greater and above.
Max-width: 768px means device which has width less than <= 768px

and the code for targeting based on max-width and min width is,

/* for targeting device less than <= 768px; */

@media (max-width: 768px) {
 h6{
 font-size: 28px
 }

 .d-inline{
 display: inline !important;
 }

 .topSpace{
 margin-top: 30px;
 }
 }

/* for targeting device greater than >= 768px; and less than <=1199.98px*/

@media (min-width: 768px) and (max-width: 1199.98px){   }

Try to understand the basic rules,
Please play around the CSS rules present in the bootstrap website in the below link,
https://getbootstrap.com/

THE END