

A background image showing a group of people in a meeting or collaborative work environment. In the foreground, a person's hands are visible, holding a pen and writing on a notepad. Other people are seated around a table in the background, some looking towards the camera and others looking away. The image has a soft, slightly blurred quality with a warm color palette. A large, light gray diagonal shape is overlaid on the right side of the image, serving as a backdrop for the text.

HUMAN- MACHINE INTERACCION



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USABILITY AND USER EXPERIENCE



Human-computer Interaction

A group of four students are sitting around a table in a library, looking at a laptop screen. The background is filled with bookshelves. The image has a semi-transparent blue overlay on the left side and a semi-transparent red overlay on the right side.

EVALUATING USABILITY

Usability is a sub-discipline of user experience design.

USABILITY: DEFINITION.



The original definition of usability is that systems should be easy to use, easy to learn, flexible and should engender a good attitude in people (Shackel, 1990).

As the variety of people, activities, contexts and technologies of interactive system design has increased, so this definition, whilst still being valid, hides many important issues.

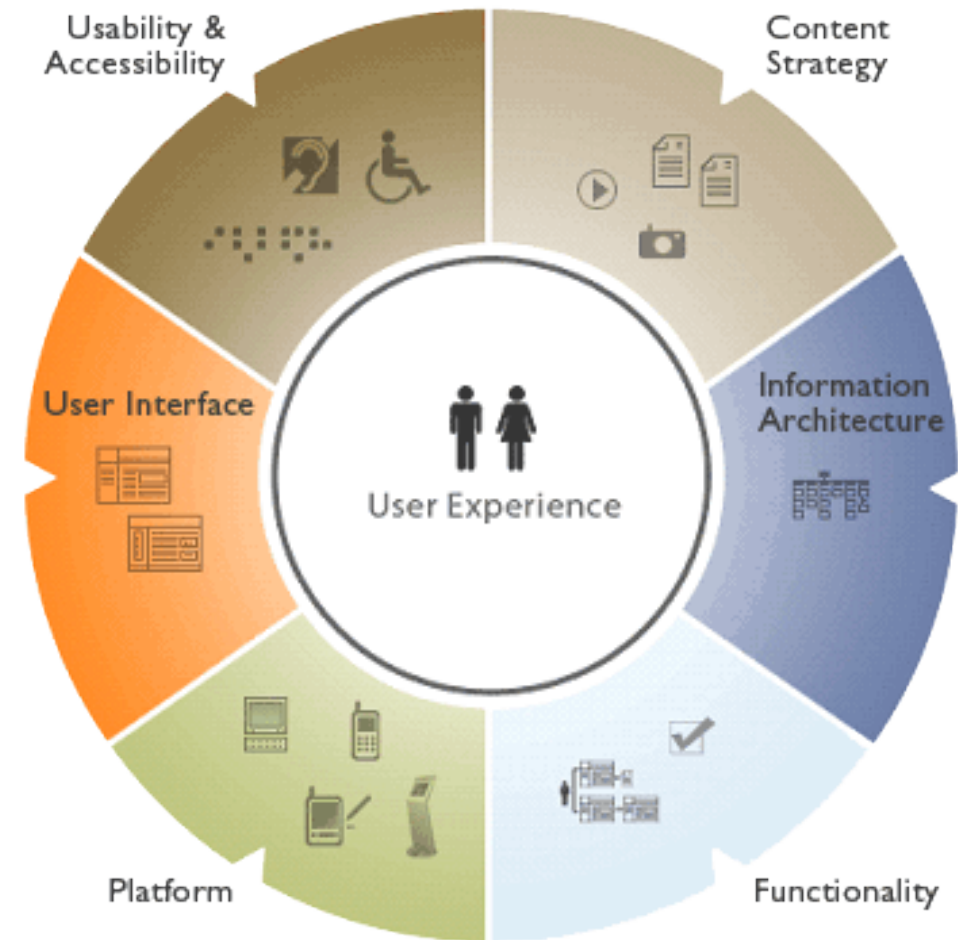


“Usability” refers to the ease of access and/or use of a product or website. It’s a sub-discipline of user experience design. Although user experience design (UX Design) and usability were once used interchangeably, we must now understand that usability provides an important contribution to UX; however, it’s not the whole of the experience. We can accurately measure usability.



ACCESSIBILITY -> USABILITY

- Accessibility concerns removing the barriers that would otherwise exclude some people from using the system at all.
- Usability refers to the quality of the interaction in terms of parameters such as time taken to perform tasks, number of errors made and the time to become a competent user.
- Clearly a system must be accessible before it is usable.



Acceptability, Accessibility



A system may be assessed as highly usable according to some usability evaluation criteria, but may still fail to be adopted or to satisfy people.

Acceptability refers to fitness for purpose in the context of use. It also covers personal preferences that contribute to users 'taking to' an artefact, or not.



The United Nations and the World Wide Web Consortium (W3C) have declarations and guidelines on ensuring that everyone can get access to information that is delivered through software technologies.

With an increasingly wide range of computer users and technologies, designers need to focus on the demands their designs make on people's abilities.



People will be excluded from accessing interactive systems for any of a number of reasons:



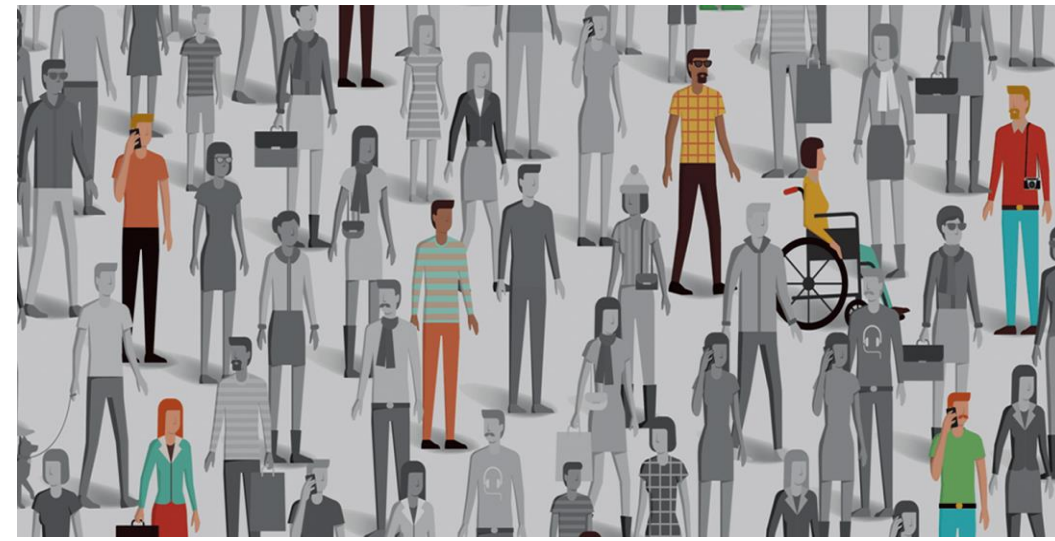
- Physically people can be excluded because of inappropriate siting of equipment or through input and output devices making excessive demands on their abilities. For example, an ATM may be positioned too high for a person in a wheelchair to reach, a mouse may be too big for a child's hand or a mobile phone may be too fiddly for someone with arthritis to use.
- Conceptually people may be excluded because they cannot understand complicated instructions or obscure commands or they cannot form a clear mental model of the system.
- Economically people are excluded if they cannot afford some essential technology.
- Cultural exclusion results from designers making inappropriate assumptions about how people work and organize their lives. For example, using a metaphor based on American football would exclude those who do not understand the game.
- Social exclusion can occur if equipment is unavailable at an appropriate time and place or if people are not members of a particular social group and cannot understand particular social mores or messages.

Overcoming these barriers to access is a key design consideration.

Two main approaches to designing for accessibility are:

Design for all (universal design) goes beyond the design of interactive systems and applies to all design endeavours.

It is grounded in a certain philosophical approach to design encapsulated by an international design community.



Inclusive design is based on four premises:

- Varying ability is not a special condition of the few but a common characteristic of being human and we change physically and intellectually throughout our lives.
- If a design works well for people with disabilities, it works better for everyone.
- At any point in our lives, personal self-esteem, identity and well-being are deeply affected by our ability to function in our physical surroundings with a sense of comfort, independence and control.
- Usability and aesthetics are mutually compatible.



Principles of universal design*

Equitable use. The design does not disadvantage or stigmatize any group of users.

Flexibility in use. The design accommodates a wide range of individual preferences and abilities.

Simple, intuitive use. Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level.

Perceptible information. The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.

Tolerance for error. The design minimizes hazards and the adverse consequences of accidental or unintended actions.

Low physical effort. The design can be used efficiently and comfortably, and with a minimum of fatigue.

Size and space for approach and use. Appropriate size and space are provided for approach, reach, manipulation, and use, regardless of the user's body size, posture, or mobility.

* Compiled by advocates of universal design, listed in alphabetical order: Bettye Rose Connell, Mike Jones, Ron Mace, Jim Mueller, Abir Mullick, Elaine Ostroff, Jon Sanford, Ed Steinfeld, Molly Story, Gregg Vanderheiden.

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PRINCIPLES OF UNIVERSAL DESIGN

As a way of ensuring an accessible system, designers should:

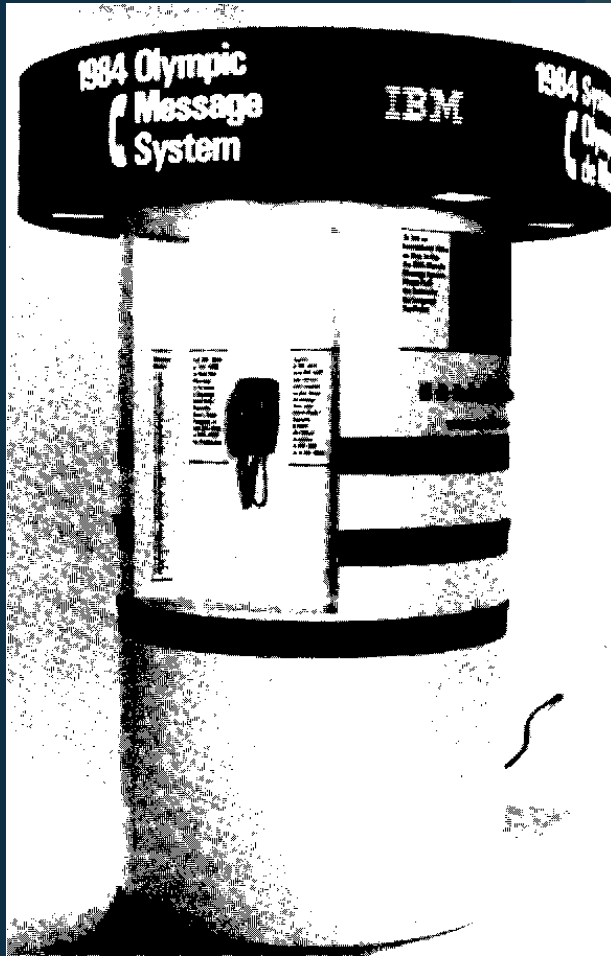
- include people with special needs in requirements analysis and testing of existing systems;
- consider whether new features affect users with special needs (positively or negatively) and note this in the specification;
- take account of guidelines - include evaluation against guidelines;
- include special needs users in usability testing and beta tests.



Assistive technologies

- There are a number of assistive technologies, such as Web browsers that read Web pages, and screen enlargers which allow people to set and move the area of focus. Voice input is increasingly available not just for text entry but also as a substitute for mouse/ keyboard control, and keyboard filters can compensate for tremor, erratic motion and slow response time.
- Indeed, there are many highly specialist methods for input and output for people with various disabilities





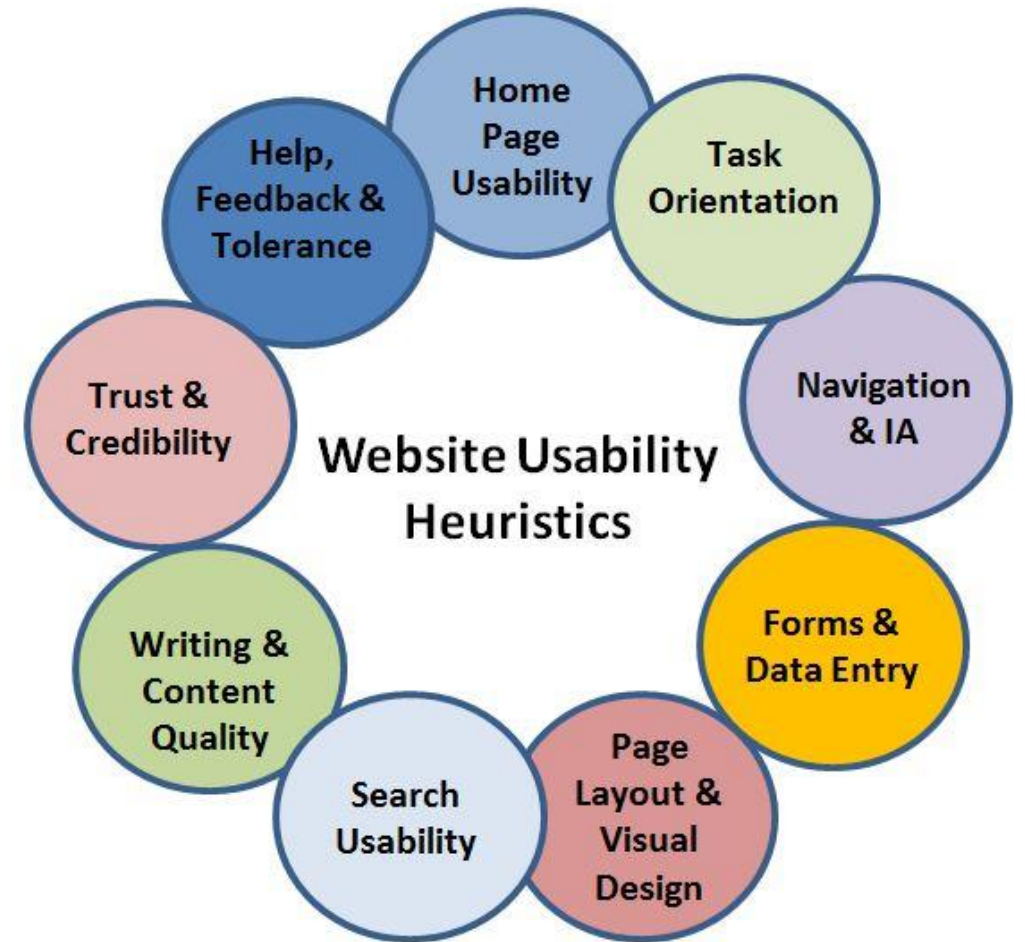
USABILITY

Some early pioneers of usability, Gould et al. (1987), developed the message kiosks for the 1984 Olympic Games



USABILITY

- A system with a high degree of usability will have the following characteristics:
 - It will be efficient in that people will be able to do things using an appropriate amount of effort.
 - It will be effective in that it contains the appropriate functions and information content, organized in an appropriate manner.
 - It will be easy to learn how to do things and remember how to do them after a while.
 - It will be safe to operate in the variety of contexts in which it will be used.
 - It will have high utility in that it does the things that people want to get done.



GOLDEN AND LEWIS PRINCIPLES (1985):

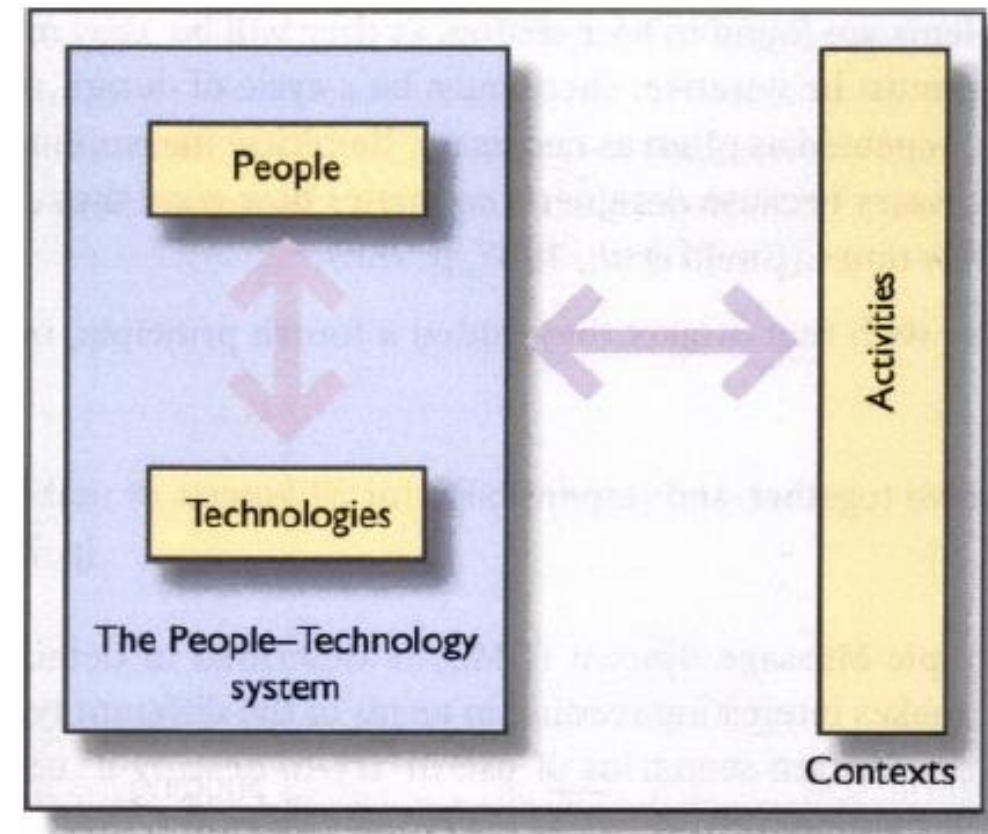
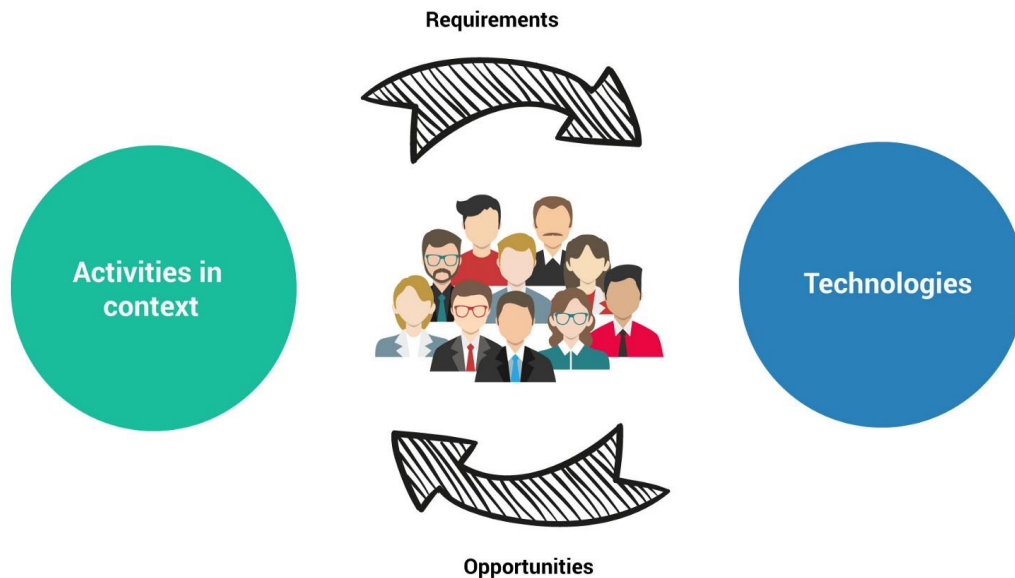
- An approach based on three key principles that Gould and Lewis (1985) proposed had evolved over the previous three years. Their principles were:
 - *Early focus on users and tasks.* Designers must first understand who the users will be, in part by studying the nature of the expected work to be accomplished, and in part by making users part of the design team through participative design or as consultants.
 - *Empirical measurement.* Early in the development process, intended users' reactions to printed scenarios and user manuals should be observed and measured. Later on they should actually use simulations and prototypes to carry out real work, and their performance and reactions should be observed, recorded and analysed.
 - *Iterative design.* When problems are found in user testing, as they will be, they must be fixed. This means design must be iterative: there must be a cycle of design, test and measure, and redesign, repeated as often as necessary. Empirical measurement and iterative design are necessary because designers, no matter how good they are, cannot get it right the first few times.



PACT

One way to look at usability is to see it as concerned with achieving a balance between PACT is covered in the four principal factors of human-centred interactive systems design, PACT:

- People
- Activities people want to undertake
- Contexts in which the interaction takes place
- Technologies (hardware and software).





USER EXPERIENCE

Designers of interactive systems are increasingly finding themselves going beyond the design of usable systems and are instead expected to design systems that provide people with great experiences.

EXPERIENCE: DEFINITIONS

"No product is an island. A product is more than the product. It is a cohesive, integrated set of experiences. Think through all of the stages of a product or service – from initial intentions through final reflections, from first usage to help, service, and maintenance. Make them all work together seamlessly."

– Don Norman, inventor of the term "User Experience"



Experience design is about recognizing that interactive products and services do not just exist in the world, they affect who we are. They influence our culture and identity.



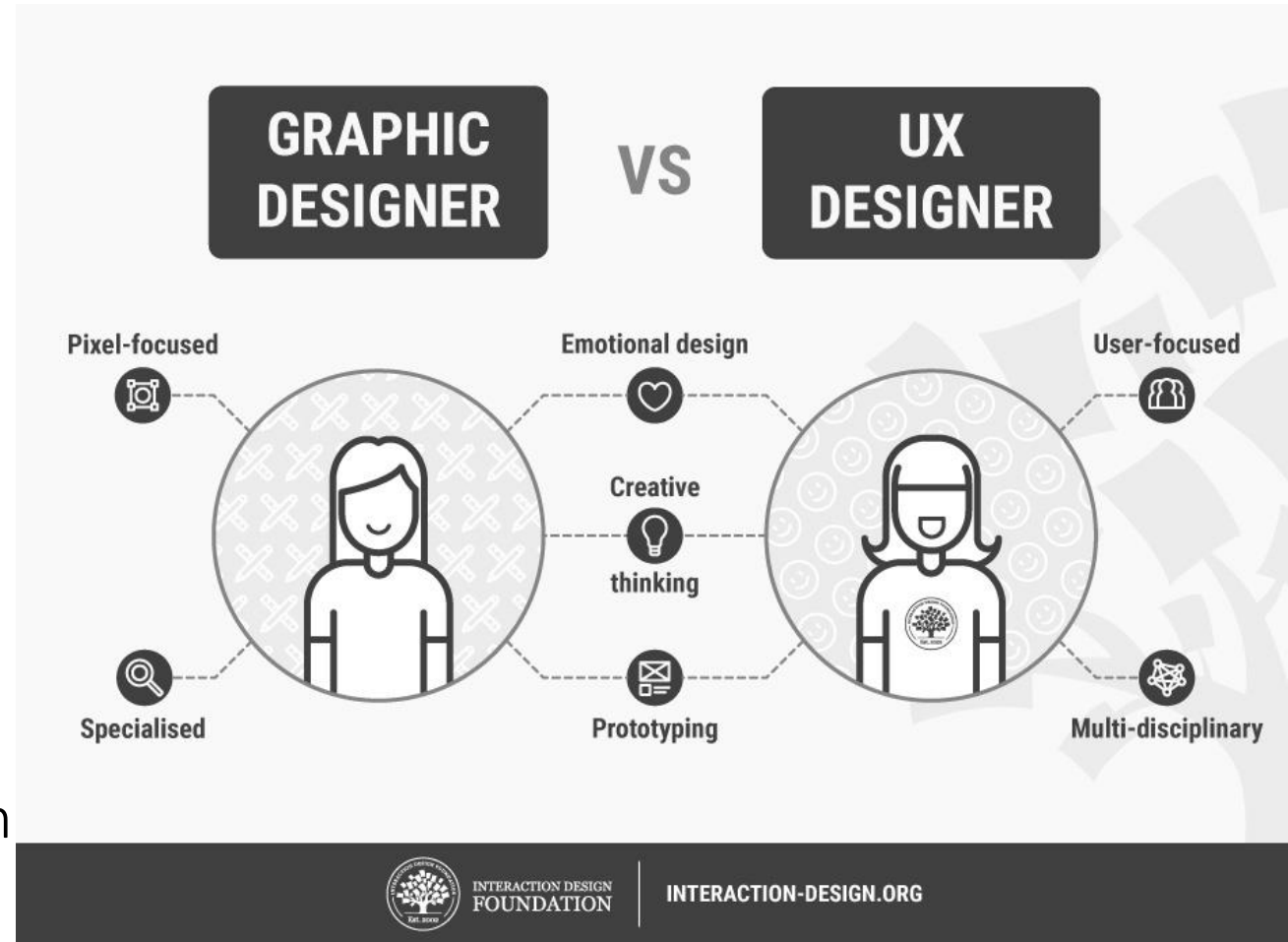
Experience is concerned with all the qualities of an activity that really pull people in - whether this is a sense of immersion that one feels when reading a good book, or a challenge one feels when playing a good game, or the fascinating unfolding of a drama.



It is concerned with all the qualities of the interactive experience that make it memorable, satisfying, enjoyable and rewarding. Emotion is a very important part of experience as experience is about feeling.

UX Designers consider the Why, What and How of Product Use

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



UX Designers consider the Why, What and How of Product Use



UX designers start with the Why before determining the What and then, finally, the How in order to create products that users can form meaningful experiences with. In software designs, designers must ensure the product's “substance” comes through an existing device and offers a seamless, fluid experience.

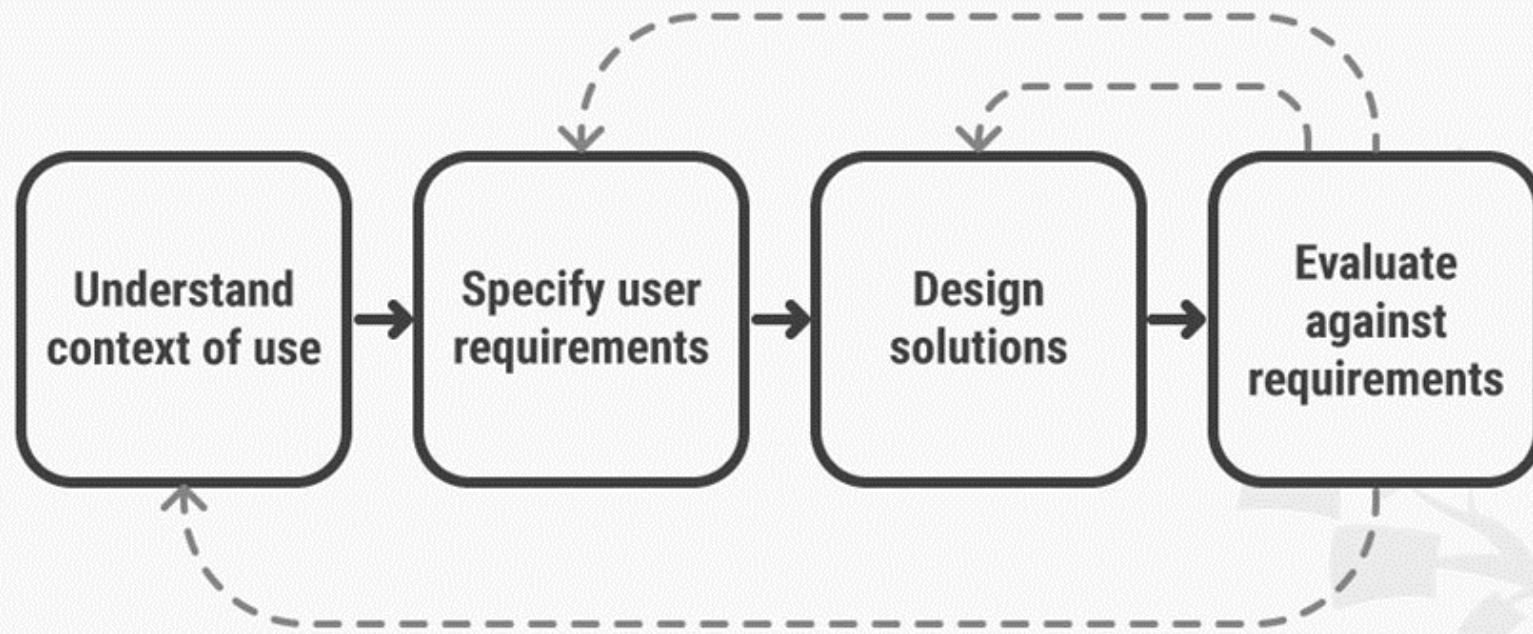
The Why, What and How of UX Design



UX Design is User-Centered

- Since UX design encompasses the entire user journey, it's a multidisciplinary field – UX designers come from a variety of backgrounds such as visual design, programming, psychology and interaction design.
- Designing for human users also demands heightened scope regarding accessibility and accommodating many potential users' physical limitations, such as reading small text.





UX Design is User-Centered

User-Centered Design is an iterative process that takes an understanding of the users and their context as a starting point for all design and development.