

Chapter 1

WHAT IS INTERACTION DESIGN?

Roadmap

- Chapter 1 : WHAT IS INTERACTION DESIGN?
 - 1.1 Introduction
 - 1.2 Good and Poor designs
 - 1.3 What is Interaction Design?
 - The Birth of HCI
 - 1.4 The User Experience
 - 1.6 Interaction Design, usability and the User Experience

Objectives

- Explain the difference between good and bad interaction design.
- Describe what interaction design is and how it relates to human-computer interaction and other fields
- Explain the relationship between user experience and usability
- Describe what and who is involved in the process of interaction design.
- Outline the different forms of guidance used in interaction design.
- Enable you to evaluate an interactive product and explain what is good and bad about it in terms of the goals and core principles of interaction design.

INTERACTION DESIGN

- How many interactive products are there for everyday use?
- What are those ?

INTERACTION DESIGN

- How usable they are?

INTERACTION DESIGN

- How usable they are?
- How many are easy, effortless (effective), and enjoyable (pleasure to use)?

INTERACTION DESIGN

- One aim of interaction design is to:
 - reduce the negative aspects such as frustration, anger, and annoyance
 - and increase the positive aspects such as enjoyment, engagement.

Elevator controls



www.baddesigns.com

Bad designs

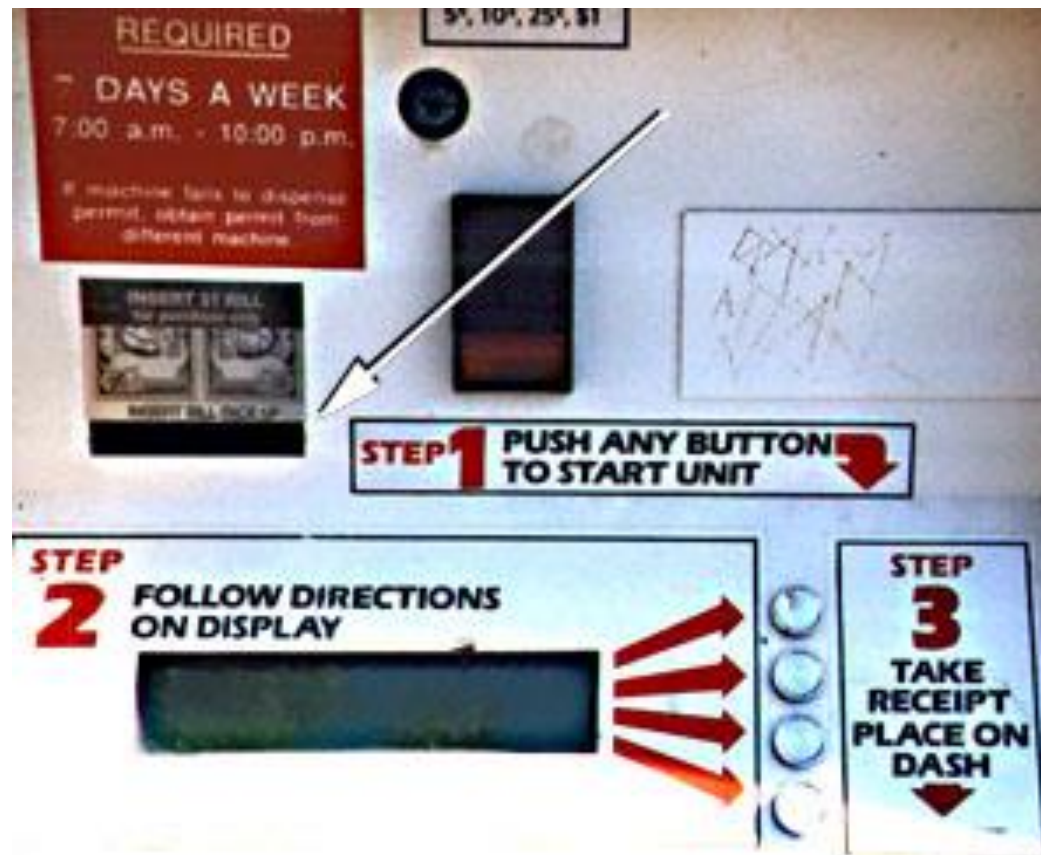
Elevator controls and labels on the bottom row all look the same, so it is easy to push a label by mistake instead of a control button



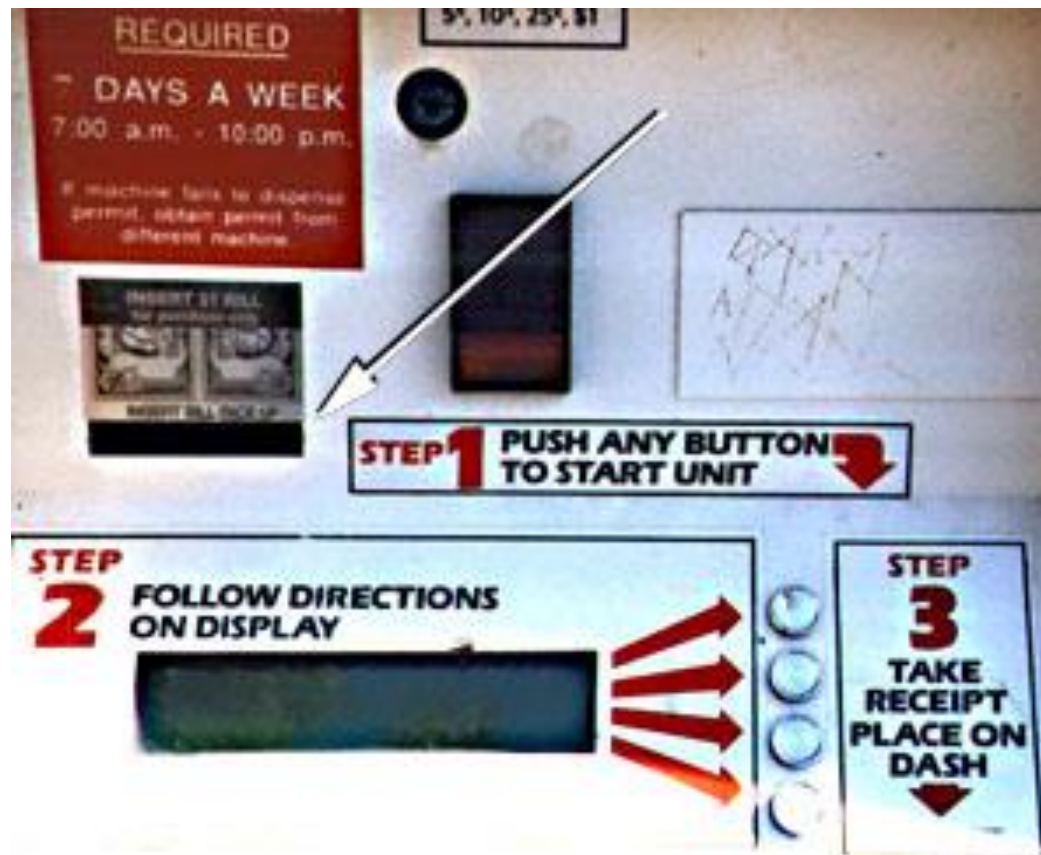
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People do not make same mistake for the labels and buttons on the top row. Why not?

Is this design of the vending machine bad or good?



Why is this vending machine so bad?



Why is this vending machine so bad?



- Need to **push button first** to activate reader
- Normally **insert bill** first before making selection
- Contravenes well known convention





Good design



Good design



- Based on how everyday objects behave
- Easy, intuitive and a pleasure to use
- Only requires one-step action to perform core tasks

What to design

- What is needed to take into account when designing an interactive product?

What to design

- Need to take into account:
 - Who the users are
 - What activities are being carried out
 - Where the interaction is taking place
- Need to optimize the interactions users have with a product:
 - So that they match the users' activities and needs

Understanding users' needs

- Need to take into account what people are good and bad at
- Consider what might help people in the way they currently do things
- Think through what might provide quality user experiences
- Listen to what people want and get them involved
- Use tried and tested user-centred methods

What is interaction design?

What is interaction design?

- “Designing interactive products to support the way people communicate and interact in their everyday and working lives.”
 - Preece, Sharp and Rogers (2015)

Goals of interaction design

- Develop usable products
 - Usability means easy to learn, effective to use and provide an enjoyable experience
- Involve users in the design process

Which kind of design?

- Number of other terms used emphasizing what is being designed, e.g.
 - user interface design, software design, user-centered design, product design, web design, experience design (UX)
- Interaction design is the umbrella term covering all of these aspects
 - fundamental to all disciplines, fields, and approaches concerned with researching and designing computer-based systems for people

Working in multidisciplinary teams

- Many people from different backgrounds involved
- Different perspectives and ways of seeing and talking about things
- Benefits
 - more ideas and designs generated
- Disadvantages
 - difficult to communicate and progress forward the designs being create

Interaction design in business

- Increasing number of ID consultancies, examples of well known ones include:
 - **Nielsen Norman Group:** “help companies enter the age of the consumer, designing human-centered products and services”
 - **Cooper:** “From research and product to goal-related design”
 - **Swim:** “provides a wide range of design services, in each case targeted to address the product development needs at hand”
 - **IDEO:** “creates products, services and environments for companies pioneering new ways to provide value to their customers”

Interaction design in Bahrain business

- **Click Bahrain Web Solutions - Design Directory**
www.designdirectory.com/firm/main?firm_id=256930
Click Bahrain Web Solutions is a creative web design / development and multimedia
Our company takes an interactive, holistic approach to your needs.
- **NEW AGE - Manama, KINGDOM OF BAHRAIN - Interaction ...**
www.designdirectory.com/firm/main?firm_id=299826
New Age is a creative web design / development and multimedia company that is
based in Kingdom of Bahrain since 2003. We create media-rich trendy content ...
- **4SPOTS - Manama, Bahrain - Interaction Design, Motion ...**
www.designdirectory.com/firm/main?firm_id=253435
4SPOTS is an interactive agency that offers clients complete online communication
solutions. With a range of services from website design and implementation, ...
- **Information Village - Design Directory**
www.designdirectory.com/firm/main?firm_id=362355
Information Village is an experienced Online Solutions Provider based in Bahrain
and has been in the ... be tailored in accordance to your company's profile, objective
and budget. ... Marketing & Communication; Branding; Interaction Design ...

What do professionals do in the ID business?

What do professionals do in the ID business?

- **interaction designers** - people involved in the design of all the interactive aspects of a product
- **usability engineers** - people who focus on evaluating products, using usability methods and principles
- **web designers** - people who develop and create the visual design of websites, such as layouts
- **information architects** - people who come up with ideas of how to plan and structure interactive products
- **user experience designers (UX)** - people who do all the above but who may also carry out field studies to inform the design of products

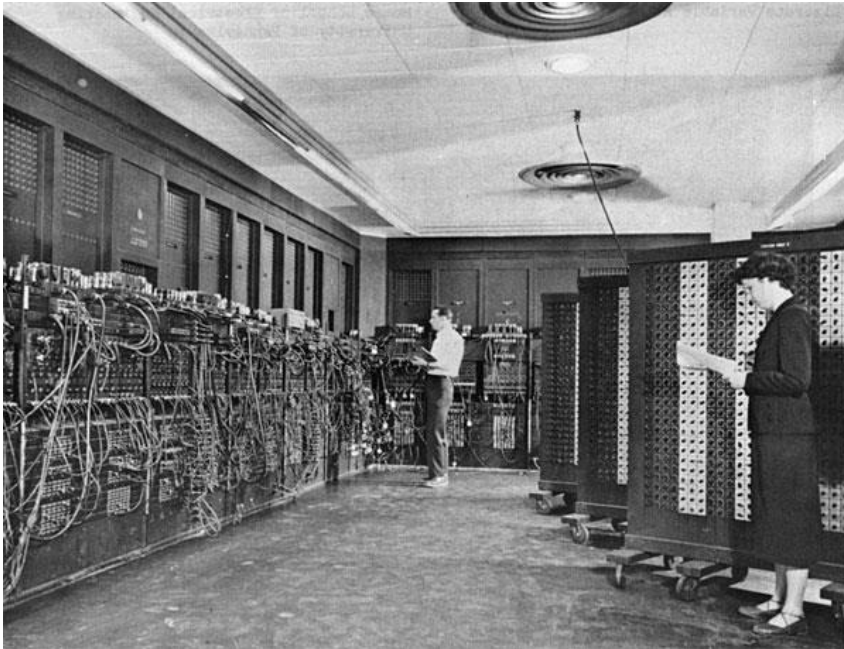
The Birth of HCI

Vannevar Bush

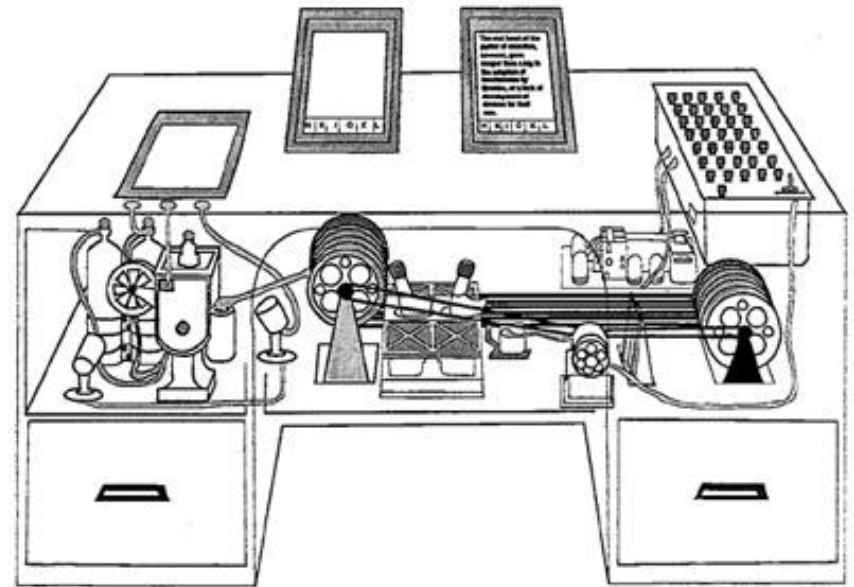
- In July of 1945, Vannevar Bush wrote an article for the Atlantic Monthly, later reprinted in Life, called “As We May Think”.



ENIAC – First Computer

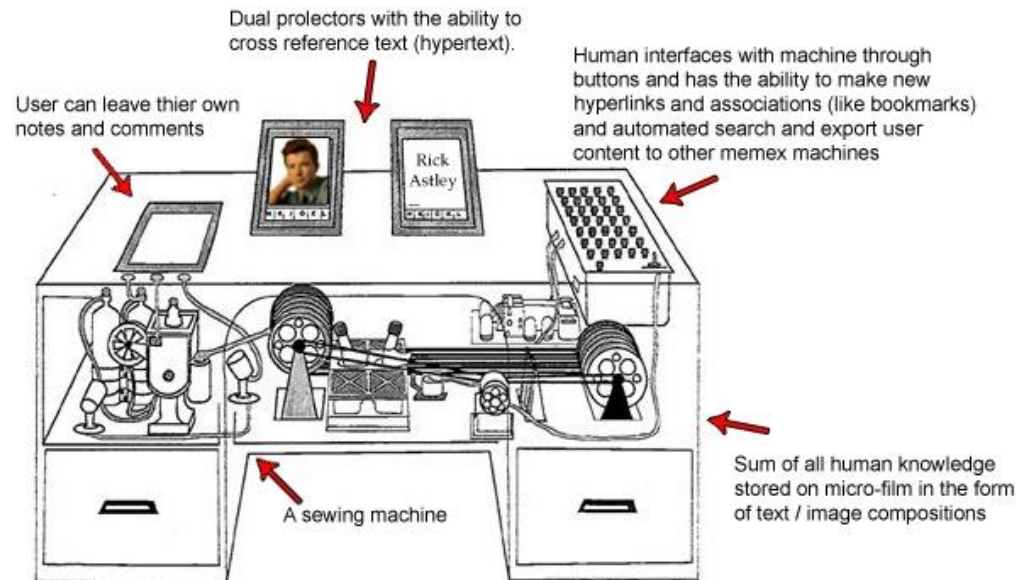


MEMEX – Future Interactive Desk



Vannevar Bush

- Bush wrote of future interactive desk, he called it Memmex. The idea is that all of the world's information would be available on the knowledge worker's desktop.



THE MEMEX order yours today!

Vannevar Bush

- Bush imagined that in the future you could wear camera right in the center of your head, like a third eye, and use it to capture stuff.



Vannevar Bush

- Also Bush memex vision invents hypertext: he has the idea that people could author trails through this information store, save them for later use, and share them with others.



Vannevar Bush

“wholly new forms of encyclopedias will appear, ready made with a mesh of associative trails running through them, ready to be dropped into the memex and there amplified”

-- “As we may think” *The Atlantic*, July 1945

Grace Hopper

- **Grace Hopper invented in the early 1950 of the first compiler.**
- **Grace conceptualized how improved tools could provide a much wider audience with access to computation.**
- **It enabled large group of developers to create the content that helped to put a PC on ever desk.**



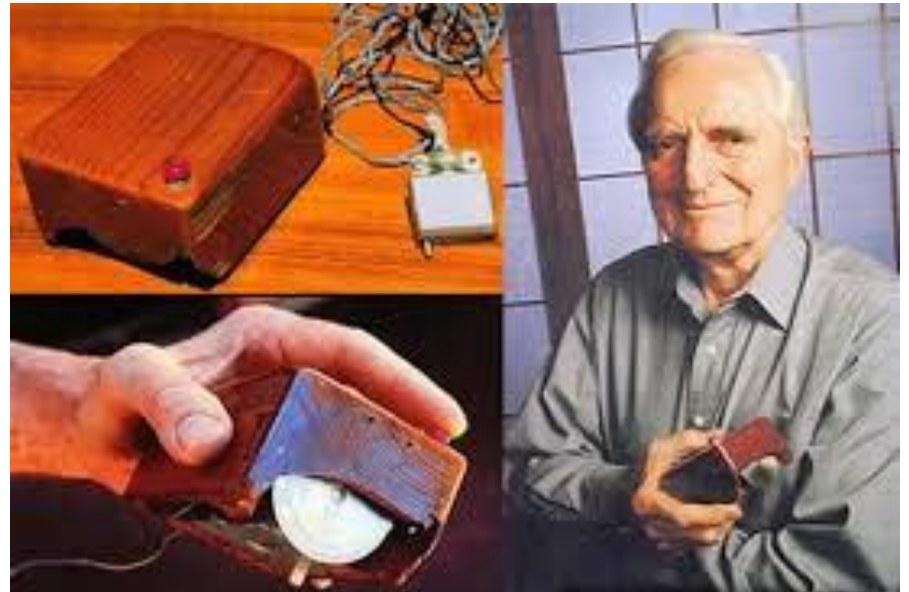
Ivan Sutherland

- The seeds of direct manipulation were shown at MIT at Lincoln Labs by Ivan Sutherland.
- The key innovation of the GUI is that the user's input is performed directly on top of the systems output. This input-on-output directness makes the interface much easier to understand and much more intuitive.
- In case of Sutherland's sketchpad, the input was a light pen and the output was an oscilloscope. This made the TX-2 a fine candidate for the sketchpad developments in 1961.



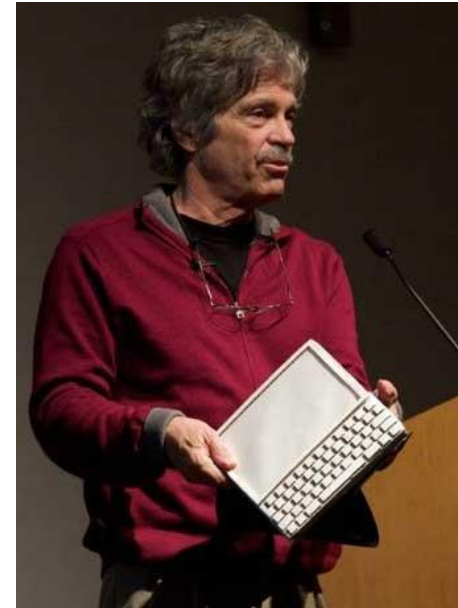
Doug Engelbart

- In 1945, Doug Engelbart was a navy radar technician in the Philippines.
- In the library, he found a copy of the magazine Life, the idea of the device that could extend the power of the human mind left Engelbart amazed. He had a vision. It took a long time, but eventually he got some funding and set to work.
- Doug Engelbart came up with the mouse in his famous demo **1968**. Engelbart's mouse worked with two orthogonal wheels.



Alan Kay

- **Alan Kay in Xerox PARC
fleshes outline 1970 his
vision of a Dynabook
which is a prototype made
from cardboard of a
computer designed to
communicate his vision.**



Alan Kay

- With this vision Alan Kay and his colleagues at Xerox PARC start building the foundation of GUI.
- It took them a decade to get it all together, to get ready to ship. Xerox released the STAR computing system in 1981.
- The STAR featured a bitmapped display, a window-based GUI, icons, folders, mice, Ethernet network, file servers, print servers, and mail.



Xerox Star 8010

Sharing this history for those of reasons:

- **First: seeing very important and influential work reminds me that good ideas are often strange or might not work well early on.**
- **Second: as Bill Buxton point out, if you are looking for a good future product, the seeds you need may already be out there in rough form, waiting for you to polish it into a diamond.**
- **Third, these early systems are totally awesome and inspiring.**

- Chapter 1 : WHAT IS INTERACTION DESIGN?
 - 1.6 interaction design and the user experience.
 - Usability Goals
 - User Experience Goals

Usability goals

- Usability refers to 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, at school, and in their everyday lives.
- What can be a usability goal ?

Usability goals

- Effective to use (effectiveness)
- Efficient to use (efficiency)
- Safe to use (safety)
- Have good utility (utility)
- Easy to learn (learnability)
- Easy to remember how to use (memorability)

Usability goals

- Usability goals are typically operationalized as questions. The purpose is to provide the interaction designer with a concrete means of assessing various aspects of an interactive product and the user experience.

Usability goals

- **Effective to use (effectiveness)** : refers to how good a product is at doing what it is supposed to do.
- Effective interfaces are visually visible and instilling in their users a sense of control. Users quickly see the breadth of their options, grasp how to achieve their goals, and can settle down to do their work. Effective interfaces do not concern the user with the inner workings of the system. Work is carefully and continuously saved, with full option for the user to undo any activity at any time. Effective applications and services perform a maximum of work, while requiring a minimum of information from users.

Usability goals

- Effective to use (effectiveness) : refers to how good a product is at doing what it is supposed to do.
 - Question ?
 - Washing machine ?
 - eLearning application ?
 - Online store ?
 - Search engine ?

Usability goals

- Effective to use (effectiveness) : refers to how good a product is at doing what it is supposed to do.
 - Question: Is the washing machine capable of allowing people to wash their cloths and get clean cloths without stains?
 - Is the interactive product capable of allowing people to learn and understand the topics?
 - Access the information they need?
 - Or buy the items they want?

Usability goals

- Efficient to use (efficiency) refers to the way a product supports users in carrying out their tasks to save time, effort, or money.
 - Question : Once users have learned how to use a product to carry out their tasks, can they sustain a high level of productivity?
 - eLearning application?
 - Online store ?
 - Washing machine ?

Usability goals

- Efficient to use (efficiency) refers to the way a product supports users in carrying out their tasks.
 - Question : Once users have learned how to use a product to carry out their tasks, can they sustain a high level of productivity?
 - eLearning application: What is the average time needed to learn?
 - Online store ? How many clicks are needed to buy an item?
 - Washing machine ? What is the time needed to complete a wash?

Usability goals

- Safe to use (safety) involves protecting the user from dangerous conditions and undesirable situations.
 - Question?

Usability goals

- **Safe to use (safety)** involves protecting the user from dangerous conditions and undesirable situations.
 - Question : What is the range of errors that are possible using the product and what measures are there to permit users to recover easily from them?
 - Online store ? Is the customer private data secure? Is the credit card information protected from fraud?

Usability goals

- Have good utility (utility) refers to the extent to which the product provides the right kind of functionality so that the users can do what they need or want to do.
 - Question: Does the product provide an appropriate set of functions that will enable users to carry out their tasks in the way they want to do them?
 - Washing machine?
 - eLearning application?
 - Online store?

Usability goals

- Have good utility (utility) refers to the extent to which the product provides the right kind of functionality so that the users can do what they need or want to do.
 - Question: Does the product provide an appropriate set of functions that will enable users to carry out their tasks in the way they want to do them?
 - Washing machine? Does it have a timer?
 - eLearning application? Does it allow to make notes? Will I receive answers to my questions instantly?
 - Online store? Does it allow to save the items in the shopping cart for later?

Usability goals

- Easy to learn (learnability) refers to how easy a system is to learn to use.
 - Questions?

Usability goals

- Easy to learn (learnability) refers to how easy a system is to learn to use.
 - Question: Is it possible that the user to work out how to use the product by exploring the interface and trying out certain actions?
 - How hard will it be to learn the whole set of functions in this way?
 - How long it will be needed to learn the whole set of functions?

Usability goals

- Easy to remember how to use (memorability) refers to how easy a product is to remember how to use , once learned.
 - Question?

Usability goals

- Easy to remember how to use (memorability) refers to how easy a product is to remember how to use , once learned.
 - Question: What kinds of interface support have been provided to help users remember how to carry out tasks, especially for products and operations they use infrequently?

The User Experience

- What is User Experience?

The User Experience

- How a product behaves and is used by people in the real world
 - the way people feel about it and their pleasure and satisfaction when using it, looking at it, holding it, and opening or closing it
 - “every product that is used by someone has a user experience: newspapers, ketchup bottles, reclining armchairs, cardigan sweaters.” (Garrett, 2010)
- Cannot design a user experience, only design *for* a user experience

Why was the iPod user experience such a success?



Figure 1.6 The iPod Nano Touch

Source: ©Press Association, reproduced with permission.

Why was the iPod user experience such a success?



Figure 1.6 The iPod Nano Touch

Source: ©Press Association, reproduced with permission.

- Quality user experience from the start
- Simple, elegant, distinct brand, pleasurable, must have fashion item, catchy names, cool, etc.

User experience goals

- A diversity of user experience goals has been articulated in interaction design which cover a **range of emotions and felt experience.**

User experience goals

Desirable aspects

satisfying
enjoyable
engaging
pleasurable
exciting
entertaining

helpful
motivating
challenging
enhancing sociability
supporting creativity
cognitively stimulating

fun

surprising
rewarding
emotionally fulfilling

Undesirable aspects

boring
frustrating
making one feel guilty
annoying
childish

unpleasant

making one feel stupid
cutesy
gimmicky

Usability and user experience goals

- Selecting terms to convey a person's feelings, emotions, etc., can help designers understand the multifaceted nature of the user experience
- How do usability goals differ from user experience goals?
- Are there trade-offs between the two kinds of goals?
 - e.g. can a product be both fun and safe?

Core characteristics of interaction design

- Users should be involved through the development of the project
- Specific usability and user experience goals need to be identified, clearly documented and agreed at the beginning of the project
- Iteration is needed through the core activities

Are cultural differences important?

Are cultural differences important?

- 5/8/2015 versus 8/5/2015?
 - Which should be used for international services and online forms?

Anna, IKEA online sales agent

- Designed to be different for UK and US customers
- What should Anna's appearance be like for other countries, like Bahrain, India, or China?

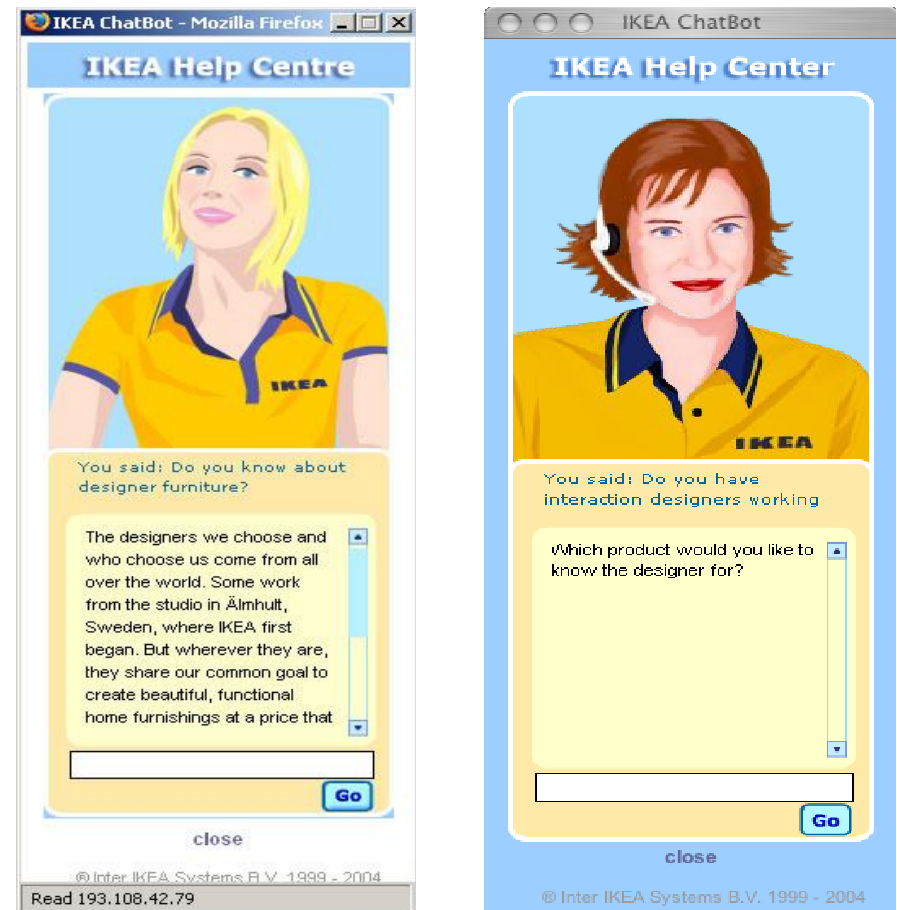


Figure 1.7 Anna the online sales agent, designed to be subtly different for UK and US customers. What are the differences and which is which? What should Anna's appearance be like for other countries, like India, South Africa, or China?

Source: Reproduced with permission from IKEA Ltd.

Accessibility

- Degree to which a product is usable and accessible by as many people as possible
- Focus on disability:
 - Have a mental or physical impairment
 - This has an adverse affect on their everyday lives
 - It is long term

Case Study-1

Examine how the online dictionary “<http://www.merriam-webster.com>” has been designed, paying particular attention to how the user is meant to interact with it.

- a) **Develop a set of usability goals (6) that will be most relevant in evaluating the device. Explain how the website fulfilled/failed to fulfill the usability goal (example).**
- b) **Decide which are the most four important ones and explain why?**
- c) **Convert the usability goals into questions in order to use them to assess how well is the software.**
- d) **Develop a set of user experience goals (3) that will be most relevant in evaluating the software. Explain for each user experience goal of how the software will support gaining the user experience goal (example).**
- e) **Convert the user experience goals into questions in order to use them to assess how well is the software.**
- f) **Discuss one possible improvement to the interface.**

Case Study-1

Examine how the online dictionary “<http://www.merriam-webster.com>” has been designed, paying particular attention to how the user is meant to interact with it.

- a) **Develop a set of usability goals (6) that will be most relevant in evaluating the device. Explain how the website fulfilled/failed to fulfill the usability goal (example).**
- **Effective to use :** the website is capable of providing me with the meaning of any word that I need or want. I have never typed a word and could not get its meaning.
 - **Efficient to use:** Save time and effort that I can get the meaning of a word in few seconds, providing options of possible words just after typing the first three letters reduce typing effort and time.
 - **Safe to use:** support saving private data (login & Password) using Facebook account. To prevent errors provide options of several words that starts with the same three letters. For misspelled words , the website provides suggestions.

Case Study-1

Examine how the online dictionary “<http://www.merriam-webster.com>” has been designed, paying particular attention to how the user is meant to interact with it.

- a) Develop a set of usability goals (6) that will be most relevant in evaluating the device. Explain how the website fulfilled/failed to fulfill the usability goal (example).**
- Utility: the system provides many useful functionalities such as to search in Dictionary, Thesaurus, ... have word of the day to improve the vocabulary. Create favorite list. Provides options of words have the same three letters.**
 - Easy to learn: it is easy to know the functionalities of the system just by exploring the website.**
 - Easy to remember: once learned how to use it is easy to remember because in most cases the interface depends on recognition and the menu is clear.**

Case Study-1

Examine how the online dictionary “<http://www.merriam-webster.com>” has been designed, paying particular attention to how the user is meant to interact with it.

b) Decide which are the most four important ones and explain why?

- **Easy to learn**
- **Effective**
- **Efficient**
- **Utility**

Case Study-1

Examine how the online dictionary “<http://www.merriam-webster.com>” has been designed, paying particular attention to how the user is meant to interact with it.

- c) Convert the usability goals into questions in order to use them to assess how well is the software.
- Effective to use :
 - Does the website allow you to get the meaning of the words that you need?
- Efficient to use:
 - How long does it take to find a definition of a word?
 - How many steps are required to get a definition of a word?
- Safe to use:
 - Does the system provide support to prevent errors?
 - Does the system provide support to recover from errors?

Case Study-1

Examine how the online dictionary “<http://www.merriam-webster.com>” has been designed, paying particular attention to how the user is meant to interact with it.

- c) Convert the usability goals into questions in order to use them to assess how well is the software.
- **Utility:**
 - What functionalities provided by the system that you think are useful?
 - Rate the usefulness of the following:
 - Word of the day
 - Favorite
 - Suggestion for misspelled words
 - Suggestion to complete the word

Case Study-1

Examine how the online dictionary “<http://www.merriam-webster.com>” has been designed, paying particular attention to how the user is meant to interact with it.

c) Convert the usability goals into questions in order to use them to assess how well is the software.

- **Easy to learn:**

- Is it easy to know the functionalities of the system just by exploring the website.
- Rate how easy is to use the site (very easy, easy, moderate, difficult, very difficult)
- It is easy to use the website (Strongly agree, agree, OK, disagree, strongly disagree)

- **Easy to remember:**

- Is it easy to remember how to use the website.
- It is easy to remember how to use the website (Strongly agree, agree, OK, disagree, strongly disagree)
- Does the system provide help when it is difficult to remember how to use the system to do a specific task.

Case Study-1

Examine how the online dictionary “<http://www.merriam-webster.com>” has been designed, paying particular attention to how the user is meant to interact with it.

- d) **Develop a set of user experience goals (3) that will be most relevant in evaluating the software. Explain for each user experience goal of how the software will support gaining the user experience goal (example).**
- **Satisfying:** the user will continue using the website and will recommend the website to others.
 - **Helpful:** fast way to get the definition of the word (several definitions) with less effort, listen to the word pronunciation, synonyms, example in a sentence.
 - **Engaging:** the website hold the attention of the user to search for a specific word then to hear to the pronunciation, word of the day which let you use the website even not for the purpose of the search.

Case Study-1

Examine how the online dictionary “<http://www.merriam-webster.com>” has been designed, paying particular attention to how the user is meant to interact with it.

- e) Convert the user experience goals into questions in order to use them to assess how well is the software.
- **Satisfying:**
 - Are you going to continue using the website.
 - Will you recommend the website to others.
- **Helpful:**
 - The website is helpful. (Strongly Agree, Agree, OK, Disagree, Strongly Disagree)[not very good]
 - The favorite list is helpful.
 - The pronunciation is helpful.
- **Engaging:**
 - Do you do tasks other than searching for a definition a word.
 - List the functionalities that you use in the system other than definition search.

Case Study-1

Examine how the online dictionary “<http://www.merriam-webster.com>” has been designed, paying particular attention to how the user is meant to interact with it.

f) Discuss one possible improvement to the interface.

- Too many ads , very disturbing but since its free it is understandable.**
- Add a browsing function like the paper dictionary.**

Case Study-2

- Examine how a smartphone has been designed, paying particular attention to how the user is meant to interact with it.
 - a) From your first impression, write down what first comes to mind as to what is good and bad about the way the device works.
 - b) Give a description of the user experience resulting from interacting with it.
 - c) Develop a set of usability and user experience goals that will be most relevant in evaluating the device. Decide which are the most important ones and explain why?
 - d) Convert the usability and user experience goals into questions. Then use them to assess how well your device fares.
 - e) Repeat (C) and (d) but this time using the design principles.
 - f) Discuss possible improvements to the interface based on the answers obtained from (d) and (e)

Case Study-2

- Examine how a smartphone has been designed, paying particular attention to how the user is meant to interact with it.
 - a) From your first impression, write down what first comes to mind as to what is good and bad about the way the device works.

Case Study-2

- Examine how a smartphone has been designed, paying particular attention to how the user is meant to interact with it.
 - a) From your first impression, write down what first comes to mind as to what is good and bad about the way the device works.

Good designs: easy to use, has many useful functions, enjoyable, elegant, light

Bad designs: screen is breakable, phone can be bended, more expensive than other phones.

Case Study-2

- Examine how a smartphone has been designed, paying particular attention to how the user is meant to interact with it.
 - b) Give a description of the user experience resulting from interacting with it. Choose from the list below:

Desirable aspects

satisfying
enjoyable
engaging
pleasurable
exciting
entertaining

helpful
motivating
challenging
enhancing sociability
supporting creativity
cognitively stimulating

fun
provocative
surprising
rewarding
emotionally fulfilling

Undesirable aspects

boring
frustrating
making one feel guilty
annoying
childish

unpleasant
patronizing
making one feel stupid
cutesy
gimmicky

Case Study-2

Examine how a smartphone has been designed, paying particular attention to how the user is meant to interact with it.

(c) Develop a set of usability and user experience goals that will be most relevant in evaluating the device. Decide which are the most important ones and explain why?

Usability Goals

- Effective to use (effectiveness)
- Efficient to use (efficiency)
- Safe to use (safety)
- Have good utility (utility)
- Easy to learn (learnability)
- Easy to remember how to use (memorability)

Desirable aspects

satisfying	helpful	fun
enjoyable	motivating	provocative
engaging	challenging	surprising
pleasurable	enhancing sociability	
Rewarding	exciting	supporting
creativity	emotionally fulfilling	
entertaining	cognitively stimulating	

Undesirable aspects

boring	unpleasant
frustrating	patronizing
making one feel guilty	making one feel stupid
annoying	cutesy
childish	gimmicky

Case Study-2

Examine how a smartphone has been designed, paying particular attention to how the user is meant to interact with it.

(d) Convert the usability and user experience goals into questions. Then use them to assess how well your device fare.

Case Study-2

Examine how a smartphone has been designed, paying particular attention to how the user is meant to interact with it.

(d) Convert the usability and user experience goals into questions. Then use them to assess how well your device fare.

- Effective to use (effectiveness) :
 - Question: Is the iPhone machine capable of allowing people to make phone calls? Is it capable of sending/receive messages?
- Efficient to use (efficiency)
 - Question : can the users make phone calls at any time/place? Can user deactivate the ringer at certain time?
- Safe to use (safety)
 - Question: Is iPhone secure to use, store photos, personal information? Are **iPhone safe** from malware?
- Easy to learn (learnability)
 - Question: Is it possible that the user to work out how to use iPhone by exploring the interface and trying out certain actions? How hard will it be to learn the whole set of functions in this way?
- Easy to remember how to use (memorability)
 - Question: What kinds of interface support have been provided to help users remember how to carry out tasks, especially for products and operations they use infrequently?

Case Study-2

Examine how a smartphone has been designed, paying particular attention to how the user is meant to interact with it.

(d) Convert the usability and user experience goals into questions. Then use them to assess how well your device fares.

Case Study-2

Examine how a smartphone has been designed, paying particular attention to how the user is meant to interact with it.

(d) Convert the usability and user experience goals into questions. Then use them to assess how well your device fares.

- Enjoyable :
 - Question: Are there many apps available for gaming?
- Satisfying
 - Question : Are you going to continue using your iPhone?
- Helpful
 - Question: Do you think findMyiPhone app helpful? Do you find appleMap helpful?

Key points

- Interaction design is concerned with designing interactive products to support the way people communicate and interact in their everyday and working lives
- It is concerned with how to create quality user experiences
- It requires taking into account a number of interdependent factors, including context of use, type of activities, cultural differences, and user groups
- It is multidisciplinary, involving many inputs from wide-reaching disciplines and fields