

# DESIGNING INTERACTIVE SYSTEMS



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# PART I

## ESSENTIAL INTERACTIVE SYSTEM DESIGN



2

# PART I

- Goal: design an interactive systems
  - Are enjoyable to use
  - Do useful things
  - Enhance the lives of the people using them
- This design should be human-centred
- Designers should put people than technology at the centre of the design process

# PART I (2)

- In the days of the Web:
  - E-commerce: immediacy
  - Issues of usability: critical to e-commerce
- This part provide a guide to the essence of the human-centred of interactive system

## PART I (3)

- Chapter 1. Designing interactive systems: A fusion of skills
- Chapter 2. People, activities, context and technologies: A framework for designing interactive systems
- Chapter 3. Principles and practice of interactive systems design
- Chapter 4. Case study: The Home Information Centre (HIC) 1

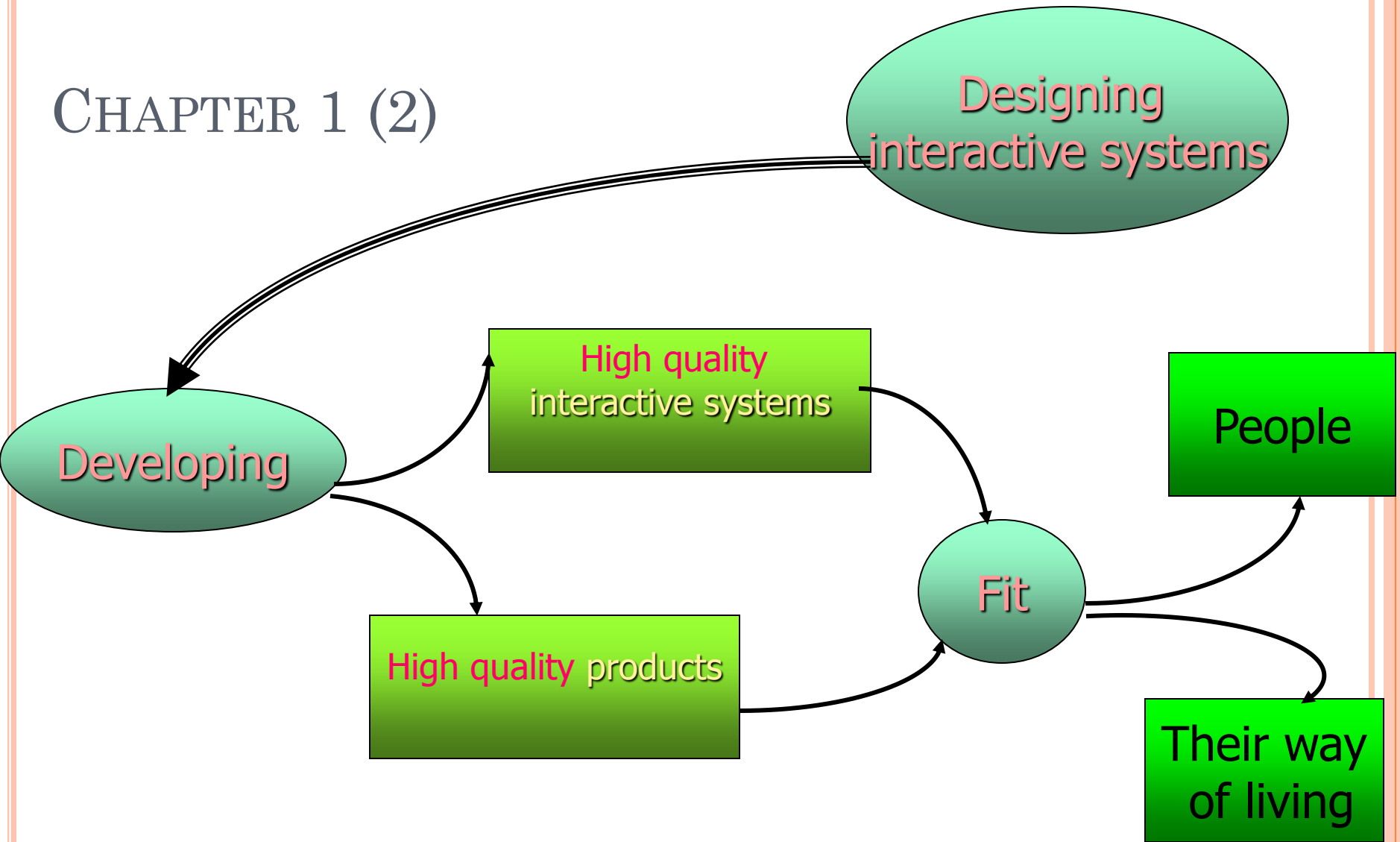
## CHAPTER 1:

# Designing interactive systems: A fusion of skills

# CHAPTER 1

- 1.1 The variety of interactive systems
- 1.2 The concerns of interactive systems design
- 1.3 Being digital
- 1.4 The skills of the interactive systems designer
- 1.5 Why being human-centred is important

## CHAPTER 1 (2)





# CHAPTER 1 (3): KNOWLEDGES RECEIVED

- Understanding the basic concepts of interactive systems design
- Understanding the importance of being human-centred in the design
- Understanding the historical background to the subject
- Understanding the skills and knowledge needed for a interactive systems designer

# 1.1 THE VARIETY OF INTERACTIVE SYSTEMS

Designing interactive systems is concerned with many types of product



Designing  
interactive systems

Software  
systems



Designing

Environment  
of communication  
and interaction  
for devices  
and people

Interactive products



Web sites

Interactive systems  
and products for



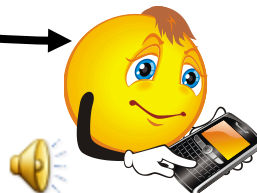
Games



MP3 players



Digital  
cameras



Application  
for telephones



The home



Work

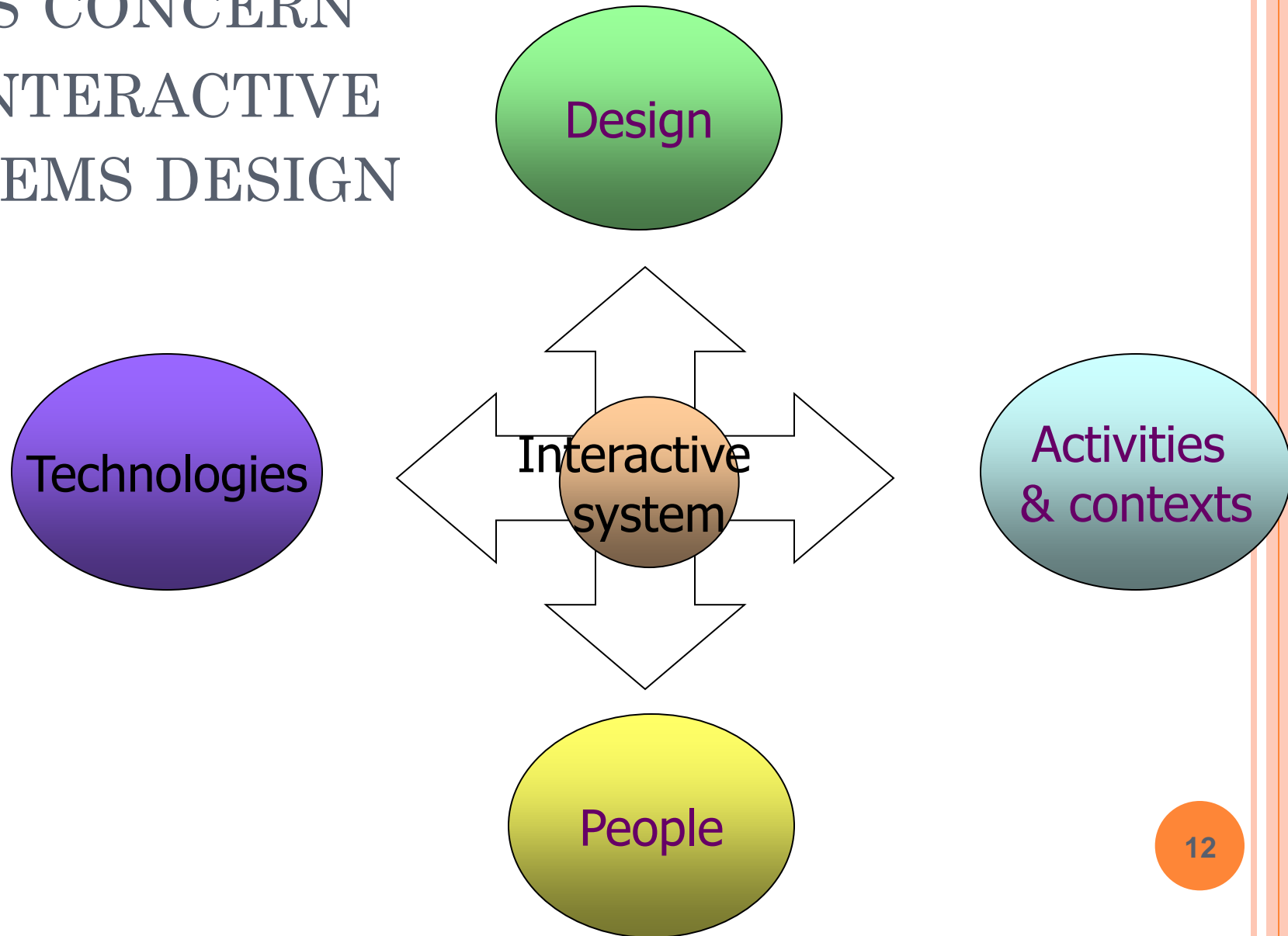


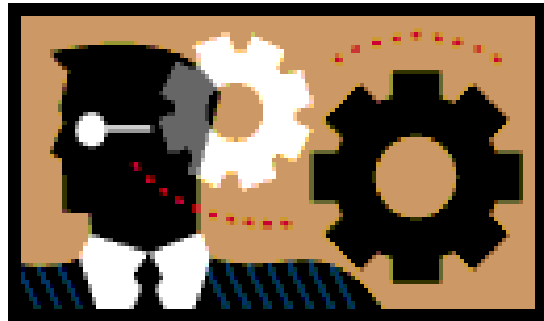
Communities

# 1.2 THE CONCERNS OF INTERACTIVE SYSTEMS DESIGN

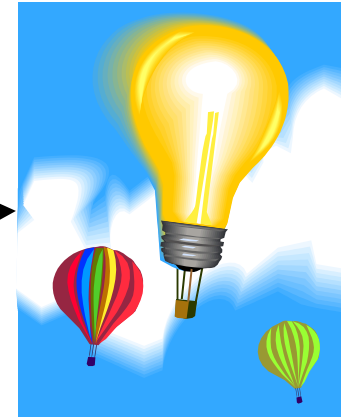
- The interactive systems design covers a very wide of activities:
    - Designers work on both hardware and software ⇒ product design
    - Designers produce a piece of software running:
      - On a computer
      - On a programmable device
      - Over the Internet
- ⇒ system design/ service design

# KEYS CONCERN OF INTERACTIVE SYSTEMS DESIGN





Design



Artistic design

Creation

----- Design as craft

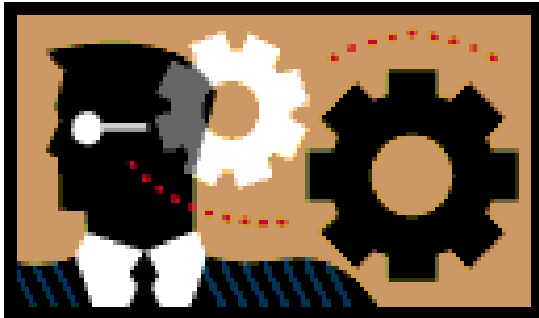


Engineering design

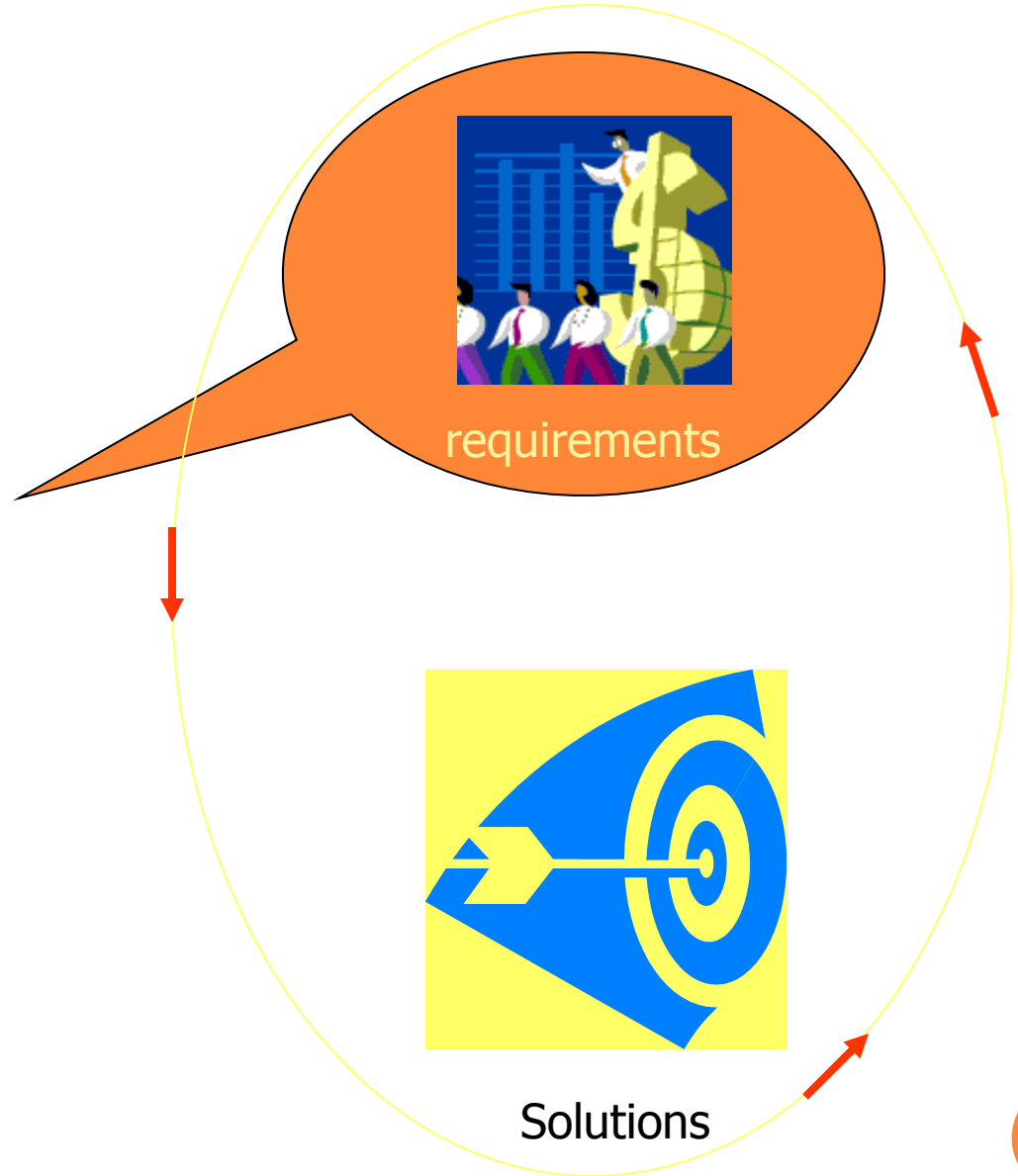
Representation

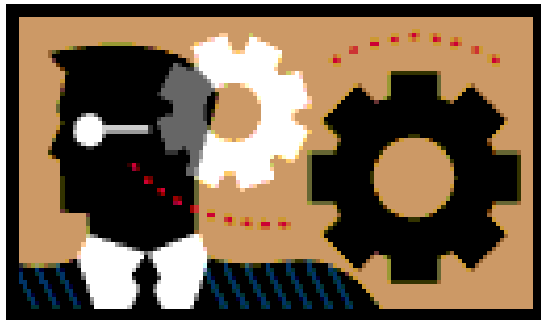
# DESIGN

- Creative process:
  - Produce sketches and outlines
  - Discuss with clients before formalizing a blueprint
- Representation:
  - Produce and evaluate various designs of:
    - Page layout
    - Colour scheme
    - Graphics
    - Overall structure



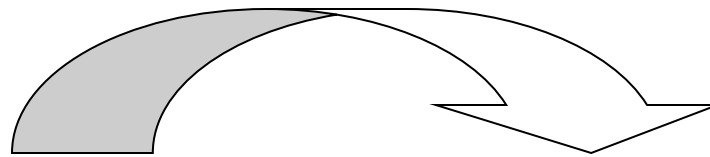
Design





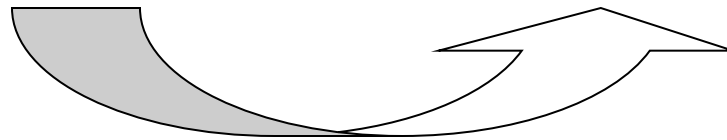
Design

work with

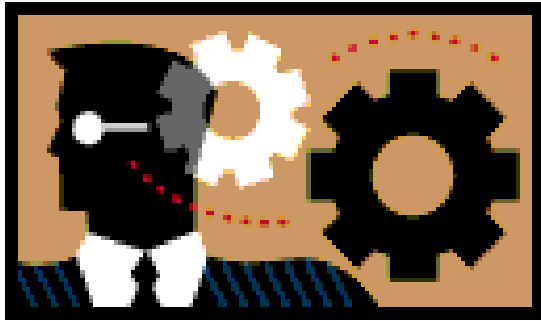


medium

shape







Design

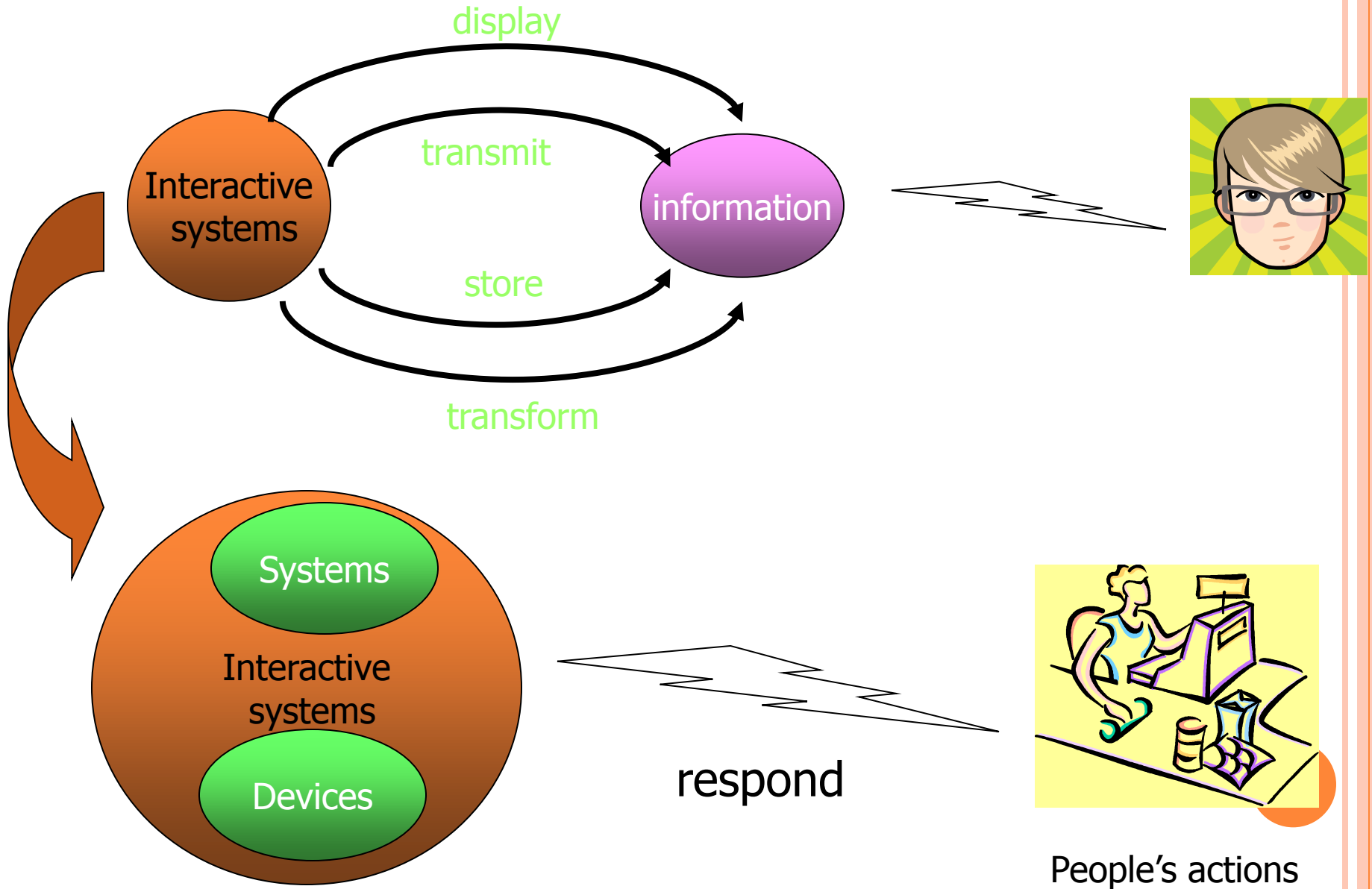


Social activity

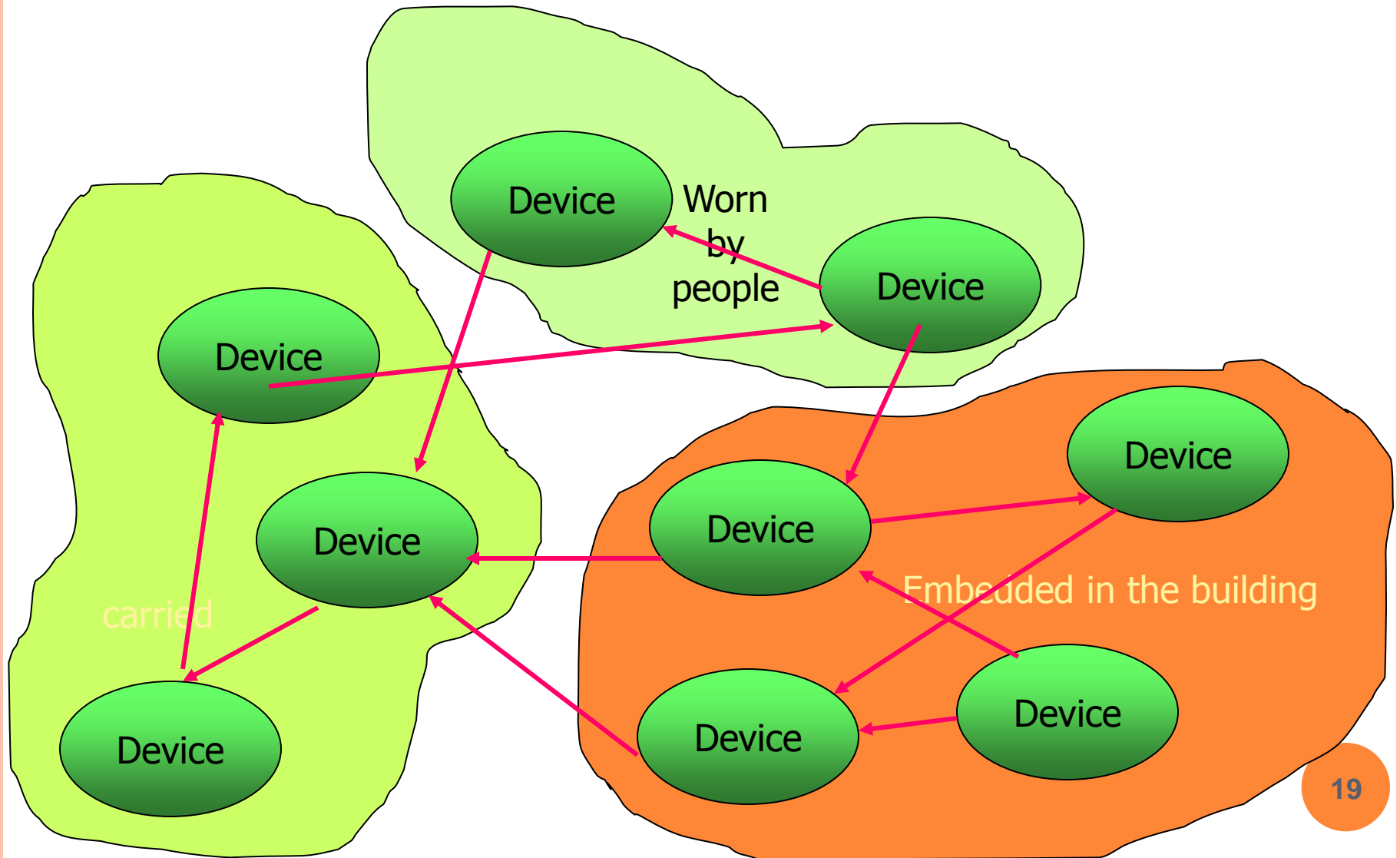


Conscious activity

# People and technologies



# People and technologies



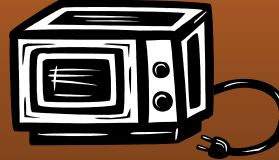
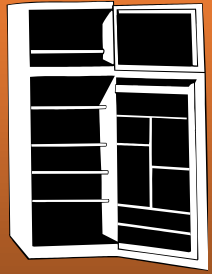
People and technologies

things which do not process info



Exclude

Interactive systems

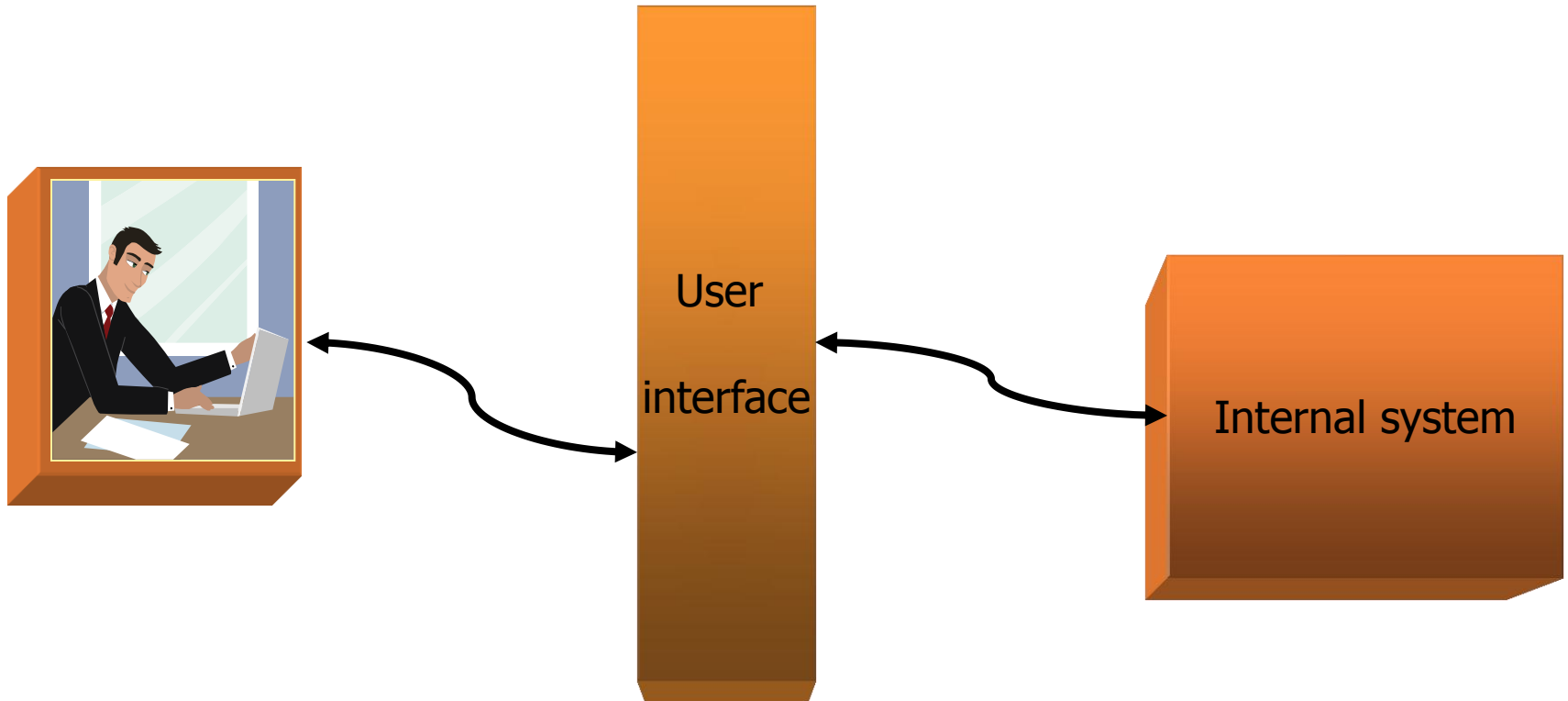


# People and technologies

View	People characters	Machine characters
Machine-centred	<ul style="list-style-type: none"><li>- Vague</li><li>- Disorganized</li><li>- Distractible</li><li>- Emotional</li><li>- Illogical</li></ul>	<ul style="list-style-type: none"><li>- Precise</li><li>- Orderly</li><li>- Undistractible</li><li>- Unemotional</li><li>- Logical</li></ul>
People-centred	<ul style="list-style-type: none"><li>- Creative</li><li>- Compliant</li><li>- Attentive to change</li><li>- Resourceful</li><li>- Able to make flexible decisions based on context</li></ul>	<ul style="list-style-type: none"><li>- Dumb</li><li>- Rigid</li><li>- Insensitive to change</li><li>- Unimaginative</li><li>- Constrained to make consistent decisions</li></ul>

Adapted from Norman (1993), p.224

# User interface

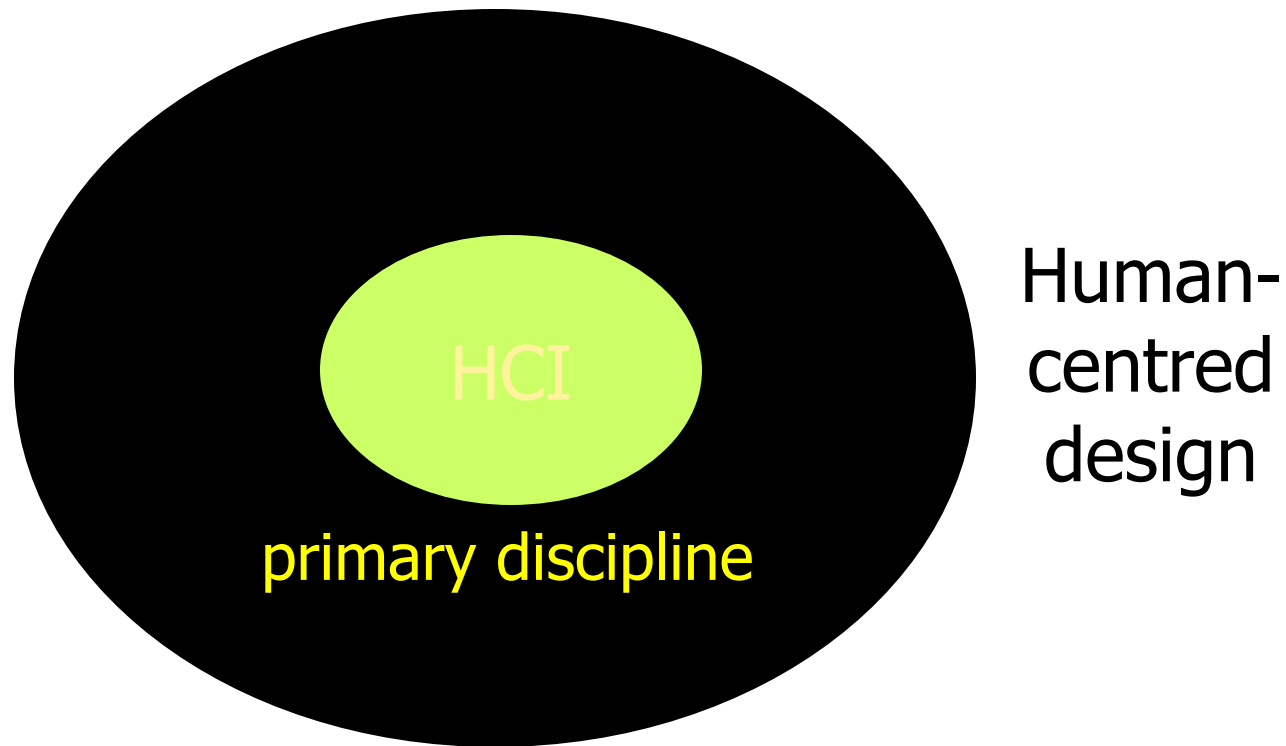


- Design an interactive system  $\supseteq$  design user interface

# Being human-centred

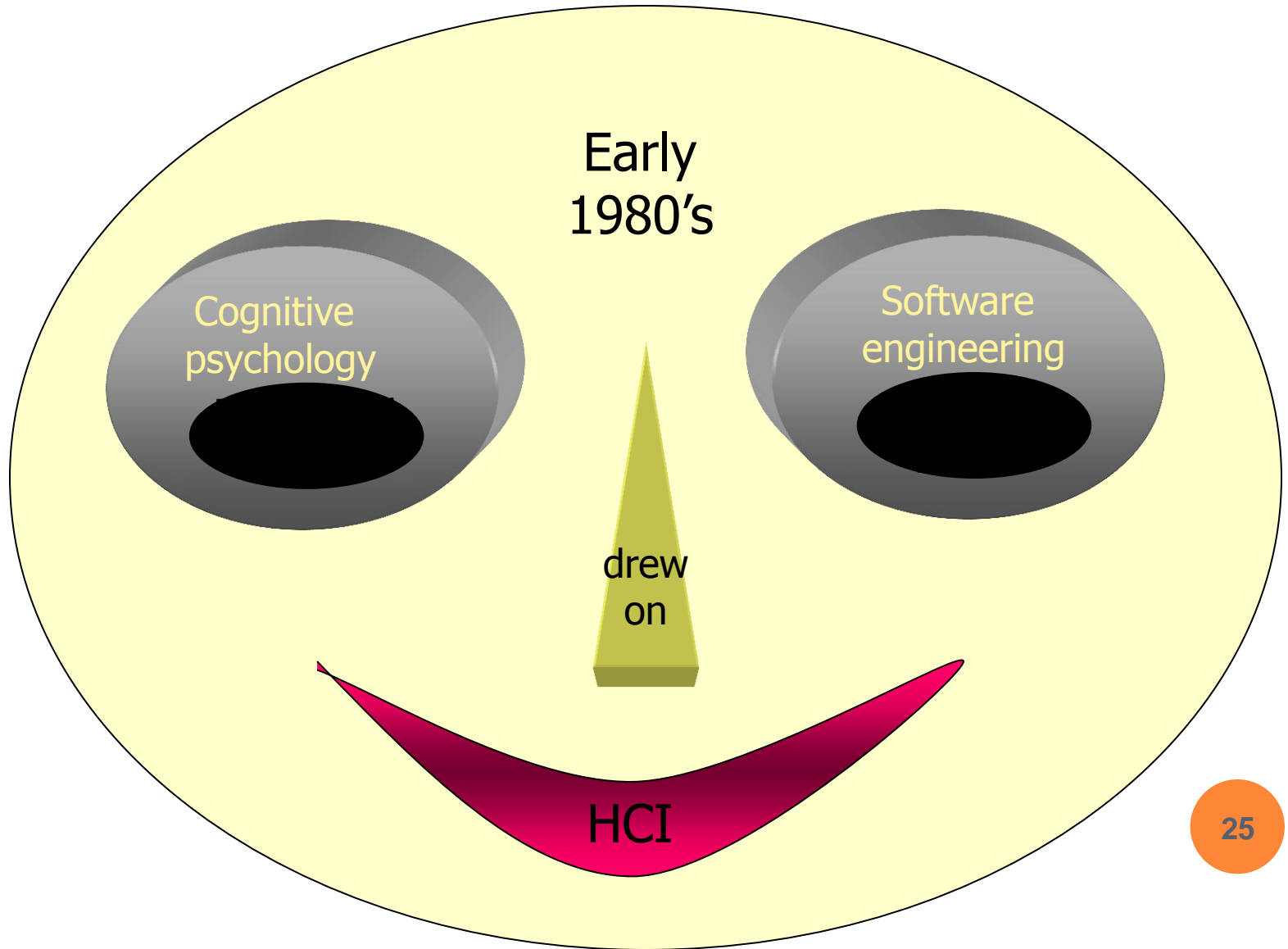
- Putting people first to support people and for people to enjoy
  - Thinking about what people want to do rather than the technology can do
  - Designing new ways to connect people to people
  - Involving people in the design process
  - Designing for diversity

# HUMAN-COMPUTER INTERACTION (HCI)



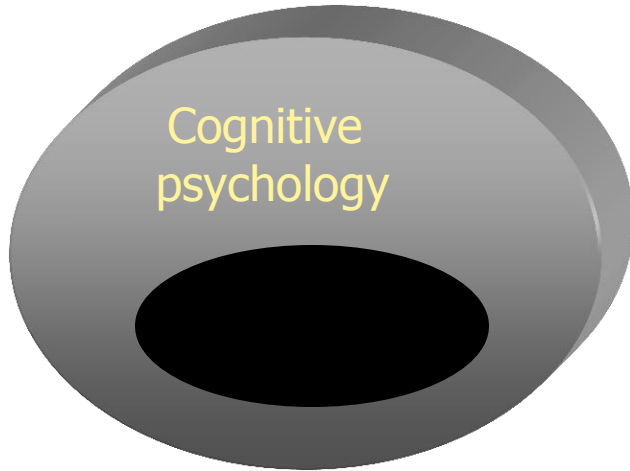


# HCI

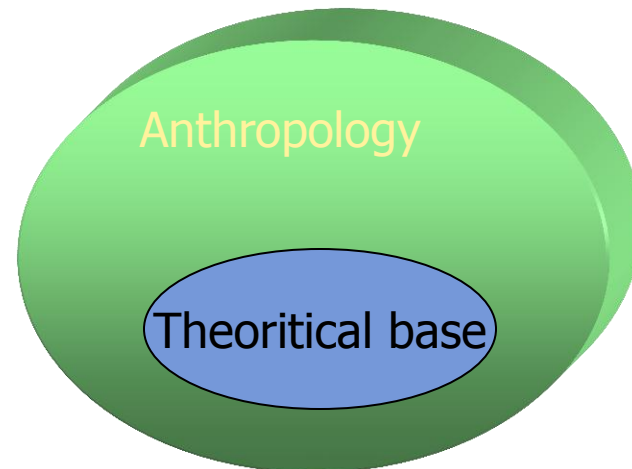
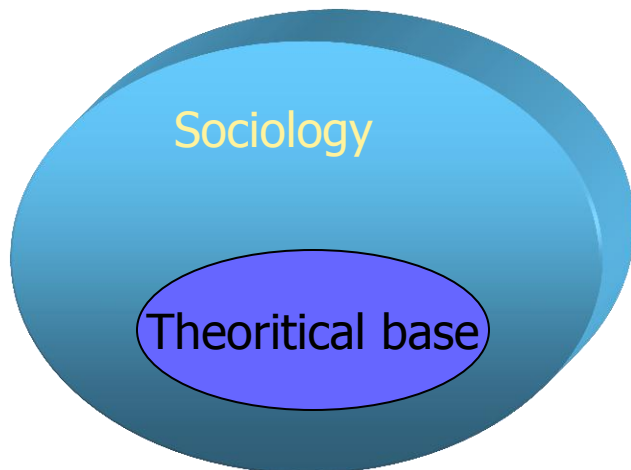


# HCI

During the 1990's

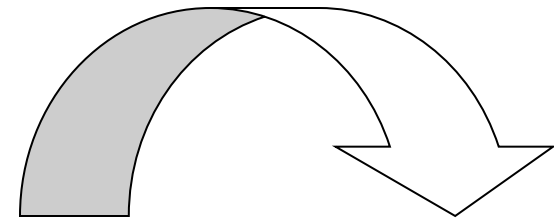
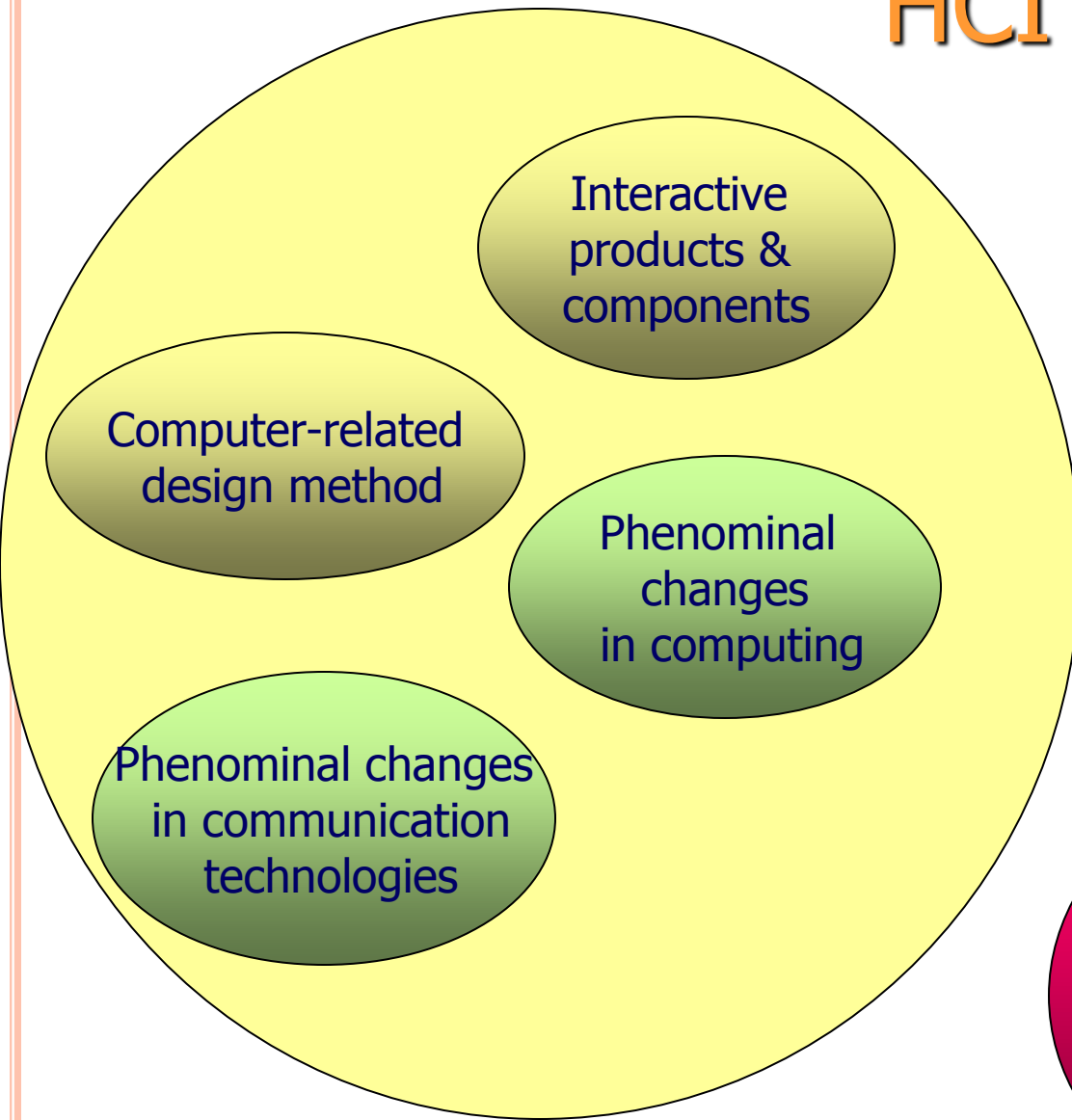


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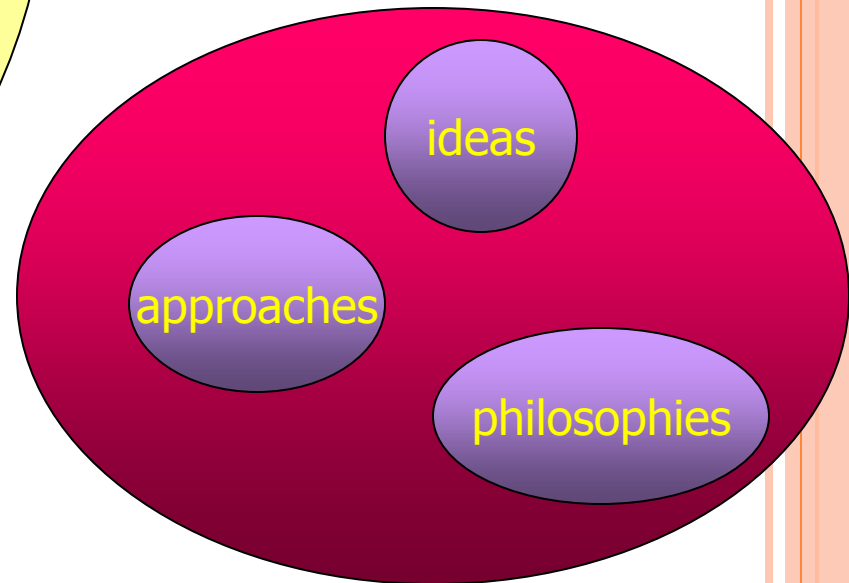


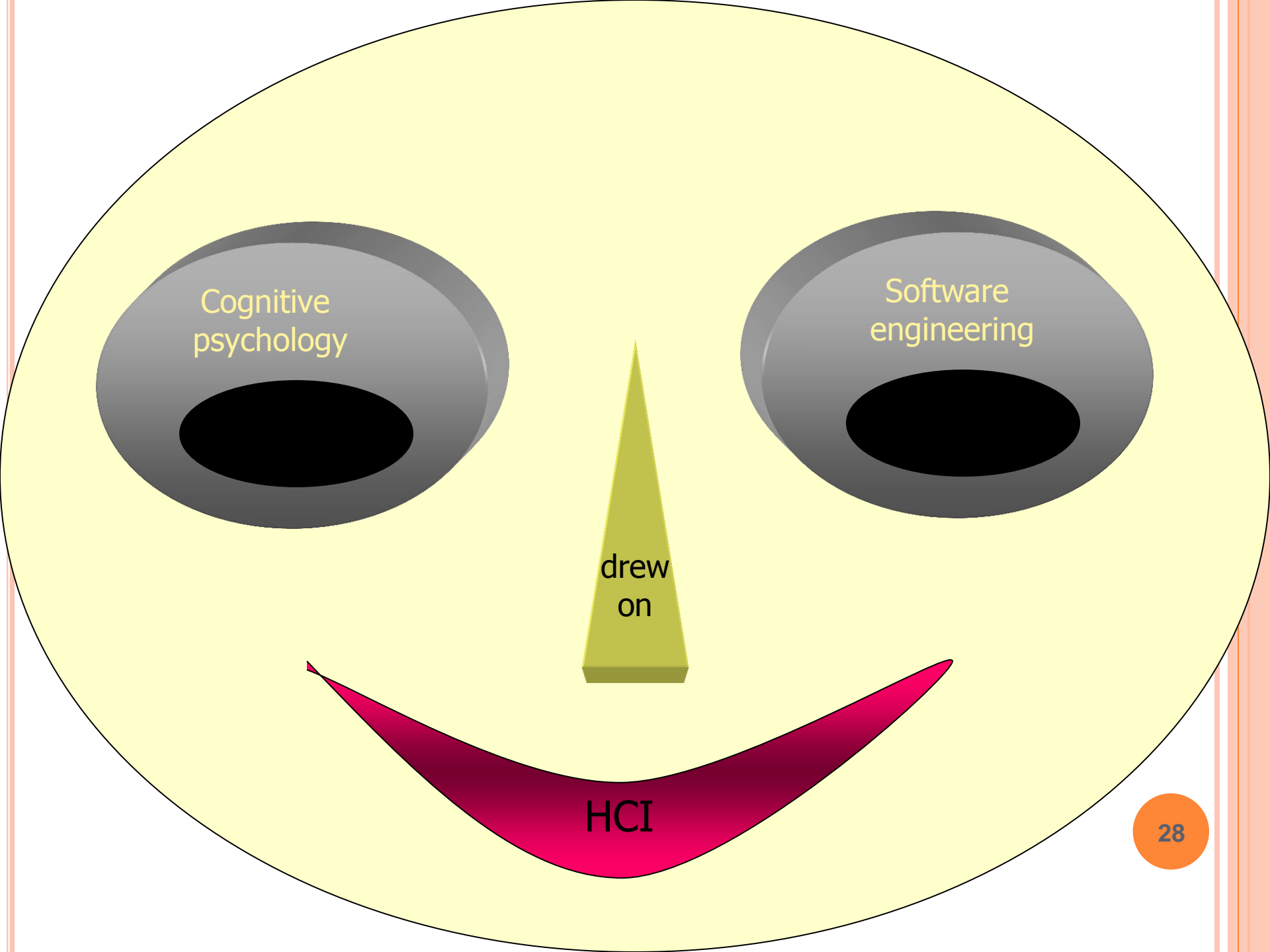
# HCI

# Today



Interactive systems & products design





Cognitive  
psychology

Software  
engineering

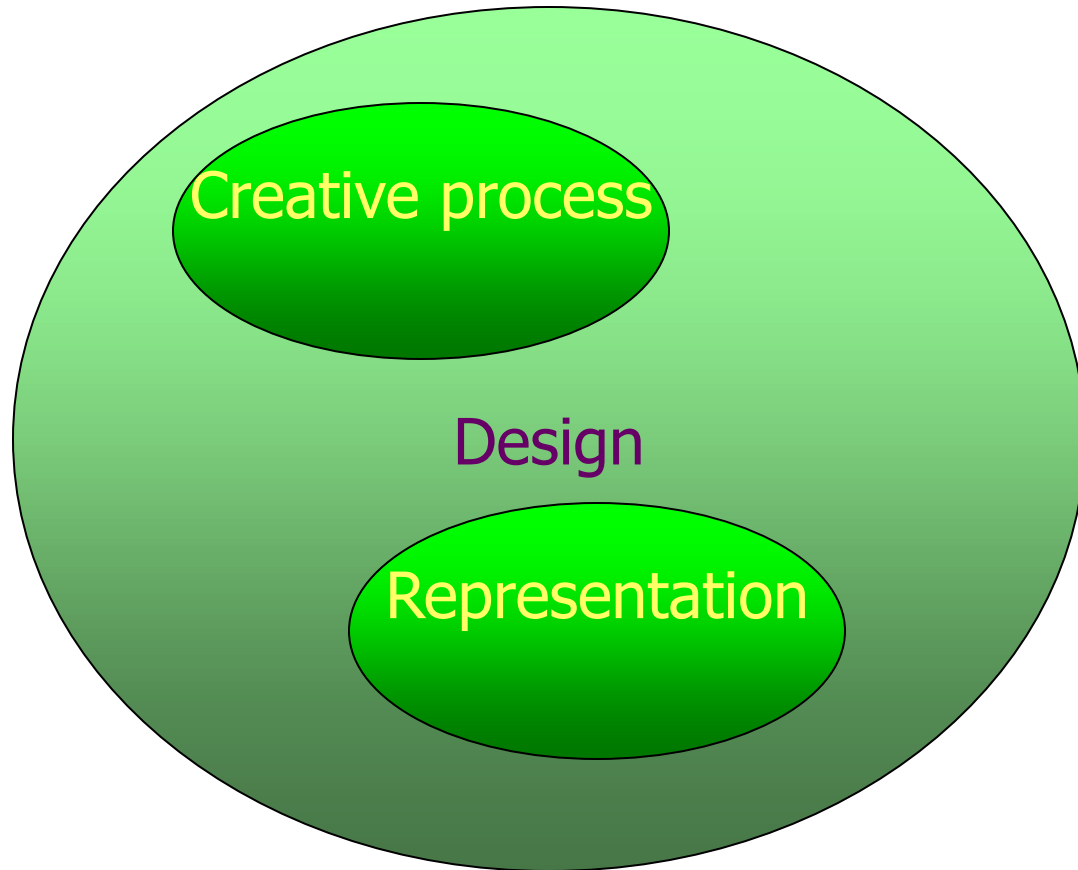
drew  
on

HCI

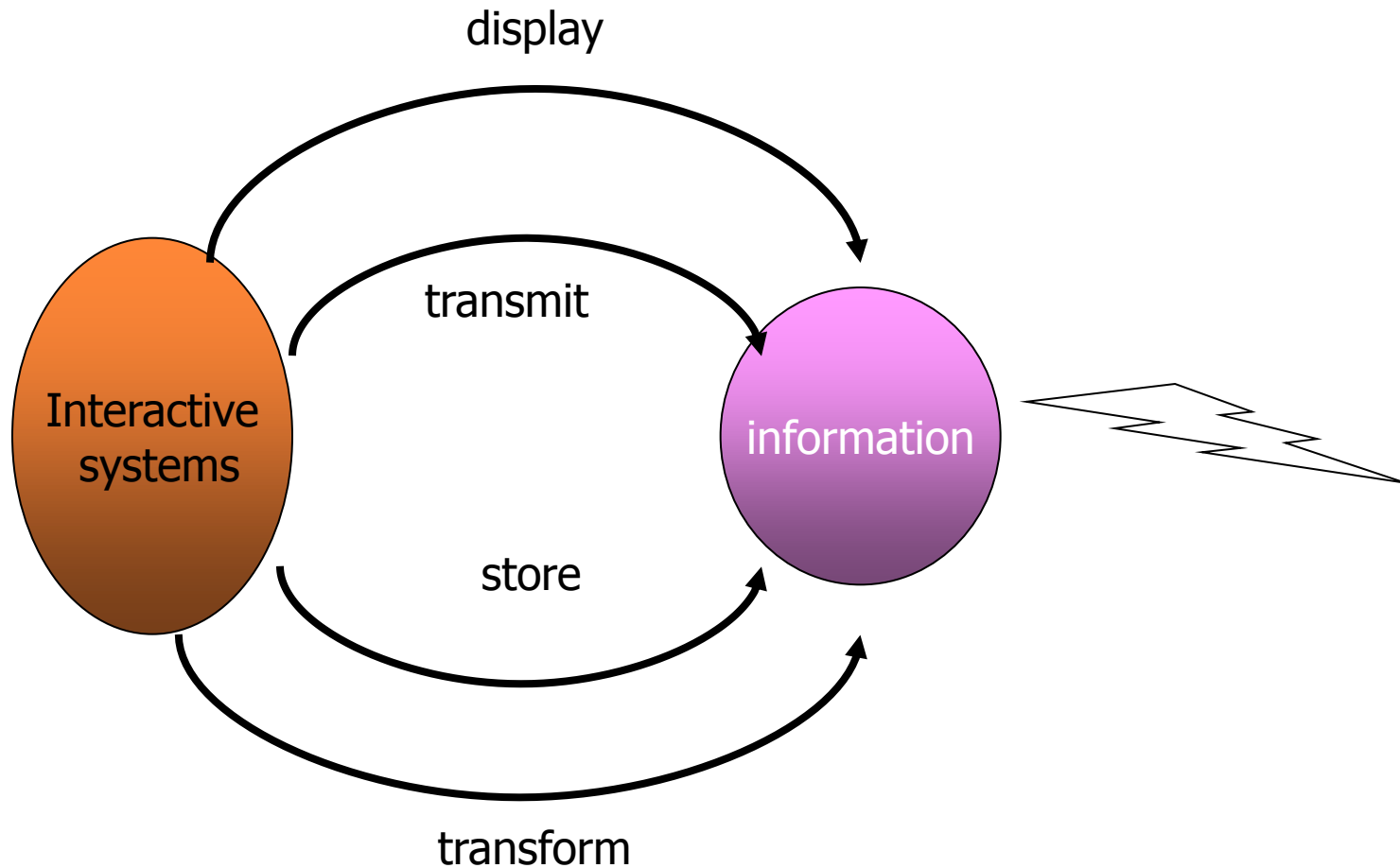
## 1.2 THE CONCERNS OF INTERACTIVE SYSTEMS DESIGN (2)

- The keys concern of interactive systems design:
  - Design
  - Technologies
  - People
  - Activities and contexts

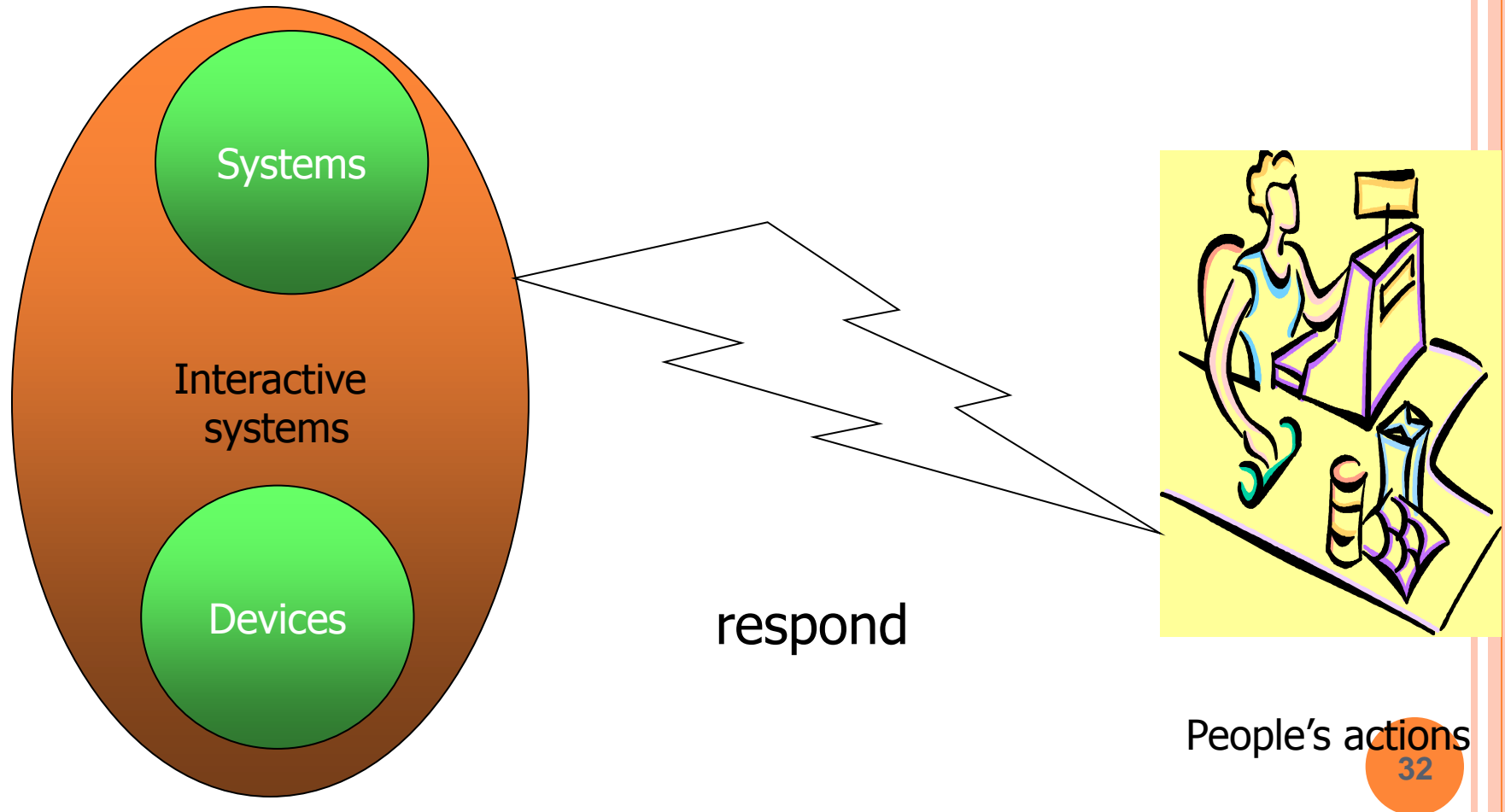
# DESIGN



# People and technologies



# People and technologies





# 1.3 BEING DIGITAL

## ○ Ergonomics:

- Is the study of the “fit” between people and the things they use.
- Until the late 1950s, it had to consider only physical characteristics of interaction.
- With the arrival of computers, it was forced to take on the psychological fit between people and devices as well.
- Sometimes: cognitive ergonomics= HCI

# EVOLUTION OF HCI

- During the 1970s:
  - The method of interaction for most people was still primary “batch”.
  - Interest in HCI and computing began to grow.
  - At the end of decade, keyboards and screens became more common.

## EVOLUTION OF HCI (2)

### ○ During the 1980s:

- That was the decade of the micro-computer
- 1982: the 1<sup>st</sup> real graphically based interfaces used a bit-mapped display ⇒
  - GUI (Graphical User Interface)
  - Interaction through pointing at icons
  - Commands grouped into menus
- 1985: Windows OS appeared on PCs
- Game consoles were popular
- Network, Internet began to grow based around email
- HCI came of age as a subject, big conference on HCI held in USA and Europe.

## EVOLUTION OF HCI (3)

### ○ During the 1990s:

- Colour and multimedia arrived on PC which had begun dominate the computer market.
- 1993: new interface take advantage of HTML  $\Rightarrow$  WWW came about and revolutionized the whole process of transmitting and sharing files.
- Pictures, movies, music, text and live video links: suddenly available to everyone at work and at home.
- The growth of personal, community and corporate websites = phenomenon

# EVOLUTION OF HCI (4)

1990s



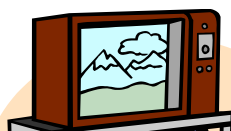
pictures



home



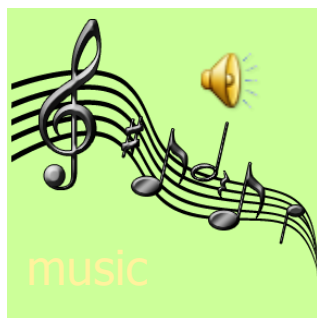
work



video

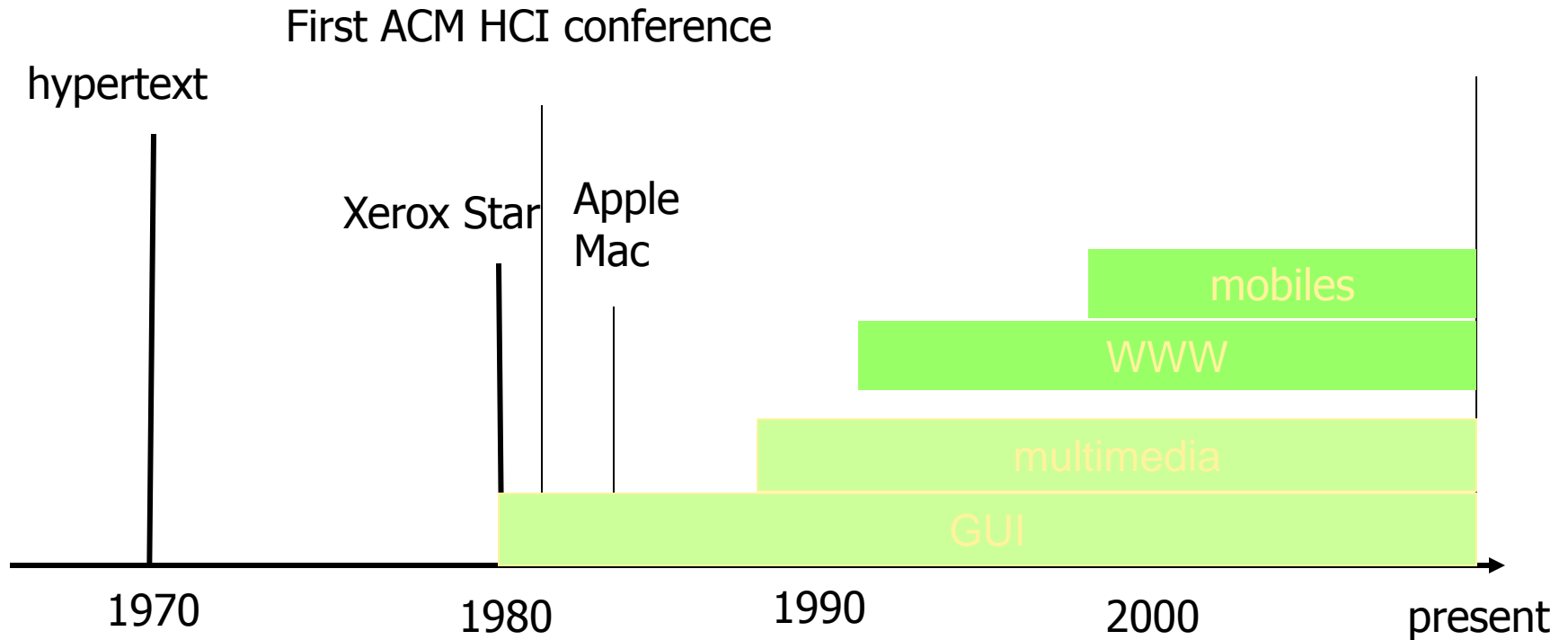


movies



music

# Evolution of HCI (5)



# CHARACTERISTICS OF INFORMATION APPLIANCES

- *Efficacy*: Appliances should be everyday things requiring only everyday skills to use.
- Appliances have a *clear, focused function* that can be *used in a variety of circumstances*.
- *Peer-to-peer interaction*: Appliances work together without the central control or uploading or downloading.
- *Direct user interface*: Appliances need to be simple and intuitive to use.

# CHARACTERISTICS OF INFORMATION APPLIANCES (2)

- *Closure*: Appliances should focus on a completion of tasks rather than an open-ended serie of tasks.
- *Immediacy*: Appliances
  - can do something on impulse, and
  - are aimed at situation where:
    - User may be engaged in another task, or
    - Their attention is diverted
- *Personal* and *portable*.



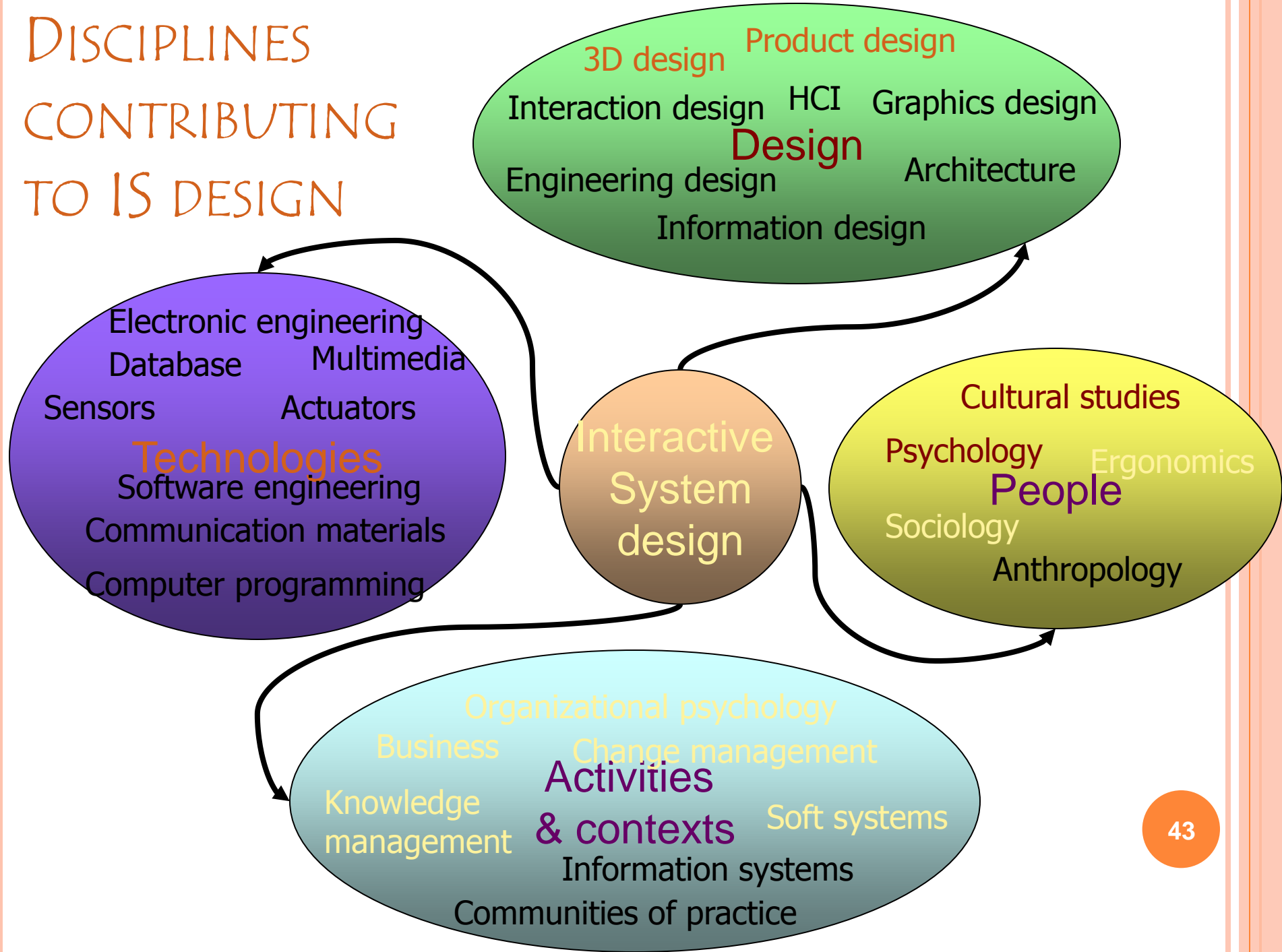
# 1.4 SKILLS OF THE INTERACTIVE SYSTEMS DESIGNER

- 1. Study and understand the activities of people and the contexts within which technologies prove useful  $\Rightarrow$  generate requirements for technologies.
- 2. Know the possibilities offered by technologies.
- 3. Research and design technological solutions that fit in with:
  - People
  - Activities they wants to undertake
  - Contexts surrounding theses activities
- 4. Evaluate alternative designs and iterate until a solution is arrived at.

## 1.4 SKILLS OF THE INTERACTIVE SYSTEMS DESIGNER (2)

- It is often that no single person possesses all the skills needed for some interactive system (IS) design  $\Rightarrow$  a design team.
- Designer of an IS can not be expert in all fields, but must be aware enough to:
  - Take techniques from different areas
  - Access research in different disciplines when appropriate.

# DISCIPLINES CONTRIBUTING TO IS DESIGN



# DISCIPLINES CONTRIBUTING TO IS DESIGN (2)

- People= social beings
- $\Rightarrow$  Approaches & techniques adopted in the social sciences should be used to understand people and technologies
- Technologies: include both software and hardware
- Activities and contexts: Interaction take place usually in the context of some “community of practice”= groups of people:
  - sharing interests and values
  - engaging in similar activities
- Design: Principles and practices of design from of all manner of design disciplines are used in designing interactive systems.

# 1.5 IMPORTANCE OF BEING HUMAN-CENTRED

- Being human-centred in design: is very expensive, involves:
  - Observing people
  - Talking to people
  - Trying ideas out with people
  - ⇒ takes time !
  - ⇒ but is advantageous
- Reasons:
  - Safety
  - Effectiveness
  - Ethics

# 1.5 IMPORTANCE OF BEING HUMAN-CENTRED – SAFETY

- Human-centred design techniques would help to avoid:
  - 2 fundamental design errors:
    - Technical error
    - Organizational error
  - Disasters attributed to:
    - Faulty display
    - Operators not understanding or interpreting correctively displays
- It's no good claiming “human error” if the design was so bad.
- ⇒ Systems have to be design for people and for contexts

# 1.5 IMPORTANCE OF BEING HUMAN-CENTRED – EFFECTIVENESS

- 2 key features of effectiveness:
  - Acceptability
  - Productivity
- **Acceptability**: ensures that systems fit in with people's ways of working  $\Rightarrow$  Involving people closely in the design.
- **Productivity**: Systems will be more effective if they are designed from a human-centred perspective, and people will be more productive.
  - Ex: Web design, e-commerce sites: turning “browsers” into ‘buyers’  $\Rightarrow$  sales increased by 225% !

## 1.5 IMPORTANCE OF BEING HUMAN-CENTRED – ETHICS

- Designers are truthful and open in their design practices. They need to be more vigilant: People know the origin of the data they give and how the data might be used.
- Intellectual property  $\Rightarrow$  privacy, security, control, honesty for a interactive system designer.
- Ethical design is needed because the systems produced should be easy and enjoyable to use and affect the quality of people's lives  $\Rightarrow$  standards and legal requirements for the designs



# SUMMARY OF THE CHAPTER 1

- Interactive systems design needs to be human-centred.
- It draw upon many areas, including both artistic design and engineering design.
- It is needed because we live in a digital age.
- It is necessary for the safe, effective anf ethical designs.