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CHAPTER 1

1.1 GOOD AND POOR DESIGN

- A central concern of interaction design is to develop interactive products that are usable. By this is generally meant easy to learn, effective to use, and providing an enjoyable user experience.
- Poor designs are typically frustrating, confusing, inefficient and difficult to use.
- Good designs are aesthetically pleasing, enjoyable and simple to use.
- When considering the usability of a design it is important to take into account where it is going to be used and who is going to use it.

1.2 INTERACTION DESIGN

- By interaction design, we mean designing interactive products to support the way people communicate and interact in their everyday and working lives. Basically creating user experience that enhance and augment the way people work, communicate, and interact.
- The focus of interaction design is very much concerned with practice. It is not devoted to a particular way of doing design, but is more eclectic, promoting the use of a range of methods, techniques, and frameworks.
- Interaction design is fundamental to all disciplines, fields and approaches that are concerned with researching and designing computer-based systems for people.
- Most interaction design is done by multidisciplinary teams, where the skill sets of various disciplines are drawn upon.

1.3 THE USER EXPERIENCE

- A concept that has become central to interaction design is the user experience. By this it is meant how a product behaves and is used by people in the real world.
- User experience includes their overall impression of how good it is to use right down to the sensual effect small details have on them, such as how smoothly a switch rotates or the sound of a click and the touch of a button when pressing it.
- One cannot design a user experience, only design for a user experience. In particular, one cannot design a sensual experience, but only create the design features that can evoke it.

1.4 THE FOUR BASIC ACTIVITIES INVOLVED IN THE PROCESS OF INTERACTION DESIGN

- Identifying needs and establishing requirements for the user experience.
- Developing alternative designs that meet those requirements.
- Building interactive versions of the design so that they can be communicated and assessed.
- Evaluating what is being built throughout the process and the user experience it offers.

1.5 USABILITY

- Usability is generally regarded as ensuring that interactive products are easy to learn, effective to use, and enjoyable from the user's perspective.
- It involves optimizing the interactions people have with interactive products to enable them to carry out their activities at work, school, and in their everyday life.

1.6 USABILITY GOALS

- Safety. Involves protecting the user from dangerous conditions and undesirable situations.
- Effectiveness. Is a very general goal and refers to how good a product is at what it is supposed to do.
- Efficiency. Refers to the way a product supports users in carrying out their task.

- Learnability. Refers to how easy a system is to learn to use.
- Utility. Refers to the extent to which the product provides the right kind of functionality so that users can do what they need or want to do.
- Memorability. Refers to how easy a product is to remember how to use, once learned.

1.7 USER EXPERIENCE GOALS

- There are a number of user experience goals they include both positive and negative ones, for example, Satisfying, Enjoyable, Aesthetically pleasing, Fun, Challenging, Frustrating, and Boring.
- Many of these are subjective qualities and concerned with how a system feels to a user.
- They differ from the more objective usability goals in that they are concerned with how users experience an interactive product from their perspective, rather than assessing how useful or productive a system is from its own perspective.

1.8 DESIGN PRINCIPLES

- Visibility. Making relevant parts visible and what needs to be done obvious.
- Feedback. Sending information back to a user about what has been done.
- Constraints. Restricting the possible actions a user can perform.
- Consistency. Design interfaces to have similar operations and use similar elements for similar tasks.
- Affordance. Refers to an attribute of an object that allows people to know how to use it.

CHAPTER 2

1.9 PROBLEM SPACE

- By problem space we mean understanding and conceptualizing what is currently the user experience or product and how this is going to be improved or changed.
- Identifying usability and user experience goals is a prerequisite to understanding the problem space.
- Another important consideration is to make clear underlying assumptions and claims. By assumption is meant taking something for granted. By claim is meant stating something to be true when it is still open to question.

1.10 CONCEPTUALIZING INTERACTION

- Primarily this involves describing what the system is going to be to the users, through developing a conceptual model.
- The design space can also be conceptualized in other ways, including exploring the nature of the interaction that underlies user activities and through the lenses of different theories, models and frameworks.
- A benefit of conceptualizing the design space using one or more of these is that it can inform and systematically structure a design solution.

1.11 CONCEPTUAL MODELS

- A conceptual model is a high-level description of how a system is organized and operates. A conceptual module can be defined as an abstraction that outlines what people can do with a product and what concepts are needed to understand how to interact with it.
- It is not the description of the user interface but a structured outlining of the concepts and the relationships between them that will form the basis of the product or system.
- A conceptual model provides a working strategy, a framework of general concepts and their interrelations.
- How the various metaphors, concepts, and their relationships are organized determines how the users will subsequently think of a product and the operations they can carry out on it.

- Once formulated and agreed upon, a conceptual model becomes a shared blueprint, which can be represented as a textual description and or in a diagrammatic form.
- The conceptual model is used by the design team as the basis from which to develop more detailed and concrete aspects of the design.

1.12 COMPONENTS OF A CONCEPTUAL MODEL

- The major metaphors and analogies that are used to convey to the user how to understand what a product is for and how to use it for an activity.
- The concepts that users are exposed to through the product, including the task-domain objects they create and manipulate, their attributes, and the operations that can be performed on them.
- The relationships between those concepts. Whether one object contains another, the relative importance of actions to others, and whether an object is part of another.
- The mappings between the concepts and the user experience the product is designed to support or invoke.

1.13 METAPHORS AND ANALOGIES

- An interface metaphor is considered to be a central component of a conceptual model. It provides a structure that is similar in some way to aspects of a familiar entity but that also has its own behaviors and properties.
- A mistake sometimes made by designers is to try to design an interface metaphor to look and behave literally like the physical entity it is being compared with. They are meant to be used to map familiar to unfamiliar knowledge, enabling users to understand and learn about the new domain.

1.14 INTERACTION TYPES

- Instructing. Where users issue instructions to a system. This can be done in a number of ways, including typing in commands, selecting options from menus or pressing buttons. A benefit of instructing is that the interaction is quick and efficient.
- Conversing. Where users have a dialog with a system. Users can speak via an interface or type in questions to which the system replies via text or speech output. A benefit of conversing is that it allows people, especially novices, to interact with a system in a way that is familiar to them.
- Manipulating. Where users interact with objects in a virtual or physical space by manipulating them. For example opening, holding or closing objects. A benefit of manipulating is that it encourages creativity and playfulness.
- Exploring. Where users move through a virtual environment or physical space.

1.15 THEORIES, MODELS, AND FRAMEWORKS

- A theory is a well-substantiated explanation of some aspect of a phenomenon.
- A model is a simplification of some aspect of human-computer interaction intended to make it easier for designers to predict and evaluate alternative designs.
- A framework is a set of interrelated concepts and or a set of specific questions that is intended to inform a particular domain area.

CHAPTER 4

1.16 COMMUNICATION AND COLLABORATION

- The kinds of information that are circulated in different social circles are diverse, varying among social groups and across cultures, the frequency with which it is distributed is also highly variable as well as the way in which information is circulated.

- Underlying the various forms of communication are mechanisms and practices that have evolved to enable us to maintain social order. Rules, procedures, and conventions have been established whose function it is to let people know how they should behave in social groups.

1.17 THREE CORE FORMS OF SOCIAL MECHANISMS THAT ARE USED AND SUPPORTED BY TECHNOLOGICAL SYSTEMS

- The use of conversational mechanisms to facilitate the flow of talk and help overcome conversational breakdowns. Formal communication involves assigning certain roles to people and prescribing the types of turns people are allowed to take in a conversation. In contrast, informal communication is the chat that goes on when people socialize.
- The use of coordination mechanisms to allow people to work and interact together. Coordination takes place when a group of people act or interact together to achieve something. There are a number of coordinating mechanisms. Primarily, these include Verbal and non-verbal communications, Shared external representations and Schedules, rules and conventions,
- The use of awareness mechanisms to find out what is happening, what others are doing and, conversely, to let others know what is happening. A specific kind of awareness is peripheral awareness. Peripheral awareness is a person's ability to maintain and constantly update a sense of what is going on in the physical and social context, through keeping an eye on what is happening in the periphery of their own vision.

1.18 COLLABORATIVE TECHNOLOGIES THAT SUPPORT AND EXTEND THESE MECHANISMS

- Collaborative technologies have been designed to support different kinds of communication, from informal to formal and from one-to-one to many-to-many conversations. Collectively, such technologies are often referred to as computer-mediated communication. For example, chat rooms and instant messengers.
- Group calendars, electronic schedulers, project management tools that provide interactive forms of scheduling and planning are some of the main kinds of mechanisms designed to support coordination.
- The emphasis in the design of these early awareness systems was largely on supporting peripheral monitoring, allowing people to see each other and their progress for example the Porthole application.

CHAPTER 5

1.19 AFFECTIVE ASPECTS

- In general, the term affective refers to the generation of an emotional response. Affective behavior can also trigger an emotional response in others.
- Emotional skills, especially the ability to express and recognize emotions, are central to human communication.
- When computers are designed to recognize and express emotions in the same way humans do, it is called affective computing.

1.20 EXPRESSIVE INTERFACES AND THE AFFECTS THEY CAN HAVE ON PEOPLE

- Expressive forms like emoticons, sounds, icons, and virtual agents have been used at the interface to convey emotional states and or elicit certain kinds of emotional responses in users.
- One of the benefits of using expressive embellishments is that they provide reassuring feedback to the user that can be both informative and fun. They can, however, sometimes have the opposite effect on people, who find them intrusive, causing them at times to get annoyed and even angry.

- The style of an interface, in terms of the shapes, fonts, colors, balance, white space and graphical elements that are used and the way they are combined, can also influence its affectiveness. Good looking interfaces are often more satisfying and pleasurable to use. A key concern, therefore, is to strike a balance between designing pleasurable and usable interfaces.

1.21 EXPRESSIVE FORMS THAT CAN BE USED

- Dynamic icons. For example the recycle bin expanding when a file is placed in it.
- Animations. For example a bee flying across the screen indicating that the computer is doing something, such as checking files.
- Spoken messages, using various kinds of voices. For example telling the user what needs to be done.
- Various sonifications indicating actions and events. For example the whoosh noise when a window closes or a ding for a new email arriving.

1.22 FRUSTRATING INTERFACES AND THE EFFECTS THEY CAN HAVE ON PEOPLE

- In many situations, computer interfaces may inadvertently elicit negative emotional responses, such as anger and disgust. This typically happens when something that should be simple to use or set turns out to be complex.
- Interfaces, if designed poorly, can make people look stupid, feel insulted or threatened. The effect can be to make them annoyed to the point of losing their temper.
- Often user frustration is a result of bad design, no design, inadvertent design, or ill-thought-out design. It is rarely caused deliberately.
- Error messages have a long history in computer interface design, and are notorious for their incomprehensibility. Threatening error messages can cause users to get even more frustrated. Rather than helping them, they can make them panic, especially if subsequently given only two chances to rectify the situation.

1.23 ANTHROPOMORPHISM IN INTERACTION DESIGN

- Anthropomorphism is the propensity people have to attribute human qualities to objects. It is something people do naturally in their everyday lives and is commonly exploited in the design of technologies.
- The finding that people, especially children, have a propensity to accept and enjoy objects that have been given human-like qualities has led many designers to capitalize on it.
- An underlying argument in favor of the anthropomorphic approach is that furnishing interactive systems with personalities and other human-like attributes makes them more enjoyable and fun to interact with.
- It is also assumed that they motivate people to carry out the tasks suggested more strongly than if they are presented in cold, abstract computer language.
- However there have been many criticisms of the anthropomorphic approach. The central argument being that anthropomorphism is deceptive.
- An unpleasant side effect is that they can make people feel anxious resulting in them feeling inferior or stupid.

1.24 INTERFACE AGENTS, VIRTUAL PETS AND INTERACTIVE TOYS

- A new genre of cartoon and life-like characters has begun appearing on our computer screens, as agents to help us search the web, as e-commerce assistants that give us information about products, as characters in video games and many more.
- Much effort has gone into designing interface agents to be life-like exhibiting realistic human movements, like walking and running, and having distinct personalities and traits.

- The design of the characters appearance, their facial expressions and how their lips move when talking are all considered important interface design concerns.

1.25 MODELS OF AFFECTIVE ASPECTS

1.25.1 THE EMOTIONAL DESIGN MODEL

- Explains how emotion and behavior are determined by different levels of the brain.
- At the lowest level, the visceral level, are parts of the brain that are pre-wired to automatically respond to events happening in the physical world. At the next level, the behavioral level, are the brain processes that control our everyday behavior. At the highest level, the reflective level, are brain processes that contemplate.
- The visceral level responds rapidly, making judgments about what is good or bad, safe or dangerous, pleasurable or abhorrent and triggers the emotional responses. The behavioral level is the site where most well-learned human activities occur, like talking or driving. The reflective level entails conscious thought where we generalize across events or step back from the routine and the immediate.
- The model makes a number of claims about how we respond to stressful and pleasurable situations. The central claim is that our affective state, be it positive or negative, changes how we think.

1.25.2 THE PLEASURE MODEL

- Focuses more on the pleasurable aspects of our interaction with products. It considers all of the potential benefits that a product can deliver.
- The pleasure model Based on the framework for pleasure, it proposes four conceptually distinct types of pleasure.
 1. Physio-pleasure, which refers to bodily pleasures connected to sensory experiences.
 2. Socio-pleasure, which refers to the enjoyment of being in the company of others.
 3. Psycho-pleasure, which refers to people's emotional and cognitive reactions to a product. And.
 4. Ideo-pleasure, which refers to peoples values and is similar to the reflective level of the emotional model.
- The pleasure model does not attempt to explain how pleasures happen at a biological or behavioral level, but is intended as a means of framing a designer's thinking about pleasure, highlighting that there are different kinds.

1.25.3 TECHNOLOGY AS EXPERIENCE FRAMEWORK

- Is an account of the user experience largely in terms of how it is felt by the user. Although defining experience is incredibly difficult, it tries to capture the essence of human experience by describing it in both holistic and metaphorical terms.
- There are four core threads that make up our holistic experiences.
 1. Sensual thread, which is concerned with our sensory engagement with a situation and is similar to the visceral level the emotional model.
 2. Emotional thread, which is concerned with how emotions are intertwined with the situation in which they arise.
 3. Compositional thread, which is concerned with the narrative part of the experience, as it unfolds and the way a person makes sense of them.
 4. Spatio-temporal thread, which refers to the space and time in which our experiences take place and their effect upon those experiences.
- The threads are meant as ideas to help designers think and talk more clearly and concretely about the relationship between technology and experience.

- Within interaction design, a paradigm refers to a particular approach that has been adopted by the community of researchers and designers for carrying out their work. In terms of shared assumptions, concepts, values, and practices.
- This follows from the way the term has been used in science to refer to a set of practices that a community has agreed upon, including, the questions to be asked and how they should be framed, the phenomena to be observed and the way findings from experiments are to be analyzed and interpreted.
- Task analytic and usability methods were developed based on an individual's cognitive capabilities. The acronym WIMP, windows, Icons, Menus, and Pointers, was used as one way of characterizing the core features of an interface for a single user. This was later superseded by the GUI, graphical user interface.

1.26 INTERFACE TYPES

1.26.1 WEB-BASED INTERFACES

- Web pages are GUI's developed in languages such as HTML and JavaScript are viewed via web browsers on the internet.
- Possible applications are for e-commerce, marketing and social interaction or sharing of information.
- The advantages of web-based interfaces are that it is fast, easy to use and gives you access to large volumes of information. It is also easy to develop and deploy.
- Possible problems are that pages can sometimes be cluttered and difficult to use and there is too much irrelevant info to search through. Sometimes pages take long to download or are unresponsive or unavailable.

1.26.2 SPEECH INTERFACES

- With speech interfaces a user interacts with a system through speech and gets feedback through a digital or synthesized voice response.
- The advantage is that it is a natural way to communicate and can be used by people with visual or physical disabilities.
- Possible problems are that it is not easy to implement and voice responses can sometimes appear unnatural. It may also not be adaptable to different dialects and "mishearing" by the system can cause problems.
- Possible application of speech systems are for call routing and information services. It can also be used as screen readers for visually impaired users.

1.26.3 PEN, GESTURE AND TOUCH SCREEN INTERFACES

- Pen interfaces are where a pen-like device is used as input devices instead of the keyboard or mouse.
- Gesture interfaces are when a physical gesture is used as input device.
- Touch screen interfaces are when you physically touch the screen of a system as input.
- The advantages of these types of interfaces are that it increases speed of input and accuracy of input and users use natural gestures or movements to interact with a system.
- Possible problems are that the flow of interaction may be interrupted and handwriting may be misinterpreted.
- The possible applications of these interfaces are interactive games and mobile devices.

1.26.4 MOBILE INTERFACES

- Mobile interfaces are handheld device that are intended for use on the move.
- The advantages are that it has multiple functions in one device, it is a flexible means of interaction and gives a user mobility.
- Possible problems are that input requires many button pushes, and the interfaces may be too complex or small for some users.

- Possible applications are cell phones and PDA's or mobile credit card machines.

1.26.5 MULTIMODAL INTERFACES

- Multimodal interfaces are a combination of multiple ways to interact with the interface.
- The advantages are that allows more flexible interaction and can support users with disabilities or even very young users.
- Possible problems with these interfaces are that they can be difficult to implement and can be very complex and expensive.
- Possible applications for these interfaces are security systems where fingerprint and face recognition is used or car control systems.

1.26.6 SHAREABLE INTERFACES

- Shareable interfaces are designed for use by more than one person at the same time, allowing more than one input channel.
- The advantages of these systems are that they provide large interactional space and supports flexible group work, it also allows for information sharing.
- Possible problems are that it may require specialized hardware and software, it can also be expensive to implement.
- Possible applications include smart boards or video conferencing in offices and multi player games.

1.26.7 TANGIBLE INTERFACES

- Tangible interfaces are sensor-based and require physical interaction with digital representations.
- The advantages are that physical representations of real-life manipulable objects enable visualization of complex plans and physical objects and digital representations can be positioned, combined and explored in dynamic ways.
- Possible problems are that it can be expensive and it can be difficult to choose the correct physical artifact or digital media.
- Possible applications are the education through technology or when a design requires arrangement of physical objects.

1.26.8 AUGMENTED AND MIXED REALITY INTERFACES

- Augmented reality is where virtual representations are superimposed on physical objects and devices and mixed reality is where views of the real world are combined with views of a virtual environment.
- The advantages are that it may enhance perception of the real-world and can support training and education.
- Possible problems are that added information can become distracting and it may become difficult to distinguish between real and virtual worlds.
- Possible applications are flight simulators or medical applications.

1.26.9 WEARABLE INTERFACES

- Wearable interfaces are when input and output devices are integrated with normal apparel, such as headgear or spectacles.
- The advantages are that it can be mobile and less restrictive than desk based technologies and can be interactive to create a sense of realism. It can also give immediate feedback.
- Possible problems are that it can be uncomfortable and have limited battery life, the size and weight may also not be applicable to all users.
- Possible applications are sensors to monitor various bodily functions for medical reasons and for use in sports or recreational activities.

1.26.10 ROBOTIC INTERFACES

- Robotic interfaces are computational devices that have physical appearance and behaviors of humans or animals.
- The advantages are that it can be sent into places too small or dangerous for humans and can be used for manual repetitive functions.
- Possible problems are that people may have unrealistic expectations of the robot and it is expensive to develop.
- Possible applications are production and assembly lines, search and rescue work or support for disabled persons.

CHAPTER 7

1.27 FOUR KEY ISSUES REGARDING DATA GATHERING

1.27.1 SETTING GOALS

- The main reason for gathering data at all is to collect information about something. There are many reasons for gathering data, and before beginning it is important to identify specific goals for the particular study.
- The goals that are set will influence the nature of the data gathering session, the data techniques to be used, and also the analysis to be performed.
- Once the goals have been set, you can concentrate on what data to look for and what to do with it once it is gathered.
- The goals may be expressed more or less formally, or using a simple description, but whatever the format they should be clear and concise. In interaction design it is more usual to express the goals of data gathering more informally.

1.27.2 THE RELATIONSHIP WITH PARTICIPANTS

- One significant aspect of any data gathering is the relationship between the person or people doing the gathering and the person or people providing the data.
- One way of creating a relationship is to ask participants to sign an informed consent form. The details of the form will vary, but it usually asks the participant to confirm that the purpose of the data gathering and how the data will be used has been explained to them and that they are happy to continue. It also often includes a statement that the participant may withdraw at any time, and that in this case none of their data will be used for the study.
- Incentives for completing a questionnaire might be needed in some circumstances because there is no clear and direct advantage to the respondent, but in other circumstances, respondents may see it as part of their job to complete the questionnaire.

1.27.3 TRIANGULATION

- Triangulation is a strategy that entails using more than one data gathering technique to tackle a goal, or using more than one data analysis approach on the same set of data.
- Triangulation provides different perspectives and corroboration of findings across techniques, thus leading to more rigorous and defensible findings.

1.27.4 PILOT STUDIES

- A pilot study is a small trial run of the main study. The aim is to make sure that the proposed method is viable before embarking on the real study.

- Data gathering participants can be very unpredictable even when a lot of time and effort has been spent carefully planning the data gathering session. Plans for a data gathering session should be tested by doing a pilot study before launching into the main study.
- If it is difficult to find people to participate or if access to participants is limited, colleagues or peers can be asked to comment. Getting comments from peers is quick and inexpensive and can be a substitute for a pilot study.
- It is important to note that anyone involved in the pilot study cannot be involved in the main study, because they know more about the study and this can distort results.

1.28 DATA RECORDING METHODS

1.28.1 NOTES PLUS STILL CAMERA

- Paper, pencil or pen and a camera are the equipment used for taking notes and photographs as data gathering technique.
- It is a very flexible and unobtrusive technique to use and has a very low disturbance of the users.
- However the reliability of data may be low as it relies on humans to make good recordings and knowing what to record. This could also lead to incompleteness of data since what is recorded is only what the note taker thinks is important and what he can record in the time available, which could be a problem with inexperienced evaluators.
- The analysis of the data is relatively easy to transcribe and can lead to rich descriptions being produced. However transcribing data can be burdensome or be a useful first step in data analysis.

1.28.2 AUDIO PLUS CAMERA

- An inexpensive hand-held recorder with a good microphone and headset for transcription is the only equipment required for using audio plus camera as data gathering technique.
- It is a flexible and unobtrusive technique to use and has a low disturbance to users, although a microphone needs to be positioned.
- The reliability of the data is high, but external noises can muffle what is said. A complete audio recording can be obtained but there is no visual data when using this technique, therefore notes, photographs or sketches can supplement the recording but will need to be coordinated with the recording.
- During analysis critical discussions can be identified, but transcriptions will be needed for detailed analysis. The recordings can also serve as a permanent original record that can be revisited.

1.28.3 VIDEO

- More expensive editing, mixing and analysis equipment is needed when using video as data gathering method.
- It is not flexible since positioning and focusing of the camera lens is required and can be obtrusive. The disturbance to users is medium as the camera needs to be positioned on a tripod.
- Care should also be taken to avoid the Hawthorne effect, whereby subjects improve or modify an aspect of their behavior being experimentally measured simply in response to the fact that they are being studied.
- The reliability of the data can be high, depending on what the camera is focused on. This is the most complete method of data gathering especially if more than one camera is used, however coordination of video material is needed.
- During analysis critical incidents can be identified and tagged. There are software tools available that can do a detailed analysis. The recordings can also serve as a permanent original record that can be revisited.

1.29 METHODS OF GATHERING DATA

1.29.1 INTERVIEWS

- Interviews can be thought of as a conversation with purpose.
- There are four main types of interviews.
 1. Open-ended or unstructured.
 2. Structured.
 3. Semi-structured.
 4. Group interviews.
- Unstructured, structured and semi-structured are named according to how much control the interviewer imposes on the conversation by following a predetermined set of questions.
- Group interviews involve a small group guided by a facilitator.
- The most appropriate approach to interviewing depends on the purpose of the interview, the questions to be addressed, and the stage in the lifecycle.

1.29.2 QUESTIONNAIRES

- Questionnaires are a well-established technique for collecting demographic data and user's opinions. They are similar to interviews in that they can have closed or open questions.
- Effort and skill are needed to ensure that questions are clearly worded and the data collected can be analyzed efficiently.
- Clearly worded questions are particularly important when there is no researcher present to encourage the respondent and to resolve any ambiguities or misunderstandings.
- Well-designed questionnaires are good at getting answers to specific questions from a large group of people, and especially if that group of people is spread across a wide geographical area, making it infeasible to visit them all.
- Questionnaires can be used on their own or in conjunction with other methods to clarify or deepen understanding. The methods and questions used depend on the context, target audience and data gathering goals.

1.29.3 OBSERVATION

- Observation is a useful data gathering technique at any stage during product development. Early in design, observation helps designers understand the user's context, tasks, and goals.
- Observation conducted later in development may be used to investigate how well the developing prototype supports these tasks and goals.
- Users may be observed directly by the investigator as they perform their activities, or indirectly through records of the activity that are read afterwards. Observation may also take place in the field, or in a controlled environment.
- In the field, individuals are observed as they go about their day-to-day tasks in the natural setting. In a controlled environment, individuals are observed performing specified tasks within a controlled environment such as a usability laboratory.

CHAPTER 9

1.30 THE IMPORTANCE OF INVOLVING USERS

- In the past, developers would often talk to managers or to "proxy users", people who role-played as users, when eliciting requirements. While a proxy user can provide useful information, they will not have the same perspective as someone who performs the task every day, or who will use the intended product on a regular basis.
- Involving real users throughout development lets developers gain a better understanding of user's goals, leading to more appropriate, more usable product.

- However, two other aspects that have nothing to do with functionality are equally as important if the product is to be usable and used, these are expectation management and ownership.
- Expectation management is the process of making sure that the users views and expectations of the new product are realistic. The purpose of expectation management is to ensure that there are no surprises for users when the product arrives.
- Involving users throughout development helps with expectation management because they can see from an early stage what the product's capabilities are and what they are not.
- Adequate and timely training is another technique for managing expectations. If you give people the chance to work with the product before it is released, either by training them on the real system or by offering hands on demonstrations of a pre-released version, then they will understand better what to expect when the final product is released.
- A second reason for user involvement is ownership. Users who are involved and feel that they have contributed to a products development are more likely to feel a sense of 'ownership' towards it and be receptive to it when it finally emerges.

1.31 WHAT IS A USER CENTERED APPROACH

- By user-centered approach we mean that the real users and their goals, not just technology, should be the driving force behind development of a product.
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- As a consequence, a well-designed system will make the most of human skill and judgment, will be directly relevant to the work in hand or other activity, and will support rather than constrain the user.
- The user-centered approach is less of a technique and more of a philosophy.

1.32 THREE PRINCIPLES THAT WOULD LEAD TO A USEFUL AND EASY TO USE COMPUTER SYSTEM

- Early focus on users and tasks. This means first understanding who the users will be by directly studying their cognitive, behavioral, anthropomorphic, and attitudinal characteristics. This requires observing users doing their normal tasks, studying the nature of those tasks, and then involving users in the design process.
- Empirical measurement. Early in development, the reactions and performance of intended users to printed scenarios, manuals and so on is observed and measured. Later on, users interact with simulations and prototypes and their performance and reactions are observed, recorded, and analyzed.
- Iterative design. When problems are found in user testing, they are fixed and then more tests and observations are carried out to see the effects of the fixes. This means that design and development is iterative, with cycles of design, test, measure, and redesign, being repeated as often as necessary.

1.33 FOUR BASIC ACTIVITIES OF INTERACTION DESIGN

- Identifying needs and establishing requirements for the user experience.
- Developing alternative designs that meet those requirements.
- Building interactive versions of the design.
- Evaluating what is being built throughout the process and the user experience it offers.

CHAPTER 10

1.34 WHAT ARE REQUIREMENTS

- A requirement is a statement about an intended product that specifies what it should do or how it should perform.

- One of the aims of the requirements activity is to make the requirements as specific, explicit and clear as possible.
- Requirements come in many different forms and various levels of abstraction.

1.35 DIFFERENT KINDS OF REQUIREMENTS

- Functional requirements capture what the product should do.
- Data requirements capture the type, volatility, size or amount, persistence, accuracy and value of the required data.
- Environmental requirements or context of use refer to the circumstances in which the interactive product will be expected to operate. Four aspects of the environment must be considered when establishing requirements.
 1. The physical environment.
 2. The social environment.
 3. The organizational environment.
 4. The technical environment.
- User requirements where user characteristics capture the key attributes of the intended user group.
- Usability goals and experience goals are another kind of requirement.

1.36 DATA GATHERING FOR REQUIREMENTS

- Interviews are good at getting people to explore issues, and semi-structured or unstructured interviews are used early on to elicit scenarios.
- Focus groups are good at gaining a consensus view and highlighting areas of conflict and disagreement during the requirements activity.
- Questionnaires may be used for getting initial responses that can then be analyzed to choose people to interview or to get a wider perspective on particular issues that have arisen elsewhere.
- Direct observation of participants in their natural setting is used to understand the nature of the tasks and the context in which they are performed.
- Studying documentation like manuals and other documentation are a good source of data about the steps involved in an activity and any regulations governing a task.
- Researching similar products allows the developer to gain an understanding of the kinds of features and interaction that might be offered.

1.37 REQUIREMENTS BRAINSTORMING

- Include participants from a wide range of disciplines, with a broad range of experience.
- Don't ban 'silly stuff' unconventional ideas often turn into really useful requirements.
- Use catalysts for further inspiration, by building one idea on top of another.
- Keep records.
- Sharpen the focus by starting with a well honed problem.
- Use warm up exercises.

1.38 TASK DESCRIPTION

1.38.1 SCENARIOS

- A scenario is an informal narrative description, that describes human activities or tasks in a story that allows exploration and discussion of context, needs, and requirements.
- Using the vocabulary and phrasing of users means that the scenarios can be understood by the stakeholders, and they are able to participate fully in the development process.
- The level of detail present in a scenario varies depending on where in the development process they are being used.

- During requirements it is a good idea for scenarios to emphasize the context, the usability and user experience goals, and the tasks the user is performing.

1.38.2 USE CASES

- Use cases also focus on user goals, but the emphasis here is on a user-system interaction rather than the user's tasks itself.
- Although their focus is specifically on the interaction between the user and a software system, the stress is still very much on the user's perspective, not the system's.
- A use case is associated with an actor, and it is the actor's goal in using the system that the use case wants to capture.
- In this technique, the main use case describes what is called the 'normal course', meaning the set of actions that the analyst believes to be most commonly performed set out in a numbered fashion.
- Other possible sequences, called 'alternative courses', are then listed at the bottom of the use case and the number of these alternative courses indicates the step in the normal course that is replaced by this action or set of actions.

1.38.3 ESSENTIAL USE CASES

- Essential use cases were developed to combat the limitations of both scenarios and use cases. Essential use cases represent abstractions from scenarios, meaning they represent a more general case than a scenario embodies and try to avoid the assumptions of a traditional use case.
- An essential use case is a structured narrative consisting of three parts.
 1. A name that expresses the overall user intention.
 2. A stepped description of user actions. And.
 3. A stepped description of system responsibility.
- One difference between an actor in scenarios and a user role in essential use cases is that an actor could be another system, whereas a user role is not a particular person, and not a another system, but a role that a number of different people may play when using the system.

1.39 HIERARCHICAL TASK ANALYSIS

- Hierarchical task analysis was originally designed to identify training needs. It involves breaking down a task into subtasks and then into sub-subtasks and so on.
- These broken down tasks are then grouped together as plans that specify how the tasks might be performed in an actual situation.
- It focuses on the physical and observable actions that are preformed, and includes looking at actions that are not related to software or an interactive product at all.

CHAPTER 11

1.40 PROTOTYPING

- A prototype can be anything from a paper-based storyboard through to a complex piece of software, and from a cardboard mockup to a molded or pressed piece of metal.
- A prototype allows stakeholders to interact with an envisioned product, to gain some experience of using it in a realistic setting, and to explore imagined uses.
- A prototype is a limited representation of a design that allows users to interact with it and to explore its suitability.
- Prototyping can serve a variety of purposes for example, to test a out the technical feasibility of an idea, to clarify some vague requirements, to do some user testing and evaluation or to check that a certain design direction is compatible with the rest of the system development.

1.40.1 LOW-FIDELITY PROTOTYPING

- A low-fidelity prototype is one that does not look very much like the final product and uses materials that are very different from the intended final version.
- Low-fidelity prototypes are useful because they tend to be simple, cheap, and quick to produce. This also means that they are simple, cheap and quick to modify so they support the exploration of alternative designs and ideas.
- Low-fidelity prototypes are never intended to be kept and integrated into the final product. They are for exploration only.
- Storyboarding is a low-fidelity prototype that is often used in conjunction with scenarios. A storyboard consists of a series of sketches showing how a user might progress through a task using the product under development.
- Wizard of Oz is a low-fidelity prototype method that assumes that you have a software-based prototype. In this technique the user sits at a computer screen and interacts with the software as though interacting with the product.

1.40.2 HIGH-FIDELITY PROTOTYPING

- High-fidelity prototyping uses materials that you would expect to be in the final product and produces a prototype that looks much more like the final thing.
- High-fidelity prototyping is useful for selling ideas to people and for testing out technical issues.
- Problems with high-fidelity prototyping are that they take too long to build, it can set expectations too high and just one bug in a high-fidelity prototype can bring the testing to a halt.

CHAPTER 12

1.41 EVALUATE

- Evaluation is needed to check that users can use the product and that they like it, particularly if the design concept is new.
- Users look for more than just a useable system, they look for a pleasing and engaging experience.
- From a business and marketing perspective there are also good reasons for investing in evaluation because designers get feedback about their early design ideas, major problems are fixed before the product goes on sale and designers focus on real problems.

1.42 EVALUATION METHODS AND APPROACHES

1.42.1 USABILITY TESTING

- Usability testing involves measuring typical users' performance on typical tasks. This is generally done by noting the number and kind of errors that the users make and recording the time that it takes them to complete the task.
- The defining characteristics of usability testing is that the test environment and the format of the testing is controlled by the evaluator.
- Typically tests take place in a laboratory or in laboratory-like conditions where the user is isolated from the normal day-to-day interruptions.

1.42.2 FIELDS STUDIES

- The distinguishing feature of field studies is that they are done in natural settings with the aim of understanding what people do naturally and how products mediate their activities.

- Fields studies can be used to help identify opportunities for new technology, establish the requirements for design, facilitate the introduction of technology or how to deploy an existing technology in new context and evaluate technology.

1.42.3 ANALYTICAL EVALUATION

- In analytical evaluation two categories of evaluation methods are considered, firstly inspections which include heuristic evaluation and walkthroughs and secondly theoretically based models, which are used to predict performance.
- Heuristics are based on common-sense knowledge and usability guidelines.
- Cognitive walkthroughs involve simulating a user's problem-solving process at each step in the human-computer dialog, and checking to see how users progress from step to step in these interactions.
- Models have been used primarily for comparing the efficacy of different interfaces for the same application, and the optimal arrangement and location of features on the interface base.

CHAPTER 13

1.43 DECIDE FRAMEWORK

- D – Determine the goals.
- E – Explore the questions.
- C – Choose the evaluation approach and methods.
- I – Identify the practical issues.
- D – Decide how to deal with the ethical issues.
- E – Evaluate, analyze, interpret, and present the data.

1.43.1 DETERMINE THE GOALS

- Goals guide the evaluation by helping to determine its scope, so identifying what these goals are is the first step in planning an evaluation.

1.43.2 EXPLORE THE QUESTIONS

- In order to make goals operational, we must clearly articulate the questions to be answered by the evaluation study.
- Questions can be broken down into very specific sub-questions to make the evaluation even more fine grained.

1.43.3 CHOOSE THE APPROACH AND METHODS

- Having identified the goals and some questions that you want to investigate, the next step is to choose the evaluation approach and methods that you will use.

1.43.4 IDENTIFY THE PRACTICAL ISSUES

- A key aspect of an evaluation is involving appropriate users or, in the case of analytical evaluation, focusing on the characteristics of the anticipated user population.
- Facilities and equipment needs to be considered during an evaluation.
- Schedule and budget constraints are important to consider during an evaluation.
- Different evaluation methods require different expertise.

1.43.5 DECIDE HOW TO DEAL WITH THE ETHICAL ISSUES

- Tell participants the goals of the study and exactly what they should expect if they participate.

- Be sure to explain that demographic, financial, health, or other sensitive information that users disclose or is discovered from the tests is confidential.
- Make sure participants know that they are free to stop the evaluation at any time if they feel uncomfortable with the procedure.
- Consider your relationship with the participants and decide whether it is appropriate to provide incentives such as food, book tokens, or financial payment.
- Avoid including quotes or descriptions that inadvertently reveal a person's identity by using numbers or fictitious names to record and identify individuals.
- Ask users' permission in advance to quote them, promise them anonymity, and offer to show them a copy of the report before it is distributed.

1.43.6 EVALUATE, INTERPRET, AND PRESENT THE DATA

- The reliability or consistency of a method is how well it produces the same results on separate occasions under the same circumstances.
- Validity is concerned with whether the evaluation method measures what it is intended to measure.
- Bias occurs when the results are distorted.
- The scope of an evaluation study may refer to how much its findings can be generalized.
- Ecological validity concerns how the environment in which an evaluation is conducted influences or even distorts the results.