User interface design

Week2: Introduction to user interface design: User-centered design

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Outline

- Intended learning outcomes
- User centered design
- Principles of user centered design
- Life cycle models for interface design

Intended learning outcomes

- Understand the key principles of UCD, such as user-centeredness, iterative design, and prototyping.
- Evaluate UCD designs to ensure that they meet the needs of users.

introduction

Activity

Figure 1: Group discussion (Authentic Journeys, 2022

Imagine you have been contracted for a cloud based project to design its interface for it to enable people share photos, movies, music, chats, and documents in an efficient, safe, and enjoyable way.

Question

- What would you do?
- How would you start?
- Would you begin by sketching how the interface might look
- would you start by asking people about their current experiences with sharing files and based on this begin thinking about how you were going to design a new service
- What would you do next?

User-centered design

- Design philosophy that focuses on the needs, wants, and abilities of the users when designing a product or service.
- It is an iterative process that involves users throughout the design process, from initial planning to final testing.
- The goal of UCD is to create products and services that are easy to use, efficient, and meet the needs of the people who will be using them.

What is involved in interface design?

- According to the Design Council of the United Kingdom, captures the key aspects involved in interface design in the double diamond of design.
- The double diamond of design is a model that describes the design process as a series of four stages i.e. discover, design, develop and deliver.
- The double diamond of design is iterative.

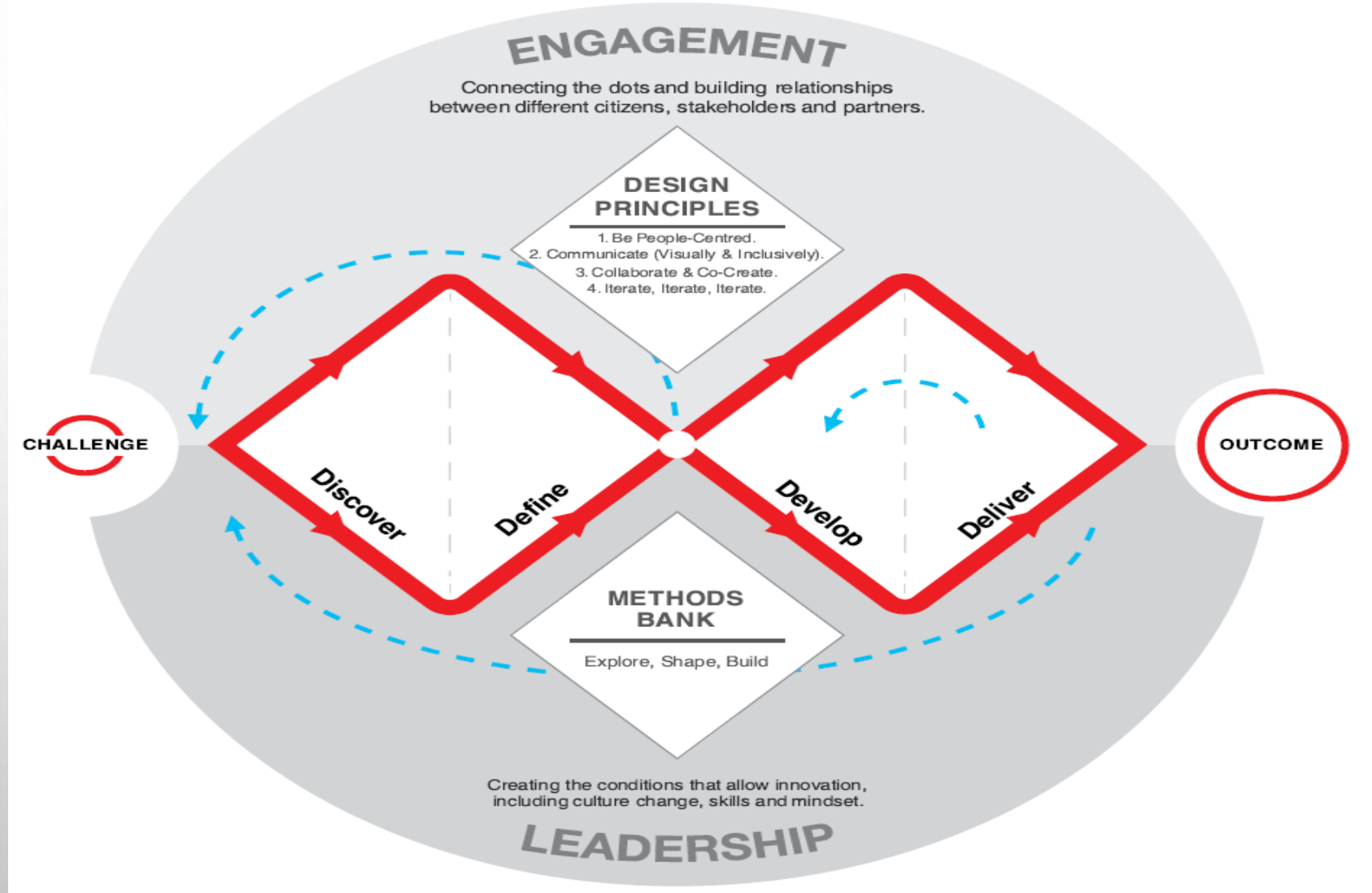

Figure 2: Model of the Double Diamond process(LogRocket Blog, 2023)

- The left side of each diamond considers the problem widely (divergent thinking).
- The right side focuses on particular responses (convergent thinking).
- Arrows indicate that the process is not linear, and the phases may be iterated several times to progress from the challenge to the outcome which shows that no idea is ever finished in an ever-changing and digital world.

- It considered leadership and the importance of creating a safe space for design and innovation by accepting diversity and differences.
- It also prioritizes user, partner, and stakeholder engagement.
- Outlines principles that designers and other problem solvers can choose to follow in order to work effectively.

Discover

- The process of understanding the user's needs, wants, and pain points.
- This is done through research methods such as surveys, interviews, and usability testing.
- The goal of the research is to discover what the user is trying to achieve, what their challenges are, and what would make their experience better.
- There are a number of different ways to discover user needs in user-centered design

Discover cont…

- **Surveys:** Surveys are a quick and easy way to gather quantitative data rather than qualitative data about user needs
- **Interviews:** Interviews are a more in-depth way to gather qualitative data about user needs.
- **Usability testing:** Observe users interacting with a product or prototype either in person or remotely.

Discover cont..

- **Card sorting: U**nderstanding how users categorize information to design effective navigation and information architecture.
- **Eye tracking:** Track where users look on a screen by understanding what users are paying attention to and how they are interacting with a design.

Design

- The process of creating a solution that meets the user needs discovered in the research phase.
- This phase involves brainstorming, sketching, prototyping, and testing.
- Brainstorming can be done by the design team or with the users themselves.
- Once some ideas have been generated, sketch them out to allow the team to visualize the ideas and get feedback from the users.

- Prototypes are created after sketches through paper, wireframes, or code to allow the team to test the usability of the design and feedback from users.
- Testing the design with the users is the final step done through usability testing or user interviews.
- The design phase is an iterative process.

Key considerations in designing of user-centered design

- ❖Use wireframes and prototypes to test your designs early and often.
- ❖Get feedback from users throughout the design process.
- ❖Willing to iterate on your designs based on feedback.
- ❖Open to new ideas and suggestions.
- ❖Patient and persistent.

Develop

- The process of creating the final product or service.
- Involves taking the design and turning it into a reality.
- Also it’s an iterative process.
- Its time-consuming and expensive, but worth creating a product or service that meets the user needs.

Steps to follow in the Development phase

- Create detailed specifications for the product or service by including things like the user interface, the functionality, and the technical requirements.

- After specifications are finalized, start the development through a team of developers or by a single developer.

Key issues in developing in user-centered design

- Use user feedback to guide your development process.
- Willing to iterate on your designs based on feedback.
- Open to new ideas and suggestions.
- Patient and persistent.

Deliver

- The process of making the product or service available to the users.
- Involves testing, deployment, and support.
- It is also an iterative process, time-consuming and expensive, but worth to make sure that the product or service is delivered successfully.

Steps in the Delivery phase

- Test and approve the product or service to make sure it is working as expected through users or with a team of testers.
- Deploy it using a variety of ways, such as through a website, an app store, or a physical store.
- Provide support to the users by including things like answering questions, fixing bugs, and providing updates.

Key issues in deliver phase in user-centered design

- ❖Keep the user in mind throughout the delivery process.
- ❖Responsive to user feedback.
- ❖Willing to iterate on your delivery plan based on feedback.
- ❖Patient and persistent.

Tools and techniques used in the delivery phase

- **User feedback: E**nsuring that the delivery process is user-centered through surveys etc.
- **Communication: C**ommunicating with the users, the development team, and other stakeholders throughout the process.
- **Documentation: L**ike user guides, installation instructions, and troubleshooting guides.
- **Support:** Ensuring users are able to use the product or service successfully through help desk, social media etc.

Who to involve in the design process

- The people you involve in the interface design process will vary depending on the specific project.
- Key stakeholders to include are:
  - ✓**Users**
  - ✓**Designers**
  - ✓**Developers**

- ✓**Business stakeholders:** Help to achieve business objectives.
- ✓**Technical experts:** provide guidance on the technical feasibility of the design and help to ensure compliance with industry standards.
- ✓**Researchers:** Help to gather data about the users and their needs.
- ✓Other stakeholders like marketing, sales, and customer support.

Importance of involving users

- **Better usability:** Provide feedback on how the interface can be improved to make it easier to use.
- **Improved user experience:** A usable interface can lead to a better user experience.
- **Reduced errors:** A usable interface can help to reduce errors.
- **Increased satisfaction:** Users who are satisfied with an interface are more likely to use it again and recommend it to others.

principles

- John Gould and Clayton Lewis (1985) proposed three principles of user-centered approach that are still relevant today and used by many designers and developers:

Early and continual focus on users

- Users should be involved in the design process from the very beginning throughout the development of the product or service.
- This can be achieved through user research, usability testing, and other methods.

Empirical measurement of usability

- This means that the usability of the product or service should be measured throughout the design process.
- This can be done through usability testing, surveys, and other methods.
- The results of these measurements can be used to improve the design.

Iterative design

- The design process should be iterative, which means that it is repeated as needed where the designer makes changes and then tests the design again.
- This allows the designers to improve the design based on feedback from the user.

Four basic activities of interaction design

- **User research: I**nvolves understanding the user's needs, goals, and tasks through research methods such as surveys, interviews, and usability testing.

- **Design: I**nvolves creating a design that is easy to use, efficient, and meets the user's needs through consideration of usability principles such as consistency, clarity, and feedback.

❖**Prototyping:** Creating a working model of the interface so that users can interact with it and provide feedback through high and low fidelity prototypes.

❖**Testing:** Involves testing the interface with users to get feedback on its usability,

❖Following these activities, designers can create user-friendly interfaces that meet the needs of the people who will be using them.

Lifecycle model for interaction design

- Lifecycle model is used to represent a model that captures a set of activities and how they are related
- The best life cycle model for interface design will vary depending on the specific project and the needs of the stakeholders.
- However, all of the models listed below can be effective if they are used correctly.

Waterfall model

- Linear model where the phases of the design process are completed in a sequence.
- Waterfall model is simple to understand and manage, but it can be inflexible and difficult to change if needed

Waterfall model

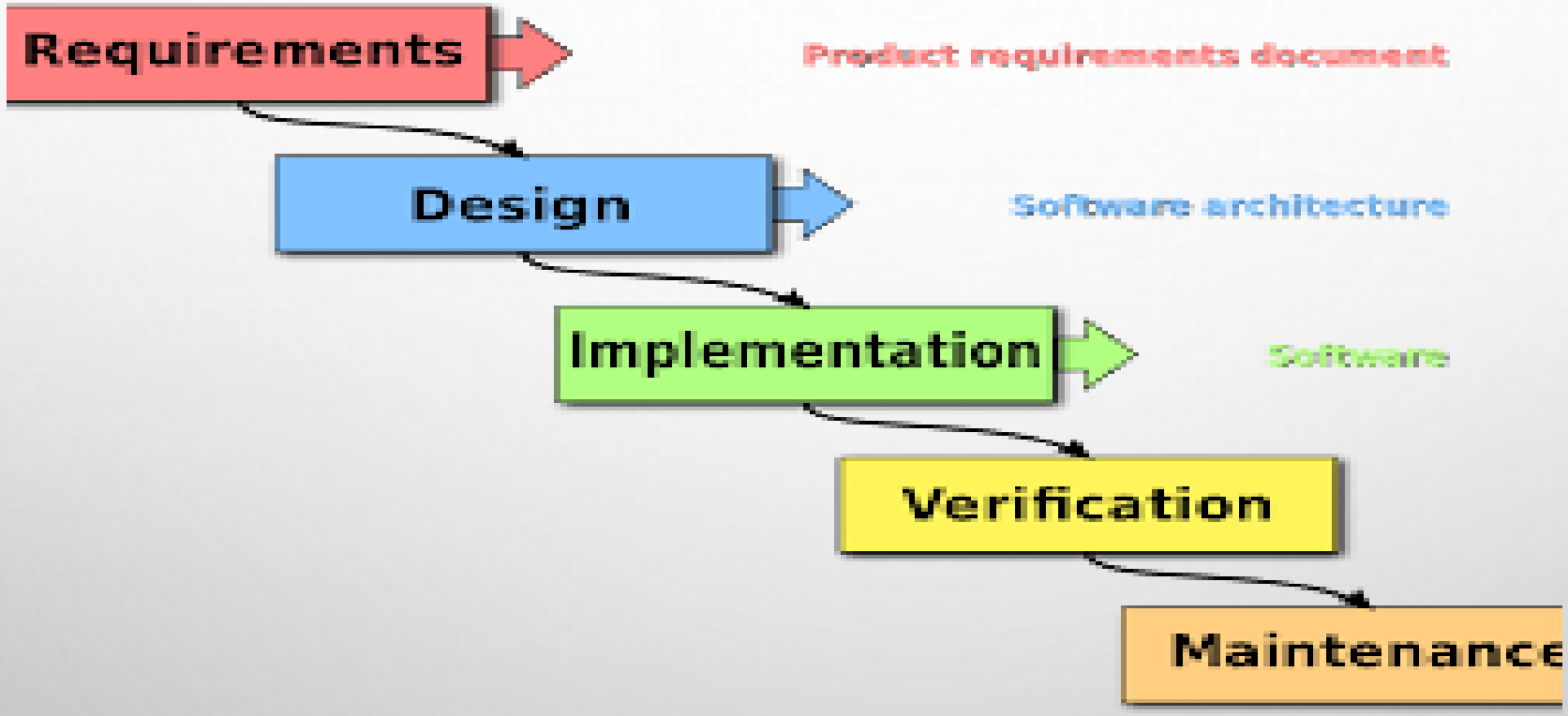

Figure 3: Water-fall model (NS804, 2022)

- All project tasks are split into phases that follow a linear sequence that flows downwards
- Users expect modern apps to have intuitive and responsive UX
- Waterfall model works incredibly well for UX, which many developers utilize.

- **Requirements:** Project managers gather all necessary customer requirements during this initial phase.
- **Design:** Design consists of a logical design and a physical design phase i.e. brainstorming and theorization of solutions.
- **Implementation:** Start writing code based on the requirements and specifications from the above phases.

❖**Verification:** Customer receives the finished product to review.

❖**Maintenance:** Maintenance team makes the necessary fixes based on customer feedback.

Key characteristics of the waterfall model

- Sequential and Linear: Each phase of the Waterfall Model is completed before moving on to the next. This linear progression makes it easy to understand and manage the project's progress.
- Well-Defined Requirements: Assumes that project requirements are well-understood and unlikely to change significantly during development. Any changes to requirements are typically costly and time-consuming to implement.

- Limited Customer Involvement: Stakeholder and customer involvement is generally more limited in the Waterfall Model compared to iterative or agile methodologies.
- Rigorous Documentation: The Waterfall Model places a strong emphasis on documenting each phase thoroughly. Detailed requirements, design documents, and test plans are typically created and maintained.
- Limited Flexibility: Due to its rigid sequential nature, the Waterfall Model is less adaptable to changes in project requirements, which can be a drawback in dynamic environments.

Iterative model

- This is a cyclical model where the phases of the design process are repeated as needed.
- It is more flexible than the waterfall model, but it can be more time-consuming and costly.
- Iterative design can be used at any phase of the design process, including when the product has already been launched.

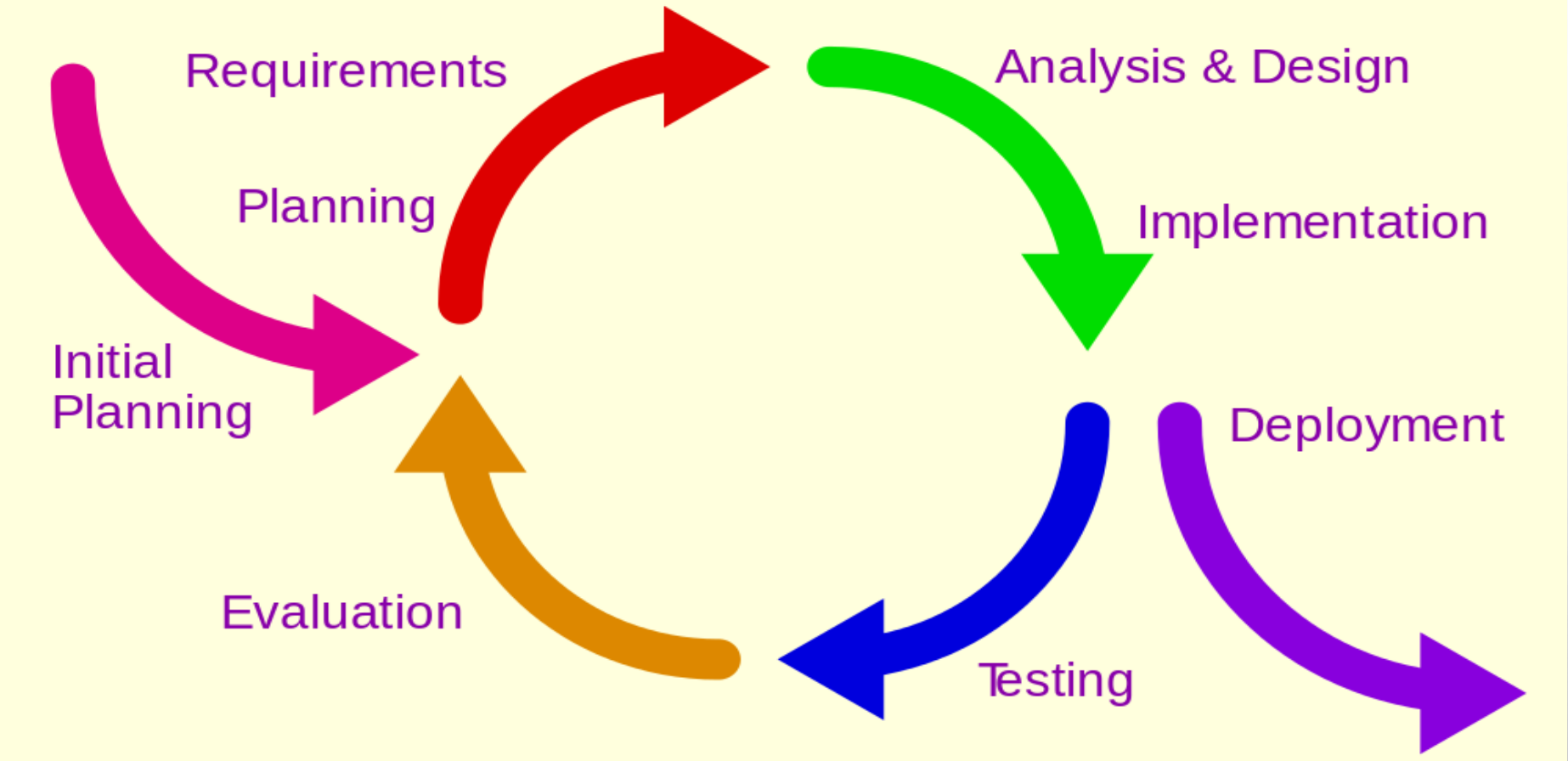

Figure 4: Iterative design (The Interaction Design Foundation, 2023)

Benefits of using iterative models

- It brings out user feedback to ensure that system requirements meet user needs.
- Gives the development team some certainty that their efforts are being focused on.
- Provides regular testing which can provide a strong desired performance.
- Gives stakeholders better visibility of progress at each iteration.

Key characteristics of the iterative model

- Flexibility: The iterative approach is highly adaptable to changing requirements, making it suitable for projects with evolving or unclear requirements.
- Incremental Development: The design is built incrementally, with each iteration adding new features or improvements, which can lead to earlier deliveries of functional software.
- Ongoing Stakeholder Involvement: Stakeholders, including end-users, are actively involved throughout the development process, ensuring that the final product aligns with their needs.

- Continuous Improvement: The iterative process promotes continuous improvement, as each iteration builds upon the lessons learned from previous ones.
- Reduced Risk: The ability to detect and address issues early in the process reduces project risk and increases the likelihood of delivering a successful product

Spiral model

- A hybrid model that combines elements of the waterfall and iterative models.
- It is more flexible than the waterfall model, but it can be more complex to manage.
- It is divided into a series of quadrants, each of which represents a phase of the design process.

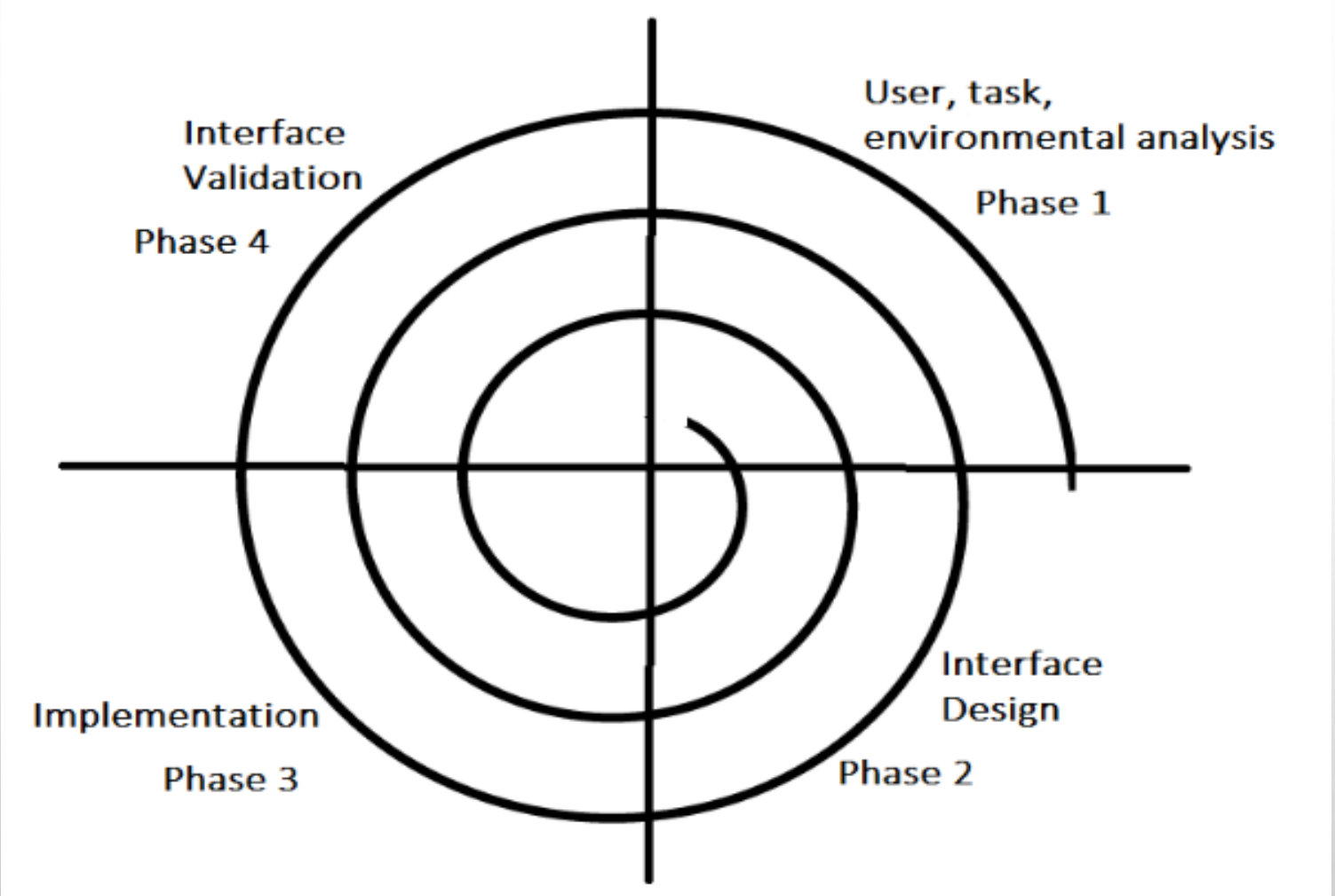

Figure 5: spiral model (GeeksforGeeks, 2023)

Key characteristics and principles of the spiral model

- Risk-Driven: The Spiral Model places a strong emphasis on risk assessment and mitigation throughout the project's life cycle. Risks are actively identified and addressed in each iteration, reducing the likelihood of project failure.
- Iterative and Incremental: Each iteration builds upon the work of the previous ones, leading to incremental improvements in the software.

- Flexibility: The Spiral Model is highly adaptable to changing requirements, making it suitable for projects where requirements are not well-defined initially or are expected to evolve over time.
- Client Involvement: Regular feedback from clients helps ensure that the product aligns with their needs and expectations.

- Phases Tailoring: The specific activities and duration of each phase can be tailored to the unique needs of the project.
- Verification and Validation: The model emphasizes thorough verification and validation of the software to ensure quality and reliability.

Agile model

- This is an iterative and incremental model that is based on the idea of continuous improvement.
- It is more flexible and adaptable than the waterfall model, but it can be more challenging to manage.
- Agile teams work iteratively and collaboratively to produce the right deliverables.

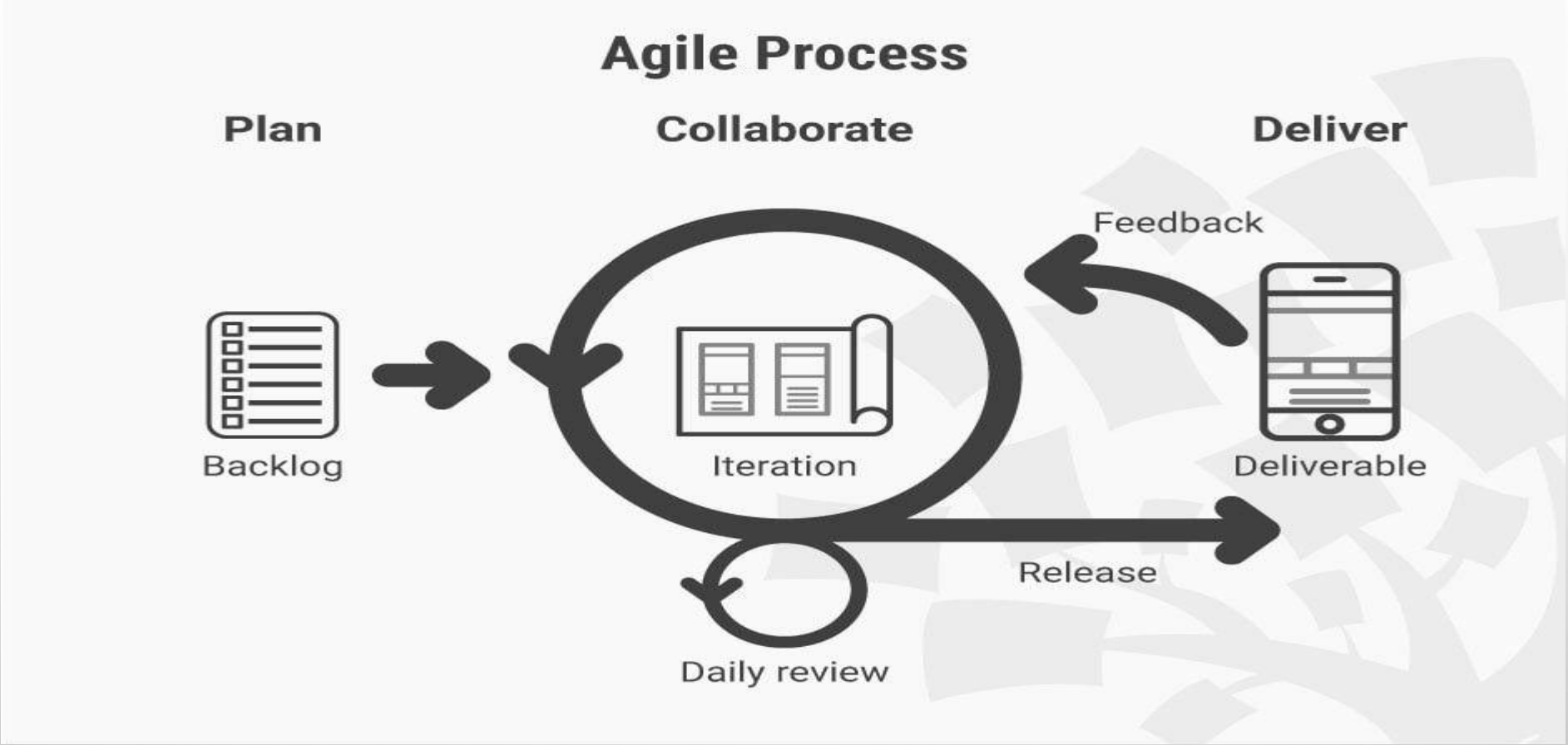

Figure 6: Agile model (The Interaction Design Foundation, 2023)

Key principles and characteristics of the agile model

- Customer-Centric Approach: Agile puts the customer and end-users at the center of the development process
- Iterative and Incremental Development: Agile divides the project into small, manageable iterations or sprints, each typically lasting two to four weeks.
- Flexibility and Adaptability: Agile is highly adaptable to changing requirements, priorities, and emerging insights.

- ❖Collaborative Teams: Agile promotes close collaboration among cross-functional teams that include developers, testers, designers, and business stakeholders.
- ❖Emphasis on Individuals and Interactions: Agile values individuals and their interactions over processes and tools.
- ❖Continuous Customer Feedback: Agile teams seek frequent feedback from customers and stakeholders, often through demonstrations of the product at the end of each iteration.

Factors on choosing a life cycle model for interface design

- **Complexity of the project**: The more complex the project, the more flexibility the life cycle model will need to have.
- **Time and budget constraints**: The model should be chosen to fit within the time and budget constraints of the project.
- **Needs of the stakeholders**: The model should be chosen to meet the needs of the stakeholders, such as the users, the developers, and the business.

User centered design key questions

- Who are the users? What are their needs, goals, and tasks?
- How will users interact with the design? What are their expectations?
- What are the pain points and frustrations that users currently experience?

- What are the key features and functionality that users need and want?
- How can the design be made more user-friendly and efficient?
- How can the design be made more accessible and inclusive?
- How can the design be tested and evaluated to ensure that it meets the needs of users?

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Thank you

Next Lecture We Shall Look At

Conceptual models, interface metaphors, interaction types