"Project report submitted in partial fulfilment of requirement for the award of"

USER INTERFACE & USER EXPERIENCE DESIGN

Degree of
Bachelor of Science

By

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CERTIFICATE

This is to certify that the project report entitled
"USER INTERFACE & USER EXPERIENCE DESIGN "

Submitted By

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record of work carried out by him in partial fulfilment of the requirement for the award of the Degree of Bachelor of Science (Computer Science), as prescribed by the Dr.V.S. Krishna Govt. Degree & P. G. College(A) in the Academic Year 2021- 2022

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DECLARATION

I hereby declare that this project report entitled " USER INTERFACE AND USER EXPERIENCE" is the result of my original work done by me and to the best of my knowledge a similar work has not been submitted previously to any other university or published any time before . This project is submitted on partial fulfillment or the requirement for the award of the degree of bachelor of science

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DATE :

ABSTRACT

Advances in personal computing and information technologies have fundamentally transformed how maps are produced and consumed, as many maps today are highly interactive and delivered online or through mobile devices Accordingly, we need to consider interaction as a fundamental complement to representation in cartography and visualization. UI (user interface) / UX (user experience) describes a set of concepts, guidelines, and workflows for critically thinking about the design and use of an interactive product, map-based or otherwise. This entry introduces core concepts from UI/UX design important to cartography and visualization, focusing on issues related to visual design. First, a fundamental distinction ismade between the use of an interface as a tool and the broader experience of an interaction, a distinction that separates UI design and UX design. Norman's stages of interaction framework then is summarized as a guiding model for understanding the user experience with interactive maps, noting how different UX design solutions can be applied to breakdowns at different stages of the interaction. Finally, three dimensions of UI design are described: the fundamental interaction operators that form the basic building blocks of an interface, interface styles that implement these operator primitives, and recommendations for visual design of an interface.

OBJECTIVES

1. Understand what user experience (UX) means and how it Matter
2. Understand how to approach UX and usability
3. Understand how to approach UI design

INTRODUCTION

User Experience

UX stands for User Experience, and, as the name suggests, UX design encompasses the end-user's interaction with the company, service, or products. It's worth mentioning here that this process can be applied to just about anything – from street lamps to websites. In theory, it's a non-digital practice that focuses on the overall feel of a product or service.

More often than not, UX is used in digital industries, as it involves the interaction between the user and the service. UX design is the broader term for considering all thedifferent elements involved in this experience. The main consideration is for how the user feels when experiencing the product and how easy it is for them to use the product or service.

UX design is not about how the service or product looks – it is solely focused on the actual experience that the user has with the product. This could be regarding how easy the checkout process is online, or whether your online banking app makes it easy for you to manage your money. UX doesn't concern the visual experience – just the quality of interaction.

User Interface

UI is the acronym for User Interface. Unlike UX, UI is strictly a digital term and concerns the look, feel, presentation, and interactivity of a product or service. It's the point of interaction between the user and the digital product – for example, the touchscreen on your phone, or even the screen you use to choose what sort of coffee you want on a coffee machine UI involves making the user interface of the product as intuitive as possible. This involves considering every visual or interactive thing that the user might encounter. From typography to colour schemes to responsive design, a UI designer's main aim is to make the user's experience with the digital product as interactive and appealing as possible.

As a UI designer, you are required to transfer the product's development, research, content, and layout into an attractive and responsive experience for users. The design has to beconsistent, coherent, and, most of all, aesthetically pleasing. You want to create something where the user doesn't have to think too much and can navigate quickly and easily.

User Interface (UI) and User Experience (UX) Design play key roles in the experience users have when interacting with digital products and applications. In this course, we'll cover the theory and methodologies behind UI and UX design. You'll also design your own wireframes and interactive prototypes. Learning UI and UX basics can help you collaborate better on team projects and create new career opportunities.

Skills you gain

- Learn UI/UX theory and practice
- Understand common methodologies
- Practice new skills with Figma

What you'll create

Wireframes

Apply design frameworks to create low-fidelity wireframe deliverables.

Prototyping with Figma

Transform low-fidelity wireframes into high-fidelity, interactive prototypes using Figma.

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CHAPTER -1
(USER EXPERIENCE DESIGN)

1.1 USER EXPERIENCE DESIGN

This article is for those who have heard about UX (User Experience) and wanted to know what is UX, why it is so important, and how to become an expert of it.

Now a days majority of companies are starting to realize the importance of their products and experiences around the user. They're hiring the professionals who can create best UX practices and refocus their business approach.

UX maturity

Measurement mechanism that allows you to understand how likely an organisation is to implement a user- centered approach to product development.Being familiar with UX maturity and how to assess it within an organisation is to understanding UX.

The following personas got 4 variations of UX maturity, and they're applicable to individualsor entire organisations.UX maturity is a

1.2 Barrier persona

The successful approaches to improve UX maturity in the barrier modelincrementally produce UX that don't interrupt project timelines. It produce the user flow based on traditional business requirements to demonstrate the requested flow anda better, proposed flow that reduces task completion time Common issues from an organisation in the barrier model:

- Not having the time in project timelines to allow for additional work
- Not having the appropriate funding to invest in resources
- Clients who aren't supportive of or interested in a UX approach

1.3 Apprehensive persona

Tie UX artifacts to improved business processes, a reduction in taskcompletion time, or an increase in revenue. Hard benefits may be difficult to reduction in task complete

come by without detailed metrics, but outlining soft benefits is still beneficial. In order to grow maturity to the next level, focus should be placed on expanding the breadth of the UX process in established projects and continuing to break down barriers that are still resistant.

1.4 Supportive persona

Adoption of the UX process extends beyond a small percentage of total projects, and people are reaching out to request UX artifacts for a wide variety ofprojects.

Grassroots efforts with individuals throughout the company have paid off, and now it's time to focus upwards. Because things are going well, you may think that people or companies should progress rapidly from the supportive persona to the advocate persona. This misconception can lead to frustration, especially if you've grown maturity from the barrier or apprehensive persona.

Advocate

The product roadmaps, project strategy, and business decisions are driven by UX or user-Centered approaches.

1.5 USER INTERFACE DESIGN

Usability is the most important quality of any app. It doesn't matter how good a feature is if the users don't know how to get to it or can't figure out how to use it. In the cutthroat environment of the mobile app market, users almost always have alternatives. If anapp doesn't feel right or if users can't figure out how to perform the main tasks, they will very often uninstall it without giving it a second chance.

The user interface is users use and view your app. Everything that lies beyond isreflected in the UI. If your killer feature provides the next generation cloud communication (or whatever the most awesome
capability of your app is) but isn't intuitive, you risk wasting hundreds of hours building something that users won't even try.Getting the user interface right requires investment into design. This chapter introduces concepts and ideas that make it easier to understand the importance of that investment. It also explains key concepts of the design process and provides some ideas for making users a more integral part of your design process.

1.6 Direct observation

Interviews and on-site user visits put you directly into the user's world. You can ask users about what their goals are and what tasks they typically do. Usually done "on location," where users would actually use the software (e.g., ina workplace or at home), interviews can be structured—with a predefined set of questions—or unstructured, in which you might probe whatever subject comes up. Interviews give you a lot of flexibility; you can do many or a few, long or short, formal or informal, on the phone or in person. These are great opportunities to learn what you don't know. Ask why. Ask it again.

1.7 Case studies

Case studies give you deep, detailed views into a few representative users or groups of users. You can sometimes use them to explore "extreme" users that push the boundaries of what the software can do, especially when the goal is a redesign of existing software. You also can use them as longitudinal studies— exploring the context of use over weeks, months, or even years. Finally, if you design custom software for a single user or site, you'll want to learn as much as possible about the actual context of use

CHAPTER-2
(User Interface Design)

2.1 User interface

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

There are four prevalent types of user interface and each has a range of advantages and disadvantages: Command Line Interface.Menu-driven Interface. Graphical User Interface. Touchscreen Graphical User Interface.

The user interface (UI) is the point of human-computer interaction and communication in a device. This can include display screens, keyboards, a mouse and the appearance of a desktop. It is also the way through which a user interacts with an application ora website.

2.2 Designing the user interface

The apps were simple, but they taught you a lot about how the different parts of App Inventor fit together. In this chapter, you'll build on this to makeapps that look fun and do interesting things using graphics and sound. The basic app you'll make is called Getting to Know Ewe. Prod the sheep, and it makes a cute "baa!" sound. You'll then improve the app to make the sheep disappear in fright if you shake the phone—an app called Ewe Scared Her!

The People choose to download apps because the apps do something useful, look attractive, and are as easy to use as possible. The "doing something useful" bit is what this book is all about. This chapter focuses on the second two aspects—making an app that looks attractive with a really simple user interface.

Use of shape and colour in UI

The use of shape and colour in a UI is crafted purposely by the designer to makethe player feel a certain way. Successful UI designs use colour asa way of manipulating a users emotions to give them a very specific experience, the choice of colour is based around the psychological understanding of colour theory where colours relate to certain emotions in humans. The shapes used in a UI are just as important as the size, weight, curvature and more

features may make a user perceive the design in a different way and will play into theiremotions differently. Colour psychology is carefully considered in the design of the user interface as a way of using a players emotions to indicate meaning from the UI, the most prominent used colours are the Four primary psychological colours red, blue, yellow, and green

This is because their meanings are almost universally understood and their representation can be perceived more easily by players. – (Enggaretal. 2020)Colour and shape are carefully considered in the process of UI design as a way of communicating a certain feeling or atmosphere with a user.

Personalisation and choice through the UI

Personalisation allows for users to feel much more comfortable with their UI as adjustments can be made by a user to make the UI work much better on their device or more suited for their needs, it can also give users a positive feeling if they think they have a lot of control. When UI is designed with personalisation, in mind it allows for developers to create much simpler designs with more add on features, so that the user can add and take away from the design as they wish. It also means that the design can be made more easily adaptive and the designer will not need to make drastic changes to fit different screen sizes and device types as it will all be handled by a user.

UI designs can either be intelligently adaptive designs, meaning users have much more control over how the UI will look and behave and allows for more personalisation, it also means that the UI will auto adapt to different screen sizes and machine types itself meaning designers only have to create a broad outline for how it must look. Tailor-made interfaces are another design type, these allow for designers to place objects in very specific locations on a screen or HUD,however this type of design means the designer must have a great understanding of who their users are, and what the display settings will be for the final product. This design type also means that if it is to be used on multiple different display types it must be re-created multiple times over and fixed to fit with each design type. – (Mirazetal. 2021) Personalisation through input methods and design allow developers to create something which a user has significantly more control over and designs can be made to suit multiple devices in a much simpler manner.

2.2 Making UI feel natural

A modern UI should be created with accessibility functions in mind and make its use feel natural to a user. Modern UI can be created with sensors, camera tracking and virtual reality devices in mind and the purpose of a UI is to allow users to perform tasks in a virtual space. A successful UI should make the action feel as natural to a user as possible through movement, speech control and facial recognition. The UI must take advantage of users situational awareness and allow them to use real-world knowledge to interact with the virtual world.

The goal of a UI designer is to make a UI that can be understood very easily and allow as many users as possible to have good situational awareness in the context of the game. – (Onal et al.2014) UI should feel as natural to players as possible through the use of human- machine interactions which are based on realworld actions rather than needing a new skill set based solely on a particular UI design.

UI usability and functionality

The purpose of UI is to allow a user to complete a task and it should be a priority of a UI designer to create a UI with usability and functionality in mind to make each task easier for a user. A user's perception of a UI is directly linked to how functional it is, it should be easy for users to find information and the UI should not have a steep learning curve. It should allow new users to pick up on what is being made available to them through the use of the design and use as much common knowledge as a basis for how users will interpret features.

A developer can make a UI design more functional by adding elements of personalisation and using proper layouts, mixed with colour and shaped designs to make the UI feel better for users to interact with. A player's perception of the information available to them is mostly influenced by the usefulness and design characteristics of the user interface. UIs tools and functions are directly linked to auser's perception of what information is available to them and how they are to access or assess said information. – (Onaletal.,2014) The UI'susability and functionality should allow for ease of use by as many types of users as possibleand a designer should attempt to keep the learning curve as low as possible for new users.

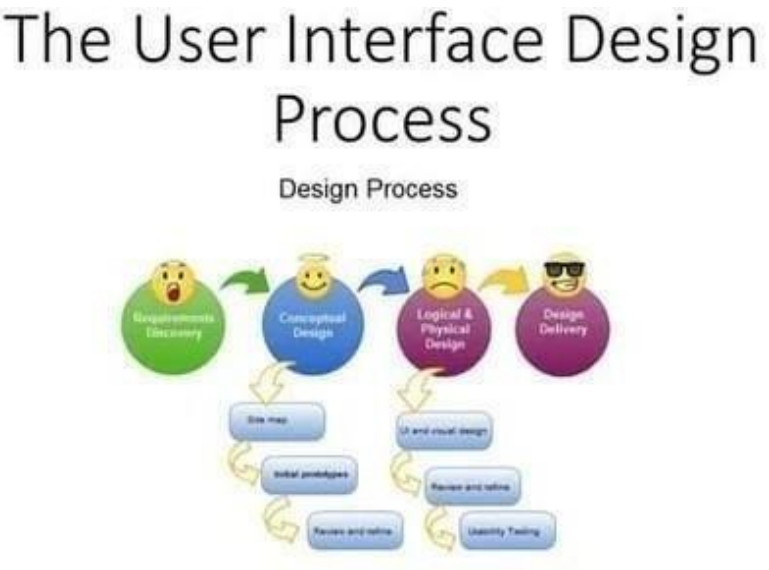
2.3 UIs effect on gameplay

Gameplay can be affected by the use of UI and so UI must be placed carefully around a game world to give the player as much immersion as possible to enhance the gameplay. If the UI of a game contains too much information players are forced to slow down gameplay and it stalls entertainment whereas if there is too little information given on the UI players become frustrated having to again, slow down gameplay to find something they may need, UI should make tasks in-game as quick and seamless as possible to keep the player immersed in the game world. The UI can also manipulate player behaviour as UI objects can be placed into the game world to make players either want to run towards them or away from them. UI objects can allow developers to control player actions and play the game in a way the developer intended. The games UI is used to give the players optional challenges like collecting and breaking game objects on the map adding to the feeling of player satisfaction. The developers have said that the bomba-game is an improvement to the original Bomber-man due to its 3d UI graphics – (Zulfaetal. 2020) Player actions can be manipulated by developersthrough clever use of game object UI and the games UI should be used to create amuch more immersive feeling for players.

Carefully crafted UI allows for simplified HCI and must strictly focus on user experience. There are many aspects of UI design that must be carefully considered by a designer ranging from the visuals, the colour and shapes used to create the HUD and game objects to the actions taken by a user to carry out tasks.

Modern technology has allowed for great strides in the development of UI meaning designers must adapt to new technologies and create adaptive designs which are compatible with multiple types of devices and screen sizes. Modern UI should attempt to take advantage ofthese new technologies to create more emotive, natural feeling HCIs to eliminate the need to learn new skills to have the most basic access to the software. These more personal interactions have also been shown to leave users feeling much more satisfied than a traditional mouse and keyboard or gamepad input method, as well as leaving a much lower learning curve again adding to a design's usability. Truly there are many considerations to be taken to create a UI that fits the needs of all people without it being overencumbered with unnecessary padding and additional features for the sakeof more features.

UI designers must take their own real-world knowledge, understanding of the human mind and body and feedback from user testing to create UI systems that can be utilized sufficiently. A UI developr's role is to translate creative software design concepts and ideas into reality using front end technology. They understand the user interface design solution both in its practical intent and creative vision, and convert it into engineered softwares.

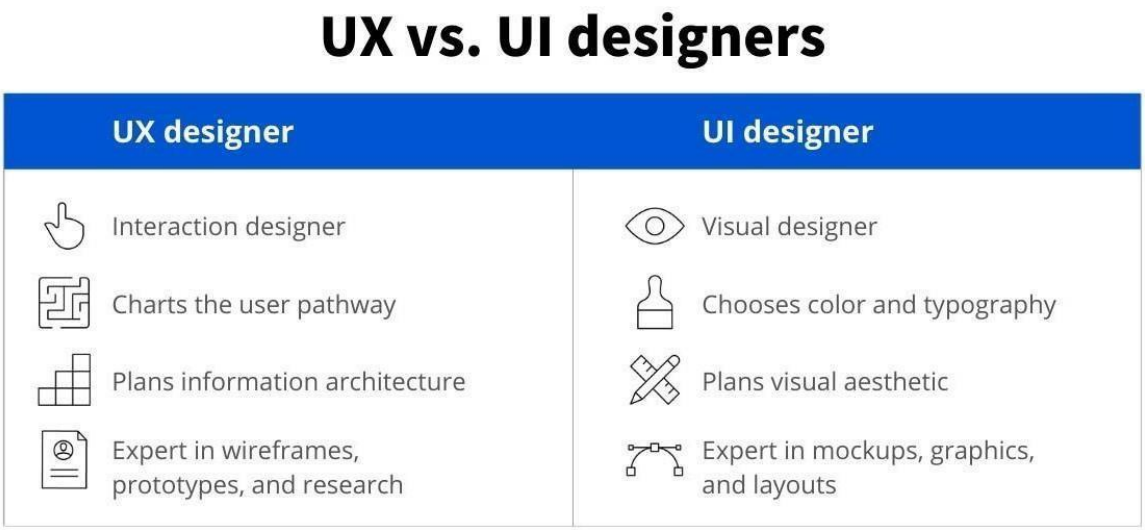


CHAPTER-3
(UI vs UX design)

3.1 UI vs UX design

User interface (UI) and user experience (UX) are two words that you might hear mentioned frequently in tech circles (and sometimes interchangeably). But what do the terms actually mean, and what does it mean to be a UX or UI designer? UI refers to the screens, buttons, toggles, icons, and other visual elements that you interact with when using a website, app, or other electronic device. UX refers to the entire interaction you have with a product, including how you feel about the interaction. While UIcan certainly have an impact on UX, the two are distinct, as are the roles that designers play.

In this article, we'll take a closer look at how the roles of UX designer and UI designer overlap and differ, and how to know which you should pursue. Finally, we'll discuss options for getting started, even if you don't have a degree or previous experience.



3.2Difference between UI and UX

Developing a product that people love often requires both good UI and good UX. For example, you could have a banking app that looks great and has intuitive navigation (UI). But if the app loads slowly or makes you click through numerous screens to transfer money (UX), it doesn't matter how good it looks. You're probably not going to want to use it.

On the other hand, a website could be loaded with unique, helpful content organized in a logical and intuitive way. But if it looks dated or you can't easily figure out how to move between screens or scroll through options, you're likely to click away from the site.

Tasks and responsibilities

UI and UX designers play key roles in the product development lifecycle. Let's take a closer look at each.

UX designers focus their work on the experience a user has with a product. The goal is to make products that are functional, accessible, and enjoyable to use. While the term UX often applies to digital products, it can also be applied to non-digital products and services (like a coffee pot or a transportation system). Common tasks for a UX designer might include:

- Conducting user research to identify any goals, needs, behaviors, and pain points involved with a product interaction
- Developing user personas based on target customers
- Creating user journey maps to analyze how a customer interacts with a product
- Building wireframes and prototypes to hone in on what the final product will look like
- Performing user testing to validate design decisions and identify problems
- Collaborating with stakeholders, UI designers, and developers

3.3 UX and the digital world

However, despite being a scientific term, its use since inception has been almost entirely within digital fields; one reason for this being that the tech industry started blowing up around the time of the term's invention.

You can learn all about the fascinating history of UX design in this article.Essentially, UX applies to anything that can be experienced—be it a website, a coffee machine, or a visit to the supermarket. The "user experience" part refers to the interaction between the user and a product or service. User experience design, then, considers all the different elements that shape this experience.

UI and the digital world

let's set the record straight once and for all. Unlike UX, user interface design is a strictly digital term.

A user interface is the point of interaction between the user and a digital device or product—like the touchscreen on your smartphone, or the touchpad you use to select what kind of coffee you want from the coffee machine.

In relation to websites and apps, UI design considers the look, feel, and interactivity of the product. It's all about making sure that the user interface of a product is as intuitive as possible, and that means carefully considering each and every visual, interactive element the user might encounter.

A UI designer will think about icons and buttons, typography and color schemes, spacing, imagery, and responsive design.

3.4 The main difference to bear in mind is this:

UX design is all about the overall feel of the experience, while UI design is all about how the product's interfaces look and function.

A UX designer considers the user's entire journey to solve a particular problem; what steps do they take? What tasks do they need to complete? How straightforward is the experience? Much of their work focuses on finding out what kinds of problems and pain-points users come up against, and how a certain product might solve them. They'll conduct extensive user research in order to find out who the target users are and what their needs are in relation to a certain product. They'll then map out the user's journey across a product, considering things like information architecture—i.e. how the content is organized and labelled across a product—and what kinds of features the user might need. Eventually, they'll create wireframes which set out the bare-bones blueprints for the product.With the skeleton of the product mapped out, the UI designer steps in to bring it to life.

UI designer considers all the visual aspects of the user's journey, including all the individual screens and touchpoints that the user might encounter; think tapping a button, scrolling down a page or swiping through an image gallery.While the UX designer maps out the journey, the UI designer focuses on all the details that make this journey possible. That's not to say that UI design is all about looks; UI designers have a huge impact on whether or not a product is accessible and inclusive. They'll ask questions like "How can different color combinations be used to create contrast and enhance readability?"or "What color pairings cater to color blindness?" You can learn more about UI design for accessibility in our guide.

3.5 UX and UI:

Two terms that are often used interchangeably, but actually mean very different things. So what exactly is the difference? We've all overheard conversations, walking down hip streets of the world's tech capitals, discussions about the great 'UX' of a product, or the poor 'UI' of a website. Is it a secret language you will never be privy to? Are these people just using slang to look cool?

Well, okay, probably yes to the latter, but a determinate NO to the rest. If you're keen to learn what exactly UX and UI mean and how they differ, you've come to the right place. Below is a breakdown of what we're going to cover in this article.Read on to learn what the terms UX and UI even mean, which of the two areas of design are better paid, and how to become a UX designer or UI designer.

UX and UI in the first place

First things first: What do UX and UI actually mean? The people you have eavesdropped on are actually discussing two professions that, despite having been around for decades, and in theory for centuries, have been defined by the tech industry as UX and UI design.UX design refers to the term "user experience design", while UI stands for "user interface design". Both elements are crucial to a product and work closely together. But despite their professional

relationship, the roles themselves are quite different, referring to very different aspects of the product development process and the design discipline.A list of differences between UX and UI designBefore we consider the key differences between UX and UI, let's first define what each term means individually.

User experience design is a human-first way of designing products. Don Norman, a cognitive scientist and co-founder of the Nielsen Norman Group Design Consultancy, is credited with coining the term "user experience" in the late 1990s. Here's how he describes it:"User experience encompasses all aspects of the end-user's interaction with the company, its services, and its products."Don Norman, Cognitive Scientist & User Experience ArchitectClear, right? Well you might note immediately that despite what I implied in the introduction, the definition has no reference to tech, no mention of digital, and doesn't tell us all that much about what a UX designer actually does. But like all professions, it's impossible to distill the process from justa few words.

Still, Don Norman's definition tells us that, regardless of its medium plenty of non- digital UX (and there's lots out there!) UX Design encompasses any and all interactions between a potential or active customer and a company.As a scientific process it could be applied to anything; street lamps, cars, Ikea shelving, and so on.

UX and the digital world

Despite being a scientific term, its use since inception has been almost entirely within digital fields; one reason for this being that the tech industry started blowing up around the time of the term's invention.You can learn all about the fascinating history of UX design in this article.

Essentially, UX applies to anything that can be experienced—be it a website, a coffee machine, or a visit to the supermarket. The "user experience" part refers to the interaction between the user and a product or service. User experience design, then, considers all the different elements that shape this experience.

3.6 UX design involve

A UX designer thinks about how the experience makes the user feel, and how easy it is for the user to accomplish their desired tasks. They also observe and conduct task analyses to see how users actually complete tasks in a user flow.For example: How easy is the checkout process when shopping online? How easy is it for you to grip that vegetable peeler? Does your online banking app make it easy for you to manage your money?

The ultimate purpose of UX design is to create easy, efficient, relevant, and all-round pleasant experiences for the user.We'll answer the question "What does a UX designer do?" more thoroughly in section four. For now, here's what you need to know about UX design in a nutshell:

User experience design is the process of developing and improving the quality of interaction between a user and all facets of a company.User experience design is, in theory, a

non-digital (cognitive science) practice, but used and defined predominantly by digital industries.UX design is NOT about visuals; it focuses on the overall feel of the experience.

UI and the digital world

So let's set the record straight once and for all. Unlike UX, user interface design is a strictly digital term.A user interface is the point of interaction between the user and a digital device or product —like the touchscreen on your smartphone, or the touchpad you use to select what kind of coffee you want from the coffee machine.

In relation to websites and apps, UI design considers the look, feel, and interactivity of the product. It's all about making sure that the user interface of a product is as intuitive as possible, and that means carefully considering each and every visual, interactive element the user might encounter.A UI designer will think about icons and buttons, typography and color schemes, spacing, imagery, and responsive design.

UI design involve

Like user experience design, user interface design is a multi-faceted and challenging role. It is responsible for the transference of a product's development, research, content and layout into an attractive, guiding and responsive experience for users.We'll look at the UI design process and specific tasks that a UI designer can expect in section four. Before we consider the main differences between UX and UI, let's quickly recap on what user interface (UI) design is all about:

Interface design is a purely digital practice. It considers all the visual, interactive elements of a product interface—including buttons, icons, spacing, typography, color schemes, and responsive design.The goal of UI design is to visually guide the user through a product's interface. It's all about creating an intuitive experience that doesn't require the user to think too much!UI design transfers the brand's strengths and visual assets to a product's interface, making sure the design is consistent, coherent, and aesthetically pleasing.

we have a clear-cut definition of both UX and UI, let's consider the key differences between the two.With the skeleton of the product mapped out, the UI designer steps in to bring it to life. The UI designer considers all the visual aspects of the user's journey, including allthe individual screens and touchpoints that the user might encounter; think tapping a button, scrolling down a page or swiping through an image gallery.While the UX designer maps out the journey, the UI designer focuses on all the details that make this journey possible. That's not to say that UI design is all about looks; UI designers have a huge impact on whether or not a product is accessible and inclusive.

They'll ask questions like "How can different color combinations be used to create contrast and enhance readability?"or "What color pairings cater to color blindness?" You can learn more about UI design for accessibility in our guide.Hopefully you're now starting to see how UX and UI design are indeed two very different things

To summarize:

- UX design is all about identifying and solving user problems; UI design is all about creating intuitive, aesthetically-pleasing, interactive interfaces.
- UX design usually comes first in the product development process, followed by UI. The UX designer maps out the bare bones of the user journey; the UI designer then fills it in with visual and interactive elements.
- UX can apply to any kind of product, service, or experience; UI is specific to digital products and experiences.

How To Get UI/UX Right

UI and UX planning can get tricky pretty quickly. To avoid costly errors, you'll first need to read up on user experience and strategies, with a side of psychology. While at it, get yourself familiar with several design principles and codeable features. Armed with this knowledge, you'll be able to match your visitors' browsing patterns and implement features that feel like second nature to them.

Here are the steps you need to achieve successful UI/UX:

Define your product

First step is to define the product or the outcome you want to see reflected on your website. For this, you'll need to set clear goals on what you want your UI to look like and the processes you'd like your UX to propel. Be sure that you get your user data from a variety of standpoints—sales, operations, marketing, product, and support. Consulting everyone in the user experience flow will give you the best idea of what it looks like for your user when they encounter your website. At the end of this step, you should have developed three key documents: User Personas, User Stories, and Use Case Diagrams.

Conduct research

You and your UI/UX team should compare and contrast various UI/UX implementations and construct a design mockup of what's successful to work towards. Study your domain to see how up-todate it is with the latest advancements in UI & UX to give you a clear idea of what will work and what will not.

Brainstorm

Compile your research and sit your team down for a brainstorming and analysis session. The primary goal should be to expand on the existing user personas and experience pathways you've identified in realty website users and visitors. At this stage, you will have supplementary documentation like hypothetical personas that will help you map out how customers will use your website for specific reasons and conversion goals. Finalize a working, conceptual website design before beginning the next step.

Design UI/UX pathway

Sketch out your ideas to give your team a better idea of what they are to come up with. You can also share this with your partners to see if they have any input to offer on the subject. Once everyone is happy with the sketches, your team will start building a wireframe—a basic structural scaffolding for your website. They'll then add on images, icons, buttons, animations, and more to give it an interactive feel. In the end, you should have a prototype of your website, complete with basic features and interactions.

Test prototype and publish a beta version

At this stage, UX team members will investigate the implementation on both desktop and mobile. Once they're happy with it, a beta version of your website will be published. The UI/UX team will then monitor every move and note any flaws to implement fixes later.

CHAPTER-4
(Mobile User Interface Design)

4.1 Mobile User Interface Design

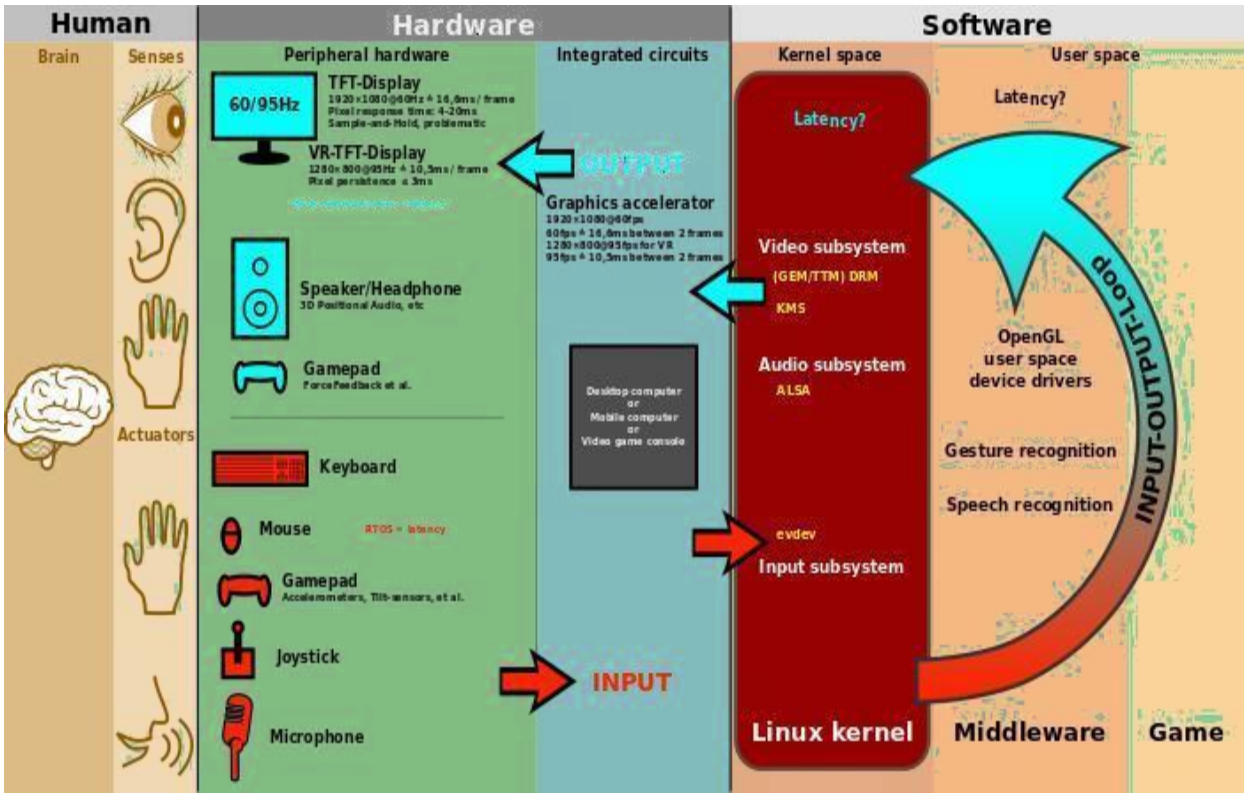
- Using the screen real estate efficiently
- How the user perceives design elements
- Social aspect of mobile interfaces
- Accessibility
- Design patterns
- Designing for the platforms

The falls into the category of craftsmanship: you do something until you are good at it, and then keep doing it until you are better. But many developers are too excited to solve the next functionality puzzle to spend much time with interface questions like appropriate color contrast or font. Don't miss out on amazing design puzzles.The latest generation of mobile devices are portable enough to carry at all times, connected to voice and data networks, and contextually aware by using sensors and networks to preemptively complete tasks.

The Current mobile limitations include bandwidth, times when users cannot access wireless Internet or phone networks, as well as a lack of technical capabilities, such as Flash, on many mainstream mobile devices. These constraints give application creators the opportunity to focus each application on a precise set of features. Mobile application creators can also use exciting new interactions with motion and gestures: zooming, swiping, tapping, turning, and shaking. These capabilities offer the chance to innovate.Technology is changing and no device has a guaranteed market share in perpetuity, providing the easy excuse that the next device might change everything anyway. But like learning the syntax of one programming …

User interface (UI) design or user interface engineering is the design of user interfaces for machines and software, such as computers, home appliances, mobile devices, and other electronic devices, with the focus on maximizing usability and the user experience. Incomputer or software design, user interface (UI) design primarily focuses on information architecture. It is the process of building interfaces that clearly communicates to the user what's important. UI design refers to graphical user interfaces and other forms of interface design. The goal of user interface design is to make the user's interaction as simple and efficient as possible, in terms of accomplishing user goals (user-centered design).

The graphical user interface is presented (displayed) on the computer screen. It is the result of processed user input and usually the primary interface for human-machine interaction. The touch user interfaces popular on small mobile devices are an overlay of the visual output to the visual input.



4.2 User interfaces are the points of interaction between users and designs. There are three type

- Graphical user interfaces (GUIs) – Users interact with visual representations on a computer's screen. The desktop is an example of a GUI.
- Interfaces controlled through voice – Users interact with these through their voices. Most smart assistants, such as Siri on smartphones or Alexa on Amazon devices, use voice control.
- Interactive interfaces utilizing gestures- Users interact with 3D design environments through their bodies, e.g., in virtual reality (VR) games.
- Interface design is involved in a wide range of projects, from computer systems, to cars, to commercial planes; all of these projects involve much of the same basic human interactions yet also require some unique skills and knowledge. As a result, designers tend to specialize in certain types of projects and have skills centered on their expertise, whether it is software design, user research, web design, or industrial design.

Good user interface design facilitates finishing the task at hand without drawing unnecessary attention to itself. Graphic design and typography are utilized to support its usability, influencing how the user performs certain interactions and improving the aesthetic appeal of the design; design aesthetics may enhance or detract from the ability of users to use the functions of theinterface.[1] The design process must balance technical functionality and visual elements (e.g., mental model) to create a system that is not only operational but also

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4.3 Considerations for mobile devices

Due to the small screen size, lack of memory, low to moderate processing power,smaller and fewer buttons and limited battery power, alongside the array of sensors, UI for mobile devices have numerous constraints, which can affect overall levels of UX. Subramanya and Li [33] classify these types of constraints as device related constraints with user related constraints including limited attention spans affected by mobility, change in locations and contexts and users' idiosyncrasies. Chong et al. [34] argue the UI and mobile device size are one of the most significant factors in mobile device design and report on the use of a single-layer touch screen UI as opposed to the more conventional multi-layer UI, with promising results in increasing overall UX.

The use of low-level computer languages, termed code optimization [34] also helps in reducing strains on available memory, as does the use of touchscreen UI, as opposed to mouse based and command-based UI topologies. This use of low-level language and single- layer UI can potentially overcome issues due to the noted complexities involved in developing applications and UI across various mobile platforms. Such mobile platforms can be incompatible, alongside the variety of programming languages and hardware differences as reported in [35]. Touchscreen UI obviate the need for physical keyboards, thereby maximising available screen sizes whilst at the same time increasing mobility with concomitant reductions in device sizes, as argued in [34].

Touchscreen UI are also aesthetically more pleasing and intuitive to use, thereby potentially facilitating increased UX. As Dunlop and Brewer [36] report with the increasing proliferation and popularity of mobile devices issues of widening access to powerful computing services and resources through the UI need to be overcome when designing UI with good UX.

In addition, alongside the small visual displays mobile devices have had poor interaction facilities, including audio and limited input/output (I/O) [36] which create challenges posed by mobile device UI, which are exacerbated bynetwork access issues. However, with advances in mobile device software and hardware leading to increased performance, effective UI designs have and are being proposed and developed. As Choi [37] report such UI can be classified into hardware and vision based, with vision-based UI receiving more focus due to not needing extra technical equipment or physical sensors. Such extra equipment may be inconvenient and relatively inaccurate [37], potentially leading to less well perceived UX due to the need to interact with additional layers, increasing the complexity of the HCI.

CHAPTER-5
(User Interface Design Principles)

5.1 User Interface Design

- Arrow Understanding interaction versus information design
- Arrow Creating user flows
- Arrow Designing easy-to-use interfaces
- Arrow Controlling consistency in your site

If you're like most people, you've gotten lost or turned around in a site at some point in your webbrowsing endeavors. When you can't see an obvious navigation scheme while in the middle of a poorly designed task sequence, and are left scratching your head, it's no wonder you get confused and irritated

As a designer, you have the ultimate responsibility for a website's so-called ease of use. After all, graphic design is communication design and is intrinsically tied to the usability of the site. Users can tell a lot about what a graphic or icon does or doesn't do simply by the way it looks and where it's placed relative to other elements on the page. Similarly, interactivewidgets that …

5.2 User Interface Design Principles

"The golden rule of design: Don't do to others what others have done to you. Remember thethings you don't like in software interfaces you use. Then make sure you don't do the samethings to users of interfaces you design and develop."

"Tracy Leonard (1996)"

Need to follow user interface principles In the past, computer software wasdesignedwith little regard for the user,

So the user had to somehow adapt to the system

- This approach tosystem design is not at all appropriate today— The system must adapt to the user
- This is why design principles are so important.Computer users should have successful experiences that allow them to build confidence in themselvesand establish self-assurance about how they work with computers. Their interactions with computersoftware should be "success begets success." Each

positive experience with a software program allowsusers to explore outside their area of familiarity and encourages them to expand their knowledge of theinterface. Well-designed software interfaces, like good educators and instructional materials, should build a “teacher-student” relationship that guides users to learn and enjoy what they are doing. Goodinterfaces can even challenge users to explore beyond their normal boundaries and stretch theirunderstanding of the user interface and the computer. When you see this happen, it is a beautifulexperience.Youshould have an understanding andawareness of the user’s mental model and the physical, physiological, and psychological abilities of users. This information (discussed in Chapters 3 and 4) has been distilled into general

5.3 Principles

Principles Of user interface design, which are agreed upon by most experts in the field. User interface design principles address each of the key components of the “Look and Feel”iceberg (see Chapter 3): presentation, interaction, and object relationships.

Interface design principles represent high-level concepts and beliefs that should be used to guidesoftware design. You should determine which principles are most important and most applicable foryour systems and then use these principles to establish guidelines and determine design decisions.

Key Idea! The trick to using interface design principles is knowing which onesare more important when making design tradeoffs. For certain products andspecific design situations, these design principles may be in conflict with eachother or at odds with product design goals and objectives. Principles are notmeant to be follow blindly, rather they are meant as guiding lights for sensibleinterface design.

The three areas of user interface design principles are:

1 Place users in control of the interface

2.Reduce users’ memory load

3.Make the user interface consistent.

Where to Find Interface Design Principles

"User interface design principles are not just relevant to today's graphical user interfaces. In fact, theyhave been around for quite some time. Hansen (1971) proposed the first(and perhaps the shortest) listof design principles in his paper, "User Engineering Principles for Interactive Systems." Hansen's principles were:

1. Know the user
2. Minimize memorization
3. Optimize operations
4. Engineer for errors.A more recent and encompassing list of design principles can be found inbyRubenstein and Hersch (1984). This classic book on human- computer interaction presents 93 design principles, ranging from "1. Designers make myths; users make conceptual models." To "93. Videotapereal users." I've listed some key books in the reference section at the end of this chapter. These booksfall into two categories: books on interface design and software design guides. Some good interfacedesign books (in addition to Rubenstein and Hersch)are Heckel (1984), Mayhew (1992), andShneiderman (1992).The major software operating system vendors have all either published or republished their designguidelines and reference materials in the past few years as they introduce new operating systems. Theseguidelines exemplify and encapsulate theirinterface design approaches. It is critical to keep up to datewith these guides for your design and development environment. These software design guides includeApple Computer, Inc. (Apple, 1992), IBM Corp. (IBM, 1992), Microsoft Corp. (Microsoft, 1995),and UNIX OSF/Motif (Open Software Foundation, 1992). All of these design guides address, at aminimum, the importance of user interface design principles

The principles that allow users to be in control are listed in Figure 5-2. After eachprinciple I've listed akey word to help remember these principles.

1. Use modes judiciously (modeless)
2. Allow users to use either the keyboard or mouse (flexible)3.Allow

users to change focus (interruptible)

4. Display descriptive messages and text(Helpful)

5. Provide immediate and reversible actions, and feedback (forgiving)

6.Providemeaningful paths and exits (navigable)

7.Accommodate users with different skill levels (accessible)8.Make the user

interface transparent (facilitative)

9. Allow users to customize the interface (preferences)

10. Allow users to directly manipulate interface objects (interactive).

5.4 Use Modes Judiciously

Here's a very familiar example of modes from the "real world" of VCRs. When you press theFastforward OrRewindButton on your VCR or on the remote control, you don't always get the sameresponse from the VCR. Why? Well, it depends! The system's response depends on which mode theVCR is in—either or thePlayMode. If the VCR is Stopped , then Fast forwardOrRewind Buttons fast forward or rewind the tape very quickly. However, if the VCR is Playing , thenthese buttons SearchForward or backward, showing the picture on the TV. The search functions don'tmove the tape asquickly as the fast forward and rewind functions.

Say you've just finished watching a rented videotape. You want to rewind the tape so you won't recharged a rewinding fee when you return the tape to the video store. You press the Rewind Button while you're watching the film credits on the screen and turn off the television. You won't even know that the VCR is really searching backward in the Play Mode. This could take a very long time and since the television is turned off, you can't even see that the VCR is still in the Play Mode. What you probably wanted to do wastopress the Stop Button first and Then Press Rewind

Would rewind the tape quickly, taking much less time and placing less strain on your VCR. This whole episode I just described recently happened at home to my wife. I had bought a new VCR and she wasn't very familiar with its operation yet. She was rewinding a tape with the television off andshe commented that it seemed to be taking a long time to rewind the whole tape. I looked at the display on the front of the VCR and sure enough, there was an indicator arrow (Ø) showing that the VCR wasstill in the Play Mode. After I explained this to my wife, she said, "That's a stupid way to design a VCR! Why don't you use that as an example in your book?"Have you ever used a graphical drawing program on your computer? The palette of drawing tools you use is an example of the use of modes. When you select the Draw Tool, you are in theDrawMode. Your mouse movement, mouse button presses, and keyboard keystrokes will all produce some type of drawing actions. Then select the Text Tool, and the same mouse and keyboard actions produce text andtext functions. Modes are a necessary part of many software interfaces. You probably can't avoid usingmodes altogether, but use them only when needed.

A common example of a familiar and unavoidablemode can be found in any word processor. When you are typing text, you areAlways Inamode— eitherInsert Mode orReplaceMode.It's easy to find interfaces that put users in modes unnecessarily. Any time a message pops up on thecomputer screen and users can't do anything else in the progam

Mode is chosen, the program will not allowusers to add, delete, or modify the data record. Users would have to change to theUpdatedataModeto perform these actions. This may be appropriate for users who are only allowed to browse thedatabase. What if users are constantly viewing data and wish to change data when they want to? Whyshould they be forced to change modes all the time? Why are users forced to either be inViewOrUpdateMode in the first place? A more user- and task-oriented approach is to let users access the datawithout being forced to choose a mode beforehand. If they choose to modify data, they should be ableto save the data and update the database without being in a particular mode. If they don't make anychanges, they can access a new data record or exit the record, without having made any decision about program modes. Perhaps the best method is to display data in a format that is consistent with a user'saccess. If limited access, display static text; if uses have update access, provide entry fields that are Don't assume that since users have a mouse attached to their computer, they will use it all of the time.Although you may design theinterface to be optimized for mouse users, provide a way to do mostactions and tasks using thekeyboard. One of the key CUA design principles is that users must be ableto do any action or task using either the keyboard or the mouse.

Key Idea! Means users can perform an action using thekeyboard rather than themouse. It does not mean that it will be easier for usersto use the keyboard, just that they don't have to use the mouse if they don't wantto, or can't. Toolbars, for example, are fast-path buttons for mouse users.However,userscan't get to the toolbar from the keyboard—they must be able touse the menu bar drop-downs to navigate to the action they want to perform.Users have very different habits when using keyboards and mice, and they often switch between themduring any one task or while using one program. With the push toward mouse-driven, direct-manipulation interfaces, not all of the major design guides follow this philosophy of implementing both akeyboard and mouse interface. There is not a total consensus of agreement on this principle. ManyMacintosh products do not provide complete keyboard access

5.5 FEATURED ONLINE GUIDES

User experience (UX) design has a UX process that varies a bit from designer to designer but ensures the finished website meets user expectations and needs. Before starting a design project, UX designers take a look at the why, what and how behind the use of the website. Why does the visitor come to the page? What features do they want from the website? How will they access the site, and what will the site look like?There are more than 238,000 UX designers in America with an average salary of $77,000. Although UX design is in demand and the pay rate is higher than average, designers must stay up on the latest trends and processes if they hope to compete against up and coming graduates.Studying the typical UX process and then finding the one that works best for you puts you ahead of the game and gives you an edge over the competition, so your finished creations excel beyond industry standards. Here are six UX process steps to follow:

1. Investigate Competitors

Next step in the UX process is studying competitors and what their UX is like. Go over to their websites and use them as if you are a customer. What elements do you like, and what isn't working for you? Take notes and list out how you can match and exceed user expectation based on what competitors offer. During this step, invest time into figuring out what the latest UX trends are across all industries. Designers can sometimes adopt new techniques in one industry that apply to a different field and give your design a unique edge.

2. Brainstorm Ideas

The next step in the UX process is brainstorming ideas for the site with anyone on your team and the client or business owner. Lay out the ideas you have from the research you've conducted, then listen to input from others. Take notes as the team comes to a consensus on areas. Now is when you sketch out your ideas and create a wireframe. Allow all those involved to add notes and thoughts to thewireframeand come to an overall consensus about design components. Numerous UX wireframing tools are available.

5. Assess Everything

Once the overall blueprint for the website is completed and approved, it's time to test every single element on your page both for functionality and usability. Start by clicking on all links and actionable items on your page. Does everything work correctly? Next, make sure all forms and features work correctly. Fill in the forms and make sure they go to the right place and that the user receives a confirmation. Once you've tested everything, take a step back and look at how easy the site is to use. A button can work but be located in a location that is difficult to find or click on. Where could you move it for better usability? Consider the site as if you're the buyer personas you developed early in the UX process.

6. Publish and Maintain

Once you assess everything and get the go-ahead from critical stakeholders, publish the site and conduct some additional A/B testing. If you weren't sure if the CTA button on the main page should be above or below the fold, test it in both locations and get feedback from actual customers through data. See where the button performs best. You can quickly check anything you're uncertain about and make adjustments as needed. Stay up on the latest trends so you can make adjustments to your site's user- friendliness as technology changes. Part the UX process is maintaining best practices over time .

CHAPTER-6

(The Human-Centered Design Process)

6.1 SOlving the Correct Problem

In design thinking, and human-centered design more specifically, the most foundational step to the entire process is to solve the right problem.It's so Important that we never take the problem we're given as, in fact, the problem we're supposed to solve. The given problem usually just satisfies a portion of the underlying issue.

We want to be thorough. We use research to use the given problem as a launching pad to find the *actual* problem. Designers primarily use two methods to finding the right problem and right solution: Double-Diamond and Human-Centered Design

The Double-Diamond Model of Design

There are two phases of all design thinking methods: find the right problem and find the right solution.An illustration of the double-diamond design method

Go left to right on the image above:

Expand the scope of the problem, researching all facets/root causes as the widest vertical spaceof the diamondRefine and "converge" on a single problem statement as the first diamond's right corner Expand again (because "double") explore multiple solutions for the problem and "converge" on a single solution as the most-right corner of the second diamond Product managers can keep designers on schedule by setting deadlines and budget constraints.

The Human-Centered Design Process

The Double-Diamond method is freeing and helpful, the Human-Centered Design process helps provide structure and process where the Double-Diamond converges. There are4 stages.

6.2 Observation

When researching the facets of the underlying problem, designers are not looking at what product people say they want or will buy. That is the domain of market research. Market research uses large data sets with quantitative methods that provide broad information about a large group. No travel required.Designers are looking for what a small target group (sometimes a specific subgroup) truly needs through qualitative research. Travel absolutely required.

Idea Generation

This next step is where the creativity reigns: generate as many solutions as possible without concern for the constraints of the project.The real emphasis here is to let your imagination go; no idea is bad. Ask lots of questions no matter how simple they seem.

Prototyping

I think there's a lot of difficulty with this next step for me, prototyping. When we're prototyping, we're creating very rudimentary mock-ups (paper, cardboard, drawing) of the potential solutions.I always want to make a MVP fully working software application at this stage, and that's going too far. Keep it simple as you explore solutions.Don Norman brings up the prototyping technique called the "Wizard of Oz" in this section. This is where you have a prototype that uses people to pretend to be the computer interaction.

Testing

Gather five people (Don Norman likes this number. Jakob Nielson also likes this number) to individually test your prototype.Of course there's a confusing bit here in the text: it says to individually test, but then also says to test in pairs even if the prototype is intended for one person because a pair of people (one interacting, one driving the interaction) will have natural discussions about the product.

Iteration

After testing, iterate. This means to go back and refine whatever the testing told youabout the solution. Maybe it's a small bit of the prototype, maybe it's going back and reconfiguring the problem statement: the idea here is embrace the failure and quickly use all feedback to try again.We continually do this in HCD to slowly enhance the solution overmultiple iterations.The impulse with iteration is , frankly, not to do it. Your team researched, your team developed ideas, your team prototyped, and then you got feedback. Lots of bosses want your team to call it a day here.But to not iterate is to make a fundamental mistake by assuming the initial requirements your team thought up were the ones the humans using your product actually need. To really find their requirements, you have to iterate several times, each time uncovering a better solution and refinement for the humans you're designing for.

6.3 Activity-Centered versus Human-Centered Design

"Support the activities while being sensitive to human capabilities, and people will accept the design and learn whatever is necessary." — Don NormanHuman-centered design produces products that are easy to use and understand for humans. But humans are wildly different… right? We have different cultures and different values.But Don Norman brings up an

interesting point here: our activities are not so different. Driving, at least the fundamental goals of getting from point a to point b with a vehicle, are not so different.

So when we have a large population of people who all share similar activities, Don Norman argues for the use of “Activity-centered design” where we don’t focus on the person, but we focus on the activity.

Iterative Design Versus Linear Stages

As with many arguments between two extremes, the best solution is often a blend of the benefits from both sides. So, the same is true with iterative versus waterfall (or “linear stages” or “gated”).The benefits of Iterative design include the precise refinement of requirements for ease of use (and therefore life of the product amiright?).The benefits of waterfall is the control of quality, budget, and schedule.So the blend is to allow refinement within a set amount of time, and then to have checkpoints where quality, budget are reviewed.Don Norman takes some time here to discuss the complexities of large projects that last over several years. I have interest in this type of project because software is often a multi-year project as technology and people change.

What I Just Told you? It Doesn’t Really Work That Way

In theory, there is no difference between theory and practice.

In practice, there is.” — Don NormanA reality I’ve lived and I imagine many others have lived: products are rarely built in a human-centered or activity-centered way.A marketing push occurs, a new technology emerges, someone makes the claim in a meeting “we need a XYZ feature like our competition,” and a new sprint, complete with user stories, is born (pushing other pressing technical debt from OTHER business/market/engineering driven decisions).What results is a very complex product (in software, at least) and a huge backlog. When engineers actually follow these instructions from sales or marketing or even the C-suite, they are inadvertently encouraging this type of feature development.Don Norman’s Law of Product Development“The day a product development process starts, it is behind schedule and above budget.” — Don Norman

This is Don’s solution:

Because product’s start already behind schedule and over budget, the promise to do it “right next time” is never met. There is never enough time or budget to squeeze in research.So have research all the time. Design and market researchers in the field constantly researching new ideas and needs.When the sales department or C-Suite needs a new feature or have a new problem, you can readily point to research that’s probably already done and have it worked on in tandem by engineers.

The Design Challenge

Communication, respect, and multi-disciplinary approaches: where teams have roles but are working alongside one another (understanding each other's role) is vital.

6.4 Products Have Multiple, Conflicting Requirements

In the real world, it's not just the user the designer is designing for. If a product is never purchased, not properly marketed, or made correctly, it will struggle. So designers need to consider purchasers, marketing, and engineers.We can't work on linear staged teams where marketing, sales, and engineering make small adjustments to fit their needs after design has happened. Design must have those requirements. Teams have to work collectively for the design to truly meet all requirements.

Designing for Special People

"Design for interests and skill levels. Don't be trapped by overly general, inaccurate stereotypes." — Don NormanIt's simply not possible to design one product that fits everyone. Don points out that even building for the 99th percentile leaves out 3 million people. The answer is to design different versions of the product.

The Stigma Problem

Objects designed as an aid for a type of disability is often avoided by the very people who need them. A wheelchair or hearing aid can scream, "DISABILITY": hence Don's title of the section.So how to design for this? Make objects flexible and adjustable for ranges that support a wide set of capabilities. Incorporate inclusive design by including a group often excluded from the design process as your main end user (because the resulting product will notonly benefit them but also benefit the others).

Complexity is Good; It is Confusion That Is Bad

Life itself is complex and we design tools for this complexity. Complexity isn't the villain, confusion is. How do we avoid confusion? Good conceptual models.

Standardization and Technology

Standardization, the process where an industry agrees upon the standards for a given object, helps users because when the user learns to use one of the objects, they can then use any of the objects.

Establishing Standards

While establishing standards is easier for smaller organizations, larger organizations or political bodies have a considerably more difficult process. There's a lot of arguing, debate, and comprise that can take several years to complete.

Why Standards are Necessary: A Simple Illustration

Norman offers the very simple (and effective) example of a clock: it's standardized. Imagine a clock that didn't go clockwise or the numbers were differently displayed. Standardization is helpful.

6.5 Deliberately Making Things Difficult

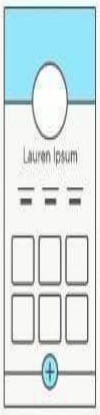
Sometimes we need to make things difficult to use. Unauthorized individuals for safety or access reasons need to not be able to access or operate some devices. As designers, we reverse our tools: we make affordances invisible, we don't offer feedback, we eliminate natural mappings. But all these things we do with precision and intention

Interface Design

1. Thumbnail
page level

2. Blockframe
layout level

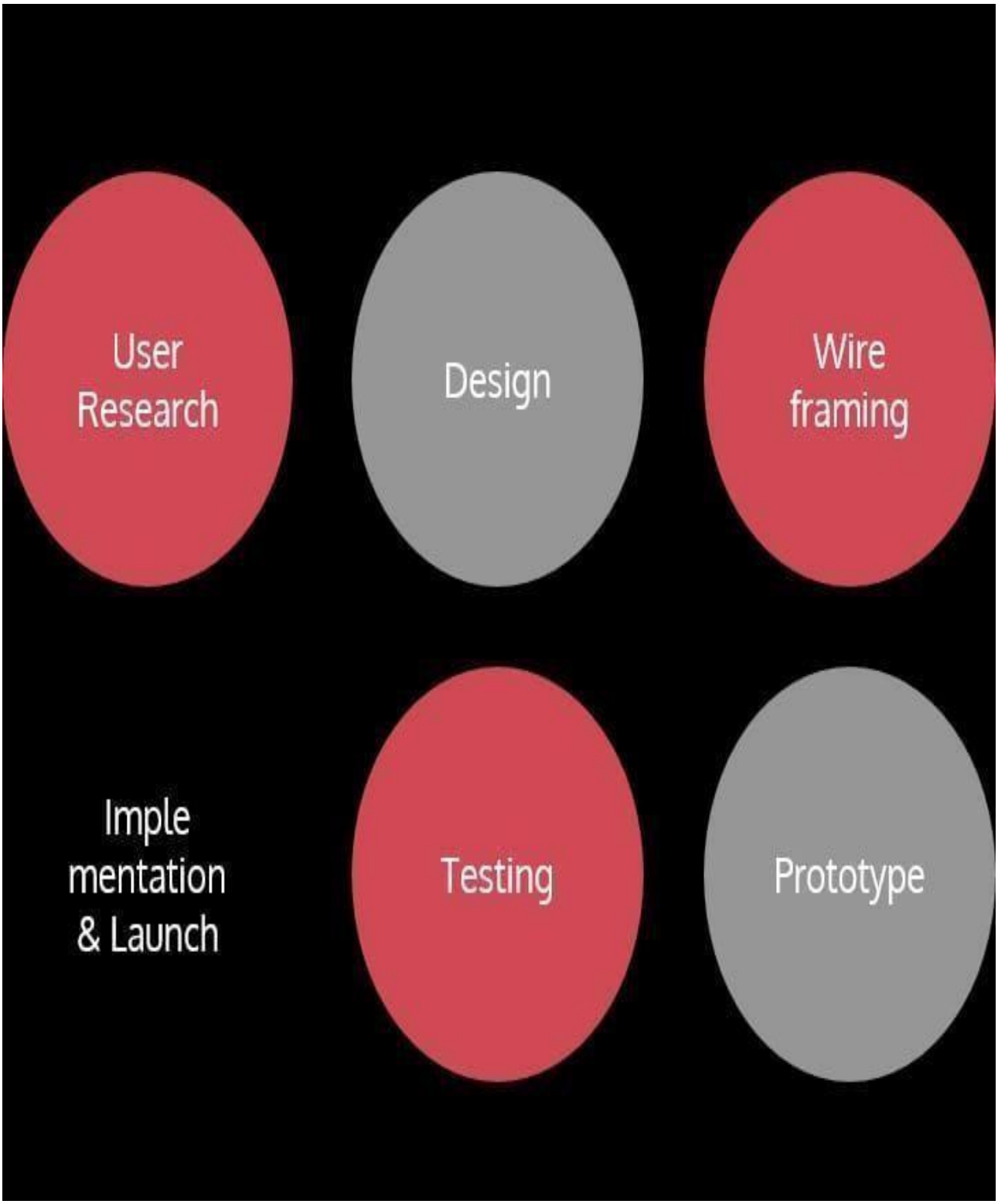
3. Wireframe
component level

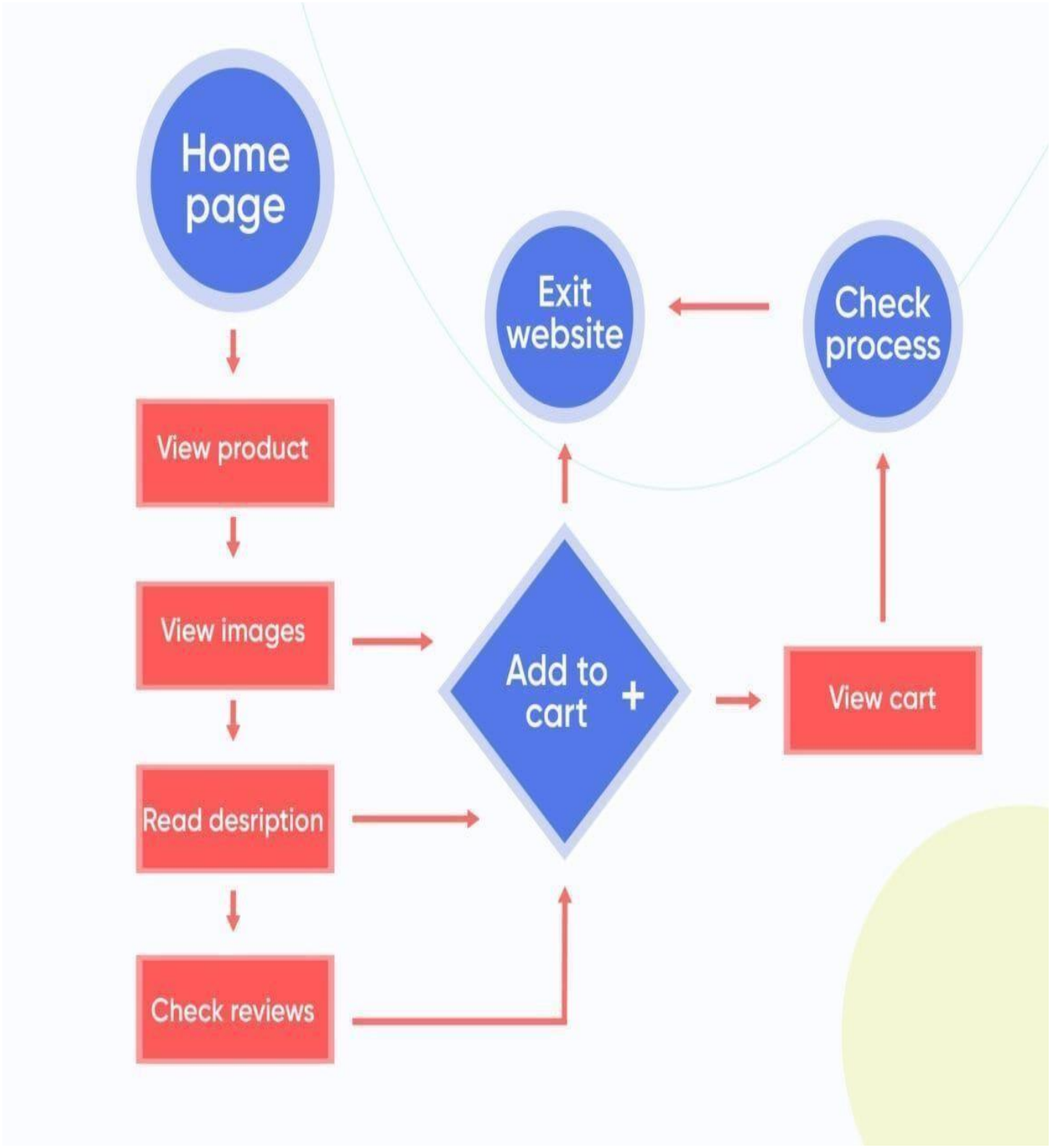


4. Interface
styles level

5. Prototype
interactions level

low-res ↔ high-res


User Research
Design
Wire framing
Imple mentation & Launch
Testing
Prototype


Home page
View product
View images
Read desription
Check reviews
Add to cart +
Exit website
Check process
View cart

CHAPTER-7
(Lean UX)

7.1 Lean UX

Lean UX is a process utilized frequently with Agile development, where rapid changes occur in design in short bursts of activity. Because Agile doesn't follow the same structure as other design processes, traditional UX methods may not work as well as a leaner approach. Lean UX focuses on the experience of the user and less on the overall functions of the design.

This allows the designer to run rapid development through the lens of the buyer persona without the worries over the design infrastructure. The lean startup movement has a model of testing a hypothesis often, learning, growing and then repeating the process. All this runs through the idea of the end user's experience with the finished design. The model meshes has an opportunity to test ideas and make changes from the very beginning stages.

Many of the processes of UX design came from rules based on heavy front-end design elements such as graphic design and architecture. Originally, design focused on physical products, but the world today has as many digital goods as physical ones.

1. Create a Hypothesis

The Lean UX process starts with thinking through the project. The designer develops a hypothesis in this phase, which is quite similar to the pre-planning done in general UX design. At this point in the design process, there is little difference between the two types of UX design.However, the focus of Lean UX design is more narrow than the wider angle of general UX design. The designer creates an assumption or hypothesis, such as that the registration process should have a save function on every page, so users can return to the material if they're interrupted without having to input information again.

2.Collaborate on the Design

After going through the various assumptions, throwing out what doesn't work and keeping what does, the next step in the design process is sketching out the design. Typically, this is acollaborative session. The designer sketches out the idea and everyone pitches in with additional ideas for improvement of the initial idea. Each improvement or idea must run back through the hypothesis phase to see if it's viable to implement into the finished design or if it improves the product.

3.Consider Brand Consistency

Some designers pause at this point. They consider whether the overall design ties into the image of the brand as a whole. Users expect brand consistency across different platforms and experiences they have with a company. Does the design mesh well with the business' color

palette? Study the mission of the brand and whether the project adds value and drives the goals of the company forward.

4.Build a Prototype

Next, you'll design a prototype of the product. With a prototype, you see if your plans equal reality or you need to make adjustments to get the design functioning the way you'd like. If you design a website, you might build a test site and only grant a few people access. You could also build a second landing page for testing purposes to see which version performs best. For physical products, go ahead and utilize a 3D printer or some other model-building method and create a working sample of the product.

5.Test the Hypothesis

One of the biggest advantages of Lean UX is the ability to test as you work through the design process. Because all the design features stem from an assumption, it's easier to test each assumption as you go along and ensure you meet user needs.

At this point in the process, you might test the example of the form above with actual customers. Ask them to try out the platform and give you feedback. If the website or product is new and you don't yet have customers, use a testing service or enlist employees, friends and family to test the design for you. A/B testing should be ongoing no matter what product or service you design.

Even when you finalize the project, run regular split tests to ensure the finished design still meets the needs of the user. With Lean UX, making changes requires a quick hypothesis of what you're trying to improve, testing and changes and more testing.

6.Solve Any Problems

Once you test the design, fix any issues you encounter. Some problems may not easily resolve, but work the process above over and over until you come to a solution. Pull in other players and get feedback from your team. Lean UX is more team-based than some of the UX design methods, so you want to gather input from co-workers and customers.

7.Slow Down and Review

Another element of lean versus general is slowing down and taking your time through each phase. Because you put functionality on the back-burner — it's taken care of during testing — you have more time to focus on whether or not the product serves the purpose you defined. If the goal is a registration form allowing users to save as they move through the stages, the design process includes delegating tasks to IT or the user interface designer and spending your time on the form itself. You'll have more time to make sure the text is readable, directions clear and the save button easy to find.

7.2 Lean UX in Action

Hopefully, you understand the basics of Lean UX now and how it works hand-in-hand with agile development. One example of a company utilizing this design approach is CarMax. In a case study of the brand, researchers looked at their desire to improve the shopping experience for their buyers both online and offline. They first created a hypothesis that if the consumer better understood available financing, they'd have a better experience once they got to the CarMax physical location. They spoke to customers, created a journey map, used prototypes and then took the prototype to design consultants for feedback.

CHAPTER-8
(Interaction Design)

8.1 User experience design

User experience design is the process of enhancing user satisfaction by improving the usability, accessibility, and pleasure provided in the interaction between the user and the product.[1] User experience design encompasses traditional human–computer interaction (HCI) design, and extends it by addressing all aspects of a product or service as perceived by users.

Elements

User experience design includes elements of interaction design, information architecture, user research, and other disciplines, and is concerned with all facets of the overall experience delivered to users. Following is a short analysis of its constituent parts.

Visual design

Visual design, also commonly known as graphic design, user interface design, communication design, and visual communication, represents the aesthetics or look-and-feel of the front end of any user interface. Graphic treatment of interface elements is often perceived as the visual design. The purpose of visual design is to use visual elements like colors, images, and symbols to convey a message to its audience. Fundamentals of Gestalt psychology and visual perception give a cognitive perspective on how to create effective visual communication.

Information architecture

Information architecture is the art and science of structuring and organizing the information in products and services to support usability and findability.In the context of information architecture, information is separate from both knowledge and data, and lies nebulously between them. It is information about objects.[citation needed] The objects can range from websites, to software applications, to images et al. It is also concerned with metadata: terms used to describe and represent content objects such as documents, people, process, and organizations.

8.2 Structuring, organization, and labeling

Structuring is reducing information to its basic building units and then relatingthem to each other. Organization involves grouping these units in a distinctive and meaningful manner. Labeling means using appropriate wording to support easy navigation and findability.

Finding and managing

Findability is the most critical success factor for information architecture.[citation needed] If users are not able to find required information without browsing, searching or asking,then the findability of the information architecture fails. Navigation needs to be clearly conveyed to ease finding of the contents.

8.3 Interaction design

Main article: Interaction design

There are many key factors to understanding interaction design and how it canenable a pleasurable end user experience. It is well recognized [clarification needed] thatbuilding great user experience requires interaction design to play a pivotal role in helping define what works best for the users. High demand for improved user experiences and strong focus on the end-users have made interaction designers critical in conceptualizing design that matches user expectations and standards of the latest UI patterns and components. While working, interaction designers take several things in consideration.

- Creating the layout of the interface
- Defining interaction patterns best suited in the context
- Incorporating user needs collected during user research into the designs
- Features and information that are important to the user
- Interface behavior like drag-drop, selections, and mouse-over actions
- Effectively communicating strengths of the system
- Making the interface intuitive by building affordances Maintaining consistency throughout the system.

The last few years, the role of interaction designer has shifted from being just focused on specifying UI components and communicating them to the engineers to a situation now where designers have more freedom to design contextual interfaces which are based on helping meet the user needs.[8] Therefore, User Experience Design evolved into a multidisciplinary design branch that involves multiple technical aspects from motion graphics design and animation to programming.

8.4 Usability

Main article: Usability

Usability is the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use.Usability is attached with all tools used by humans and is extended to both digital and non- digital devices. Thus, it is a subset of user experience but not wholly contained. The section of usability that intersects with user experience design is related to humans' ability to use a system or application. Good usability is essential to a positive user experience but does not alone guarantee it.

8.5 Accessibility

Main article: Accessibility

Accessibility of a system describes its ease of reach, use and understanding. In terms of user experience design it can also be related to the overall comprehensibility of the information and features. It contributes to shorten the learning curve attached with the system. Accessibility in many contexts can be related to the ease of use for people with disabilities and comes under usability.

Human–computer interaction

Main article: Human-computer interaction

Human–computer interaction is concerned with the design, evaluation and implementation of interactive computing systems for human use and with the study of major phenomena surrounding them.

Human–computer interaction is the main contributor to user experience design because of its emphasis on human performance rather than mere usability. It provides key research findings which inform the improvement of systems for the people. Human-computer interaction extends its study towards more integrated interactions, such as tangible interactions, which is generally not covered in the practice of user experience. User experience cannot be manufactured or designed; it has to be Incorporated in the design. Understanding the user's emotional quotient plays a key role while designing a user experience. The first step while designing the user experience is determining the reason a visitor will be visiting the website or use the application in question. Then the user experience can be designed accordingly.

Design

Main article: Design

User experience design incorporates most or all of the above disciplines to positively impact the overall experience a person has with a particular interactive system and its provider.User experience design most frequently defines a sequence of interactions between a user (individual person) and a system, virtual or physical, designed to meet or support user needs and goals, primarily, while also satisfying systems requirements and organizational objectives.

Typical outputs include:

- Persona (an archetypal user for whom the product or service is being designed)
- Wireframes (screen blueprints or storyboards)
- Prototypes (for interactive or in-the-mind simulation)

- Written specifications (describing the behavior or design)
- Site audit (usability study of existing assets)
- Flows and navigation maps
- User stories or scenarios
- Sitemaps and content inventory
- High-fidelity visual mockups (precise visual layout and design of the expected product or interface

General design process

While designing a product or service for a client, it is of utmost importance that the designers are on the same page as the client. All the information collected, plans made, design executed will reflect on the final product. Rigorous analysis must be done before proceeding to the design stage and then numerous testings done to optimize the site as per best standards so that the competitive edge is maintained. Leading Digital marketing companies combine three elements to provide the best responsive product to the customer. These are: 1.Researching about the target audience

2. Understanding the company's business goals

3. And most importantly apply out of the box thinking.

Brainstorming and testing ultimately leads them to finalize the design for their customers. Let's have a detailed look at the step by step process of product design: Collecting information about the problem

UX designer needs to find out as much as they can about people, processes, and products before the design phase. Designers can do this by meeting with the clients or business stakeholders frequently to know what their requirements are, or by conducting interviews with users in their home or work spaces. This kind of qualitative research helps designers create products and services that better serve user needs.

"Getting ready to design"

After research, the designer must make sense of the data they've collected. Typically this is done through modeling of the users and their environments. User modeling or personas are composite archetypes based on behavior patterns uncovered during research. Personas provide designers a precise way of thinking and communicating about how groups of users behave, how they think, what they want to accomplish and why.[13] Once created, personas help the designer to understand the users' goals in specific contexts, which is particularly useful during ideation and for validating design concepts. Other types of models include work flow models, artifact models, and physical models.

When the designer has a firm grasp on the user's needs and goals, they begin to sketchout the interaction framework (also known as wireframes). This stage defines the high-level structure of screen layouts, as well as the product's flow, behavior, and organization. There are

many kinds of materials that can be involved in during this iterative phase, from whiteboards to paper prototypes. As the interaction framework establishes an overall structure for product behavior, a parallel process focused on the visual and industrial designs. The visual design framework defines the experience attributes, visual language, and the visual style.

Once a solid and stable framework is established, wireframes are translated from sketched storyboards to full-resolution screens that depict the user interface at the pixel level. At this point, it's critical for the programming team to collaborate closely with the designer. Their input is necessary to creating a finished design that can and will be built while remaining true to the concept. Test and iterate

Usability testing is carried out through prototypes. The target users are given various tasks to perform on the prototypes. Any issues or problems faced by the users are collected as field notes and these notes are used to make changes in the design and reiterate the testing phase.[15] Usability testing is, at its core, a means to "evaluate, not create".

8.6 UX Deliverables

UX designers' main goal is to solve the end-users' problems, and thus the ability to communicate the design to stakeholders and developers is critical to the ultimate success of the design. Regarding UX specification documents, these requirements depend on the client or the organization involved in designing a product. The four major deliverables are: a title page, an introduction to the feature, wireframes and a version history.[17] Depending on the type of project, the specification documents can also include flow models, cultural models, personas, user stories, scenarios and any prior user research. Documenting design decisions, in the form of annotated wireframes, gives the developer the necessary information they may need to successfully code the project.

- Process-control systems are characterized as older interfaces that were based on the programs that the user needed to run
- The text also portrays this kind of interface as representative of systems in which users had to make requests for simple reports through the IT staff, instead of being able to ask for such reports themselves through a system interface. User interfaces were typically limited to character based screens, and were not major parts of systems.
- User-centered systems are described as being used in more modern systems, allowing users to make requests for their desired output without IT staff intervention
- User interfaces became more complicated when technology supported it, when systems began having graphics, and processing power supported Graphic User Interfaces (GUIs). This began around the time Windows was available on personal computers. It was at that time that user interfaces became a feature of a system, which naturally caused system developers to be interested in their development.

- **Understand the business** : Determine what the users need to do in the interface, asking qhttps://www.instagram.com/reel/CjZy2BNgAct/?igshid=YmMyMTA2M2Y=

Questions about their needs and making charts of their intended use of the system.

- **Maximize graphical effectiveness** – The text advises us to use visual elements to help users function and to learn the system. Good use of screen space should be a goal for every system.

- **Think like a user** – This means more than getting the user requirements. It means to understandwhat the users know, what they are used to in a system, and what will work from their point of view.

- **Use models and prototypes** – This is a reiteration of the idea of making prototypes, showing them to users, and improving the system based on user feedback. An intermediate design step we have not discussed in this context is the use of a storyboard. A storyboard can be as simple as a comic strip, or can be a series of mocked up screen shots.

- **Focus on usability** – The text recommends striking a balance between too much on a screen andtoo little. Another recommendation from the world wide web is to minimize the number of clicks needed to reach an objective. If a system takes too long to use, it will not be successful.

- **Invite feedback** – The text reminds us to listen to users during development, and to listen to their comments after the system is deployed as well. The testers of your system may not encounter features of the system that the users will come to love or hate.

- **Document everything** – We have seen this advice before. This time the advice is about user interfaces, but the general idea is the same: record your findings, your tests, and your results. You may continue a project or someone else may continue it, but no one can do a good job without the information gathered at each step.

CHAPTER-9
(Hierarchical Representation)

9.1 User interface design Place the user in control

Define interaction modes in a way that does not force a user into unnecessary or undesired actions:- An interaction mode is current state of interface.Example: spell-checking mode. (user should be able to enter and exit the mode with little or no effort).Provide for flexible interaction: different users have different interaction preferences, so choices should be provided. For example, s.w might allow a user to interact via keyboard commands, mouse etc.

Allow user interaction to be interruptible and undoable: User should be able to interrupt the seq. to do something else. The user should also be able to "undo" any action.Streamline (restructure) interaction as skill levels advance and allow the interaction to be customized:- user often finds that they perform the same sequence of interaction repeatedly. (advance user can modify) Hide technical internal from casual user: Interface should never require that the user interact at a level that is "inside" the machine.

Design for direct interaction with objects that appear on the screen: The user feels a sense of control when able to manipulate objects that are necessary to perform a task in a manner similar to what would occur if the objects were a physical thing. (e.g. "stretch" an object i.e. scale in its size)

Reduce the user's memory load

Reduce demand on short term memory: The interface should be designed to reduce the requirement to remember past actions and results. This can be accomplished by providing visual cues (remainder) that enable a user to recognize past actions, rather than having to recall them.Establishing meaningful defaults: The initial set of defaults should make sense for the average user, but user should be able to specify individual preferences.Define shortcuts that are intuitive: Mnemonics are used to accomplish a system function (e.g. alt-p to invoke print function).The visual layout of the interface should be based on real world metaphor: e.g. a bill payment system should use check book and check reg. metaphor to guide the user through the bill paying process. Disclose information in a progressive fashion: Information about task, an object, or some behavior should be presented first at a high level of abstraction. More detail should be presented after the user indicates interest with mouse pick.

Make the interface consistent

Allow the user to put current task into meaningful context: The user should be able to determine where he has come from and what alternatives exist for a transition to new task.

Maintain consistency across a family of applications: A set of applications should implement the same design rules so that consistency is maintained for all interaction.If the past interactive models have created user expectations, do not make changes unless there is a compelling reason to do so: for example, the use of ctrl-s to save file, user expects this in every applications he encounters.

User Interface Analysis and Design

Interface analysis and design models

Four different models:-

(1) Human eng establishes a user model.

(2) S.W eng creates design model.

(3) End user develop mental image that is often called the user's mental model or the system perception

(4) Implementers of the system creates implementation model.

Each of these model differ significantly.An interface designer should reconcile these differences and derive a consistent representation of the interface.

9.2 User model

The user model establishes the profile of end users.To build an effective user interface, "all design should begin with an understanding of intended users including their profile of their age, physical ability, education, motivation, goals, personality etc." User can be categorized as:

(1) Novices: No syntactic (informative) knowledge of the system and little semantic (logical) knowledge of the application or computer usage in general

(2) Knowledgeable, intermittent users: Reasonable semantic knowledge but relatively low recall of syntactic information necessary to use the interface

3) Knowledgeable, frequent users: good semantic and syntactic knowledge.

The implementation model

Design model

- It incorporates data, architectural, interface, and procedural representation of the software. User's mental model
- It is the image of the model that end users carry in their heads.
- The implementation model
- It combines outward appearance of the computer based system (the look of the interface), coupled with all supporting information (books, manuals, videotapes, help files) that describe the system syntax and the semantics.

The Process

The analysis and design process for user interface is iterative and can be implemented using spiral model.The user interface analysis and design process encompasses four distinct framework activities:

- Interface analysis and modeling

- Interface design
- Interface construction (implementation)
- Interface validation

It implies that each of these tasks will occur more than once, with each pass around the spiral representing additional elaboration of requirements and the resultant design.Interface analysis focuses on the profile of the users who will interact with the system. Skill level, business understanding, and general receptiveness to new system are recorded; and different users categories are defined.Once the general requirements have been defined, a more detailed task analysis is conducted. Those tasks that the user performs to accomplish the goals of the system are identified, described, and elaborated.

Finally, analysis of user environment focuses on the physical work environment.The goal of interface design is to define a set of interface objects and actions that enables a user to perform all defined tasks in a manner that meets every usability goal defined for the system.Interface construction normally begins with the creation of prototype that enables usage scenarios to be evaluated. Interface Validation focuses on

(1) The ability of the interface to implement every user task correctly, to achieve user requirements.

(2) The degree to which the interface is easy to use and easy to learn.

(3)The user's acceptance of the interface as a useful tool in their works.

Interface analysis

Key intent of all software engineering model is : understand the problem before you attempt to design a solution.In case of user interface design, understanding the problem means understanding : (1) the people who will interact with the system through the interface (User Analysis) (2) the task that end users must perform to do their work (Task analysis and Modeling) (3) the content that is presented as a part of the interface (Analysis of display content) (4) the environment in which these task will be conducted. (Analysis of the work environment)

User Analysis

Designer has to understand the user themselves as well as how these people will use the system. Information from broad array of sources can be used to accomplish these.

- User interviews: representative from the software team will meet with end users to better understand their needs, motivation, work culture and myriad of other issues.(many of other issues). This can be accomplished in one-one meetings or through focus groups.
- Sales input: sales people meet with the customer and users on a regular basis and can gather information that will the software team categorized the users and better understand their requirements.

- Marketing input: It can be invaluable (priceless) in the definition of the market segments while providing an understanding of how each segment might use the s.w in subtly (finely) ways.
- Support i/p : Support staff talk with users on a daily basis, making them the most likely source of information on what users like and what they dislike, what features generates questions, what features are easy to use etc.
- Task analysis and modeling
- The goal of task analysis is to answer the following questions :
- 1) What work will user perform in specific circumstances?
- 2)What tasks and subtasks will be performed as the user does the work?
- 3)What specific problem domain objects will the user manipulate as work is performed?

  4) What is the sequence of work task?

  5)What is the hierarchy of tasks?

Analysis techniques:

(1)Use case (2)Task elaboration (3)Object elaboration (4)Work flow analysis (5)Hierarchical representation

Use Case

It describes the manner in which an actor (person) interacts with system.When used as part of task analysis, the use case is developed to show how an end-user performs some specific work related tasks.In most instances the use case is written in an informal style (asimple paragraph).From this a s.w eng can extract tasks, objects, and overall flow of the interaction.

Task Elaboration It can be applied in two ways:

A human eng must understand the tasks that humans currently performed (using manual approach) and then map these into a similar but not necessarily identical set of tasks in the context of user interface.Alternatively human eng can study an existing specification for a computer based solution and derive a set of user tasks that will accommodate the user model, design model and system perception.Regardless of overall approach to task analysis, human eng must first define and clarify tasks.

Object Elaboration

Rather than focusing on the tasks that user must perform, the s.w eng examines the usecase and other information obtained from the users and extracts the physical objects.These objects can be categorized into classes.Attributes of each class are defined and an evaluation of the actions applied to each object provide designer with a list of operations.

E.g. class furniture with attributes size, shape, location etc. The task select, move etc. are called operations.

Workflow Analysis

When a number of different users, each playing different roles, makes use of a user interface, it is sometimes necessary to go beyond task analysis and object elaboration and apply workflow analysis.It allows a s.w eng to understand how a work process is completed when several people are involved.Work flow can be represented with UML Swimlane diagram.

9.3 Hierarchical Representation

Once the workflow has been established , a task hierarchy can be defined for each user type.It is derived by stepwise elaboration of each task identified for the user.

Analysis of Display Content

For modern applications, display content can range from character-based report (spreadsheet), graphical display (a 3-d model, pa picture), or specialized information(e.g. audio or video files).The analysis modeling techniques identified the output data objects that are produced by an application.

These data objects may be:

(1) Generated by components in other parts of the applications.

(2) Acquired form data stored in database; that is accessible from applications; or

(3)Transmmited from system externals to the application in question.

Analysis of the Work Environment

In some applications the user interface for a computer based system is placed in a “user friendly location” (e.g. proper lighting, good display height etc.), but in others lighting may be suboptimal, noise may be factor, keyboard or mouse may not be the option, display placement may be less than the ideal.

The Interface designer may be constrained by factors that mitigate (moderate) against ease of use.In addition to physical environmental factor, the work place culture also comes into play like,

-> How will support be provided to users of the system?

->Will system interaction be measured in some manner? (Accuracy of transaction or Time per transaction)

Interface Design Steps

It is iterative process.

Combination of the following steps:

(1) Using information developed during interface analysis, define interface objects and actions (operations).

(2) Define events (user actions) that will cause the state of the user interface to change.

(3) Depict each interface state as it will actually look to the user.

(4) Indicate how the user interprets the state of the system from information provided through the interface.

Applying Interface Design Steps

An important step in interface design is the definition of interface objects and the actions that are applied to them. For it, use-case can be used.

That is, description of use-case is written. Objects and actions are isolated to create list of it. Once they have been defined, they are categorized by type. Target, source, and application objects are identified.A source object (e.g. report icon) is dragged and dropped onto a target object (printer icon).An applications objects represents application-specific data that are not directly manipulated as part of screen interaction. E.g. a mailing list is used to store name of mailing. The list itself might be stored, merged but it is not dragged and dropped via user interaction. When the designer is satisfied that all important objects an actions have been defined (for one design iteration), screen layout is performed. It Is an interactive process in which graphical design and placement of icons, definition of descriptive screen text, specification and titling for windows and definition of major and minor menus is conducted.

9.4 User Interface Design Patterns

GUI has become so common that a wide variety of user interface design patterns has emerged. A design pattern is an abstraction that prescribes a design solution to a specific, well-bounded design problem.

Example: Calender Strip

Design Issues Four common design issues:

(1)System response time

(2)User help facility

(3) Error information handling

(4)Command labeling

Response time

It is measured from the point at which the user performs some control action until the s.w responds with desired o/p or action.

It has two characteristics:

- Length
- Variability

Length: if system response is too long, user frustration and stress will be the result.

Variability: It refers to the deviation from average response time.

Help Facility Every user requires help.

In some cases, a simple question addressed to a knowledgeable colleague. In others, detailed research in multivolume set of “user manuals” may be the only option. Modern software provides online help facilities.

A no. of design issues must be addressed like:

-> Will help be available for all system function and all time during system interaction?

-> How will the user request help? How will help be represented ?

-> How will user return to normal interaction?

9.5 Error Handling Error messages are “bad news” delivered to users.

Error messages and warnings impart useless or misleading information and serve only to increase user frustration.

Error message or warning has the following characteristics:

-> should describe the problem in language the user can understand.

-> message should provide advice for recovering from error.

-> The message should indicate any –ve results of the error (e.g. potentially corrupted data files)

->The wording should never place blame on the user. (i.e. nonjudgmental)

Menu and command labeling

A no. of design issue arises when typed commands or menu labels are provided as a mode of interaction:

->Will every menu option have corresponding command?

->How difficult will it be to learn and remember the commands?

->What can be done if the command is forgotten?

->Are submenus consistent with the functions implied by master menu item?

Internationalization

Application accessibility

Software engineers must ensure that interface design encompasses mechanisms that enable easy access for those with special needs.Accessibility guidelines provide detail suggestions for designing interface. Internationalization

The challenge for software engineer is to create “globalized” software. That is, user interfaces should be designed to accommodate a generic core of functionality that can be delivered to all who use the software.

Localization features enable the interface to be customized for specific market.

Internationalization guidelines are available. These guidelines address broad design issues (e.g. screen layouts) and discrete implementation issues (e.g. different alphabets may create specialized labeling and spacing requirements).The Unicode standard [Uni03] has been developed to address the daunting challenge of managing dozen of natural languages with hundreds of natural languages with hundreds of characters and symbols.

9.6 Interface Design Principles and Guidelines

1) **Anticipationn:** A WebApp should be designed so that it anticipates the user's next move. E.g. Printer Driver Download.

2) **Communication :** The interface should communicate the status of any activity initiated bythe user. Communication can be obvious (e.g. text message) or subtle (e.g. image of a sheet pf paper moving through a printer) controlled

3) **Consistency : T**he use of navigation controls, menus, icons, and aesthetic should be consistent through out the WebApp.

4) **autonomy :** The interface should facilitate user movement throughout the WebApp, but it should do so in a manner that enforces navigation conventions that have been established for the application. E.g. navigation to secure portion of the WebApp should be controlled by userID and password.

5) **Efficiency :** The design of the WebApp and its interface should optimize the user's work efficiency, not the efficiency of the developer who designs and builds it or the client-server environment that executes it.

6) **Flexibility :** The interface should be flexible enough to enable some users to accomplish tasks directly and others to explore the WebApp in somewhat random fashion.

7) **Focus :** The WebApp interface should stay focused on the user tasks at hand.

8) **Fitt's law :** The time to acquire a target is a function of the distance to and size of the target.

9) **Human interface objects :** A vast library of reusable human interface objects has been developed for WebApps. Use them.

10) **Learnability** : A WebApp interface should be designed to minimize learning time, and once learned, to minimize relearning required when the WebApp is revisited.

11) **Readability** : All information presented through the interface should be readable by young and old.

12) **Track state** : When appropriate, the state of the user interaction should be tracked and stored so that a user can logoff and return later to back up where she left off.

Design Guideline:

Reading speed on monitor is 25% slower than reading speed for hardcopy. So, do not force user. Avoid “under construction” signs. User prefer not to scroll. Aesthetic should never supersede (replace) functionality.

CONCLUSION

My conclusion from that Things are shifting, quick.With the internationalization of teams, from the development to design, companies are now facing the challenge of having to think globally instead of a single market. Of course there are business models that should and have to only work for the inner market but, those will have a harder time to shift into global if they decide to in the future. I am very excited to see what is the future of UI and UX globally. the course of my training, I learnt how important it was to follow a user-centered design process and this project further solidified that thinking. I'll close with one my favourite quotes by Paul Boag— "To be a great designer, you need to look a little deeper into how people think and act."

REFERENCE

UX: Designing the User Experience

Website: Maintain and expand the ICA Commission website on user experience (UX) issues. Usability is identified as one of the 10 main research themesin the ICA agenda, and UX design encapsulates issues related to map use, maps users,and map usability. Map **UX design** herein is defined as the set of workflows, methods,and techniques needed for a successful user outcome with a map or interactive mapping system, as well as a productive and satisfying user process while arriving at this outcome.

1. **Bibliography:** Maintain an online bibliographic database on user studies and UXdesign research in Cartography and related fields. The bibliography includesreferences on the following topics: map-based user interfaces (UI) and user experience (UX) design; usercentered design and usability engineering, as applied to map design and development; studies of user abilities and differences therein; use case studies with print, web-based, and mobile maps; methods and techniques for evaluating products; the use of emerging mapping technologies.
2. **Student Services:** Hold listening sessions to involve young (PhD) researchers and researchers from different cultural environments in all UX Commission activities in order to promote scientific research and support them in their activities.
3. **Educational Workshops:** Organize training workshops for students and non- specialists on map-based user studies and UX design. The resulting educational materials will be made available on the commission's website.
4. **Scholarly Workshops:** Jointly organize with other ICA Commissions pre-conference workshops in disciplines adjacent to Cartography (e.g., GIScience, Information Visualization, Human-Computer Interaction) aimed at research and designinnovations.
5. **ICA Sessions:** Organize special sessions on map-based user studies and UX design at future ICA conferences as well as other regional cartography conferences. Original scientific contributions will be gathered and organized through the UX Commission website.
6. **UX Research Agenda:** Jointly organize with other ICA Commissions on research agenda papers and/or special issues on topics intersecting with user studies and UX design. Planned topics include mobile map UX and reproducibility in cartography, although topics will evolve through the workshop process.
7. **User Studies Handbook:** Jointly organize with other ICA Commissions a workshop to produce a handbook on user methods for cartography. The handbook will support an audience of both students and practitioners, treating user methods for basic science and user-centered design. The handbook will discuss best practices for a range of UX methods, breaking down method alternatives by participants, materials, procedures, and analyses.

OUTPUT
(FRONT END DESIGN)

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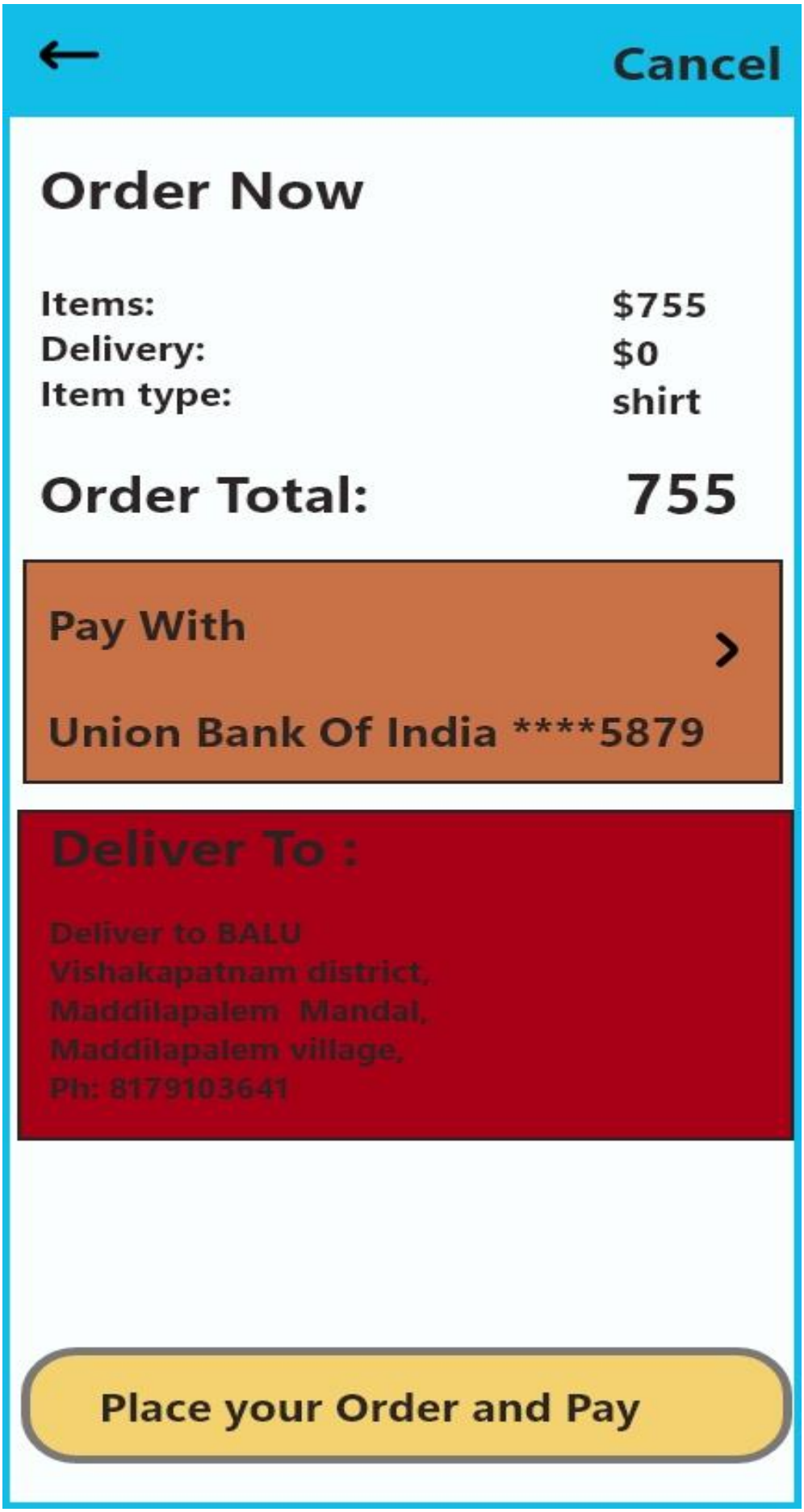
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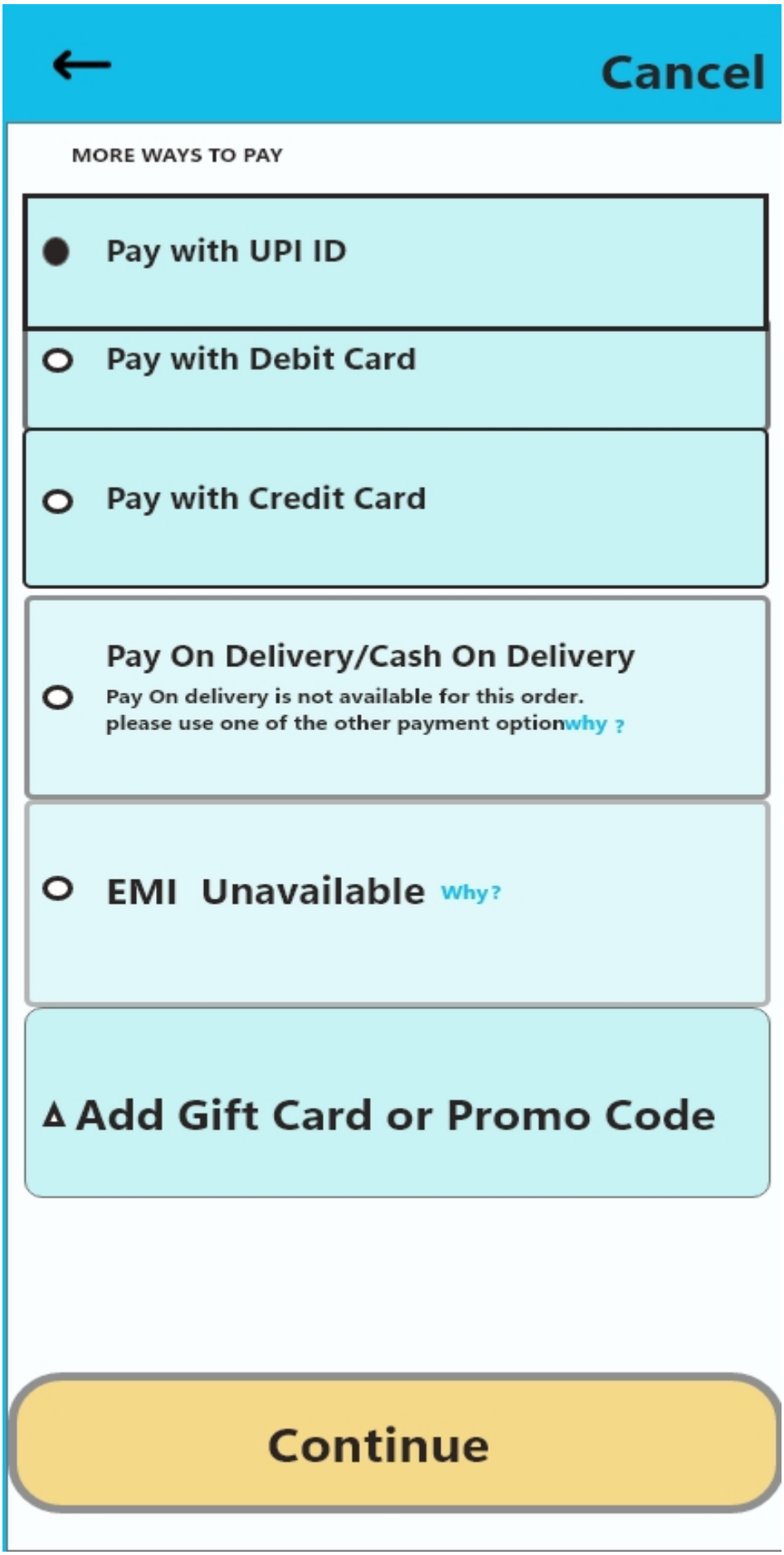
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