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IT3060 - Human Computer Interaction

Lecture 04 - Design for Different Interactions

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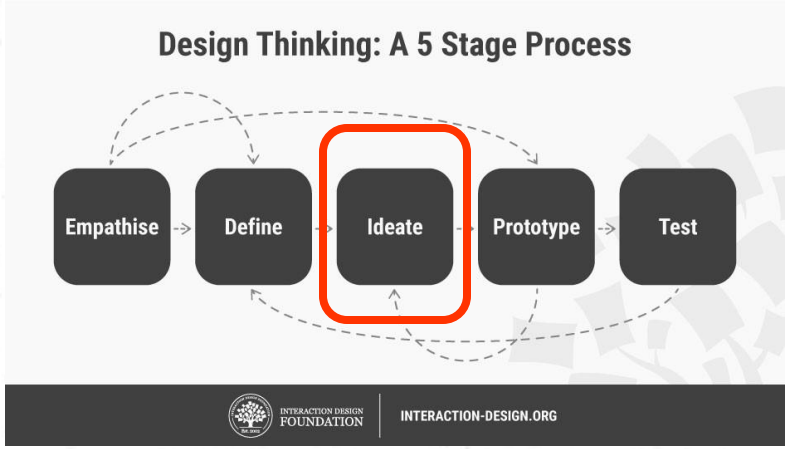
Design for different interactions

- Ideation
- Interaction Design
- Information Architecture
- Interaction Types
- Interface Types

different types of ~~interaction~~

Ideation

- The process of generating ideas is referred to as Ideation.
- The design team will gather information from as many of the people involved as possible, including designers, test users, usability engineers, and all other stakeholders.



Golden rules of ideation

4 Rules that will help you ideate like an expert!

- There are no bad ideas
- Capture everything
- Go for Hybrid Brainstorming
- Quantity over Quality

There are no bad ideas

- Everyone in the room feels comfortable contributing their ideas.
- How to do so? By asking everyone to kill judgment completely: no negative thinking, no “yes, but”, no nah-faces.
- If someone hesitates in jotting down an idea, tell them **“at this stage, there are no bad ideas”**.

Capture everything

- In the heat of the action, brilliant ideas might get lost ("it is such a good idea, tomorrow we'll remember it for sure". You won't).

- There is (only) one way to solve this: capture every idea on a post-it

Go for Hybrid Brainstorming

- Group brainstorming is always better than individual brainstorming, right?

- Well, not really: research shows that **combining individual brainstorming with group exercises leads to more and better ideas**.

- Best solution: "Hybrid Brainstorming". **Individual ideation first, then group ideation**.

Quantity over Quality

- The adage “Quality over Quantity” doesn’t hold during ideation exercises.
- There is nothing like thinking about the quality or feasibility of ideas to stop the creative juice from flowing.
- Read this Idea Hunting guide to get more inspiration.

Ideation Techniques Brainstorming

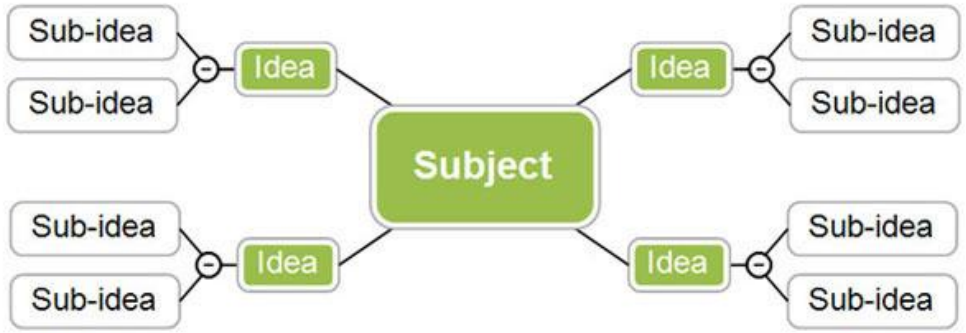
- This process involves producing a huge number of solutions (ideas) for a specific problem.
- In the course of brainstorming, there is no assessment of ideas.
- People can speak out their ideas freely without fear of criticism.
- Even bizarre/strange ideas are accepted with open hands
- Frequently, ideas are blended to create one good
- Brainstorming can be done both individually and in groups.
- The typical brainstorming group comprises six to ten people

Ideation Techniques Brainwriting

- Brainwriting, however, gives everyone equal opportunity to participate, and it enables all group members to think without any "blocking."
- Seat group members at a table, with a sheet of paper in front of each person. At the top of the page, ask them to write down the problem that everyone is trying to solve. (Note: they should not write their names.) Appoint someone to be moderator, and time each round.
- Give the group three minutes to write down three ideas for how to solve the problem. They should not edit the ideas or try to perfect them. Allow them to write in "free form." Do not permit any discussion.
- After three minutes, move on to round two. Gather in the papers, shuffle them, and then pass them out. You may need to sort out cases where someone gets back a paper they have already written on. Ask everyone to generate three more ideas on the new paper they have just received. They can build on the first three ideas that are already written or think of three new solutions.
- The moderator decides how many rounds there are.
- When all rounds are finished, collect the papers, and write all of the ideas on a whiteboard for everyone to see. Then begin discussing which ideas would work best for solving the current problem

Ideation Techniques Mind Mapping

- a popular note-taking and brainstorming tool that “maps” | out your thinking based on a central idea.
- To create a mind map, simply start with a bubble that has your central theme, idea, or topic inside it, and then create parent/child branches that flow from that topic into subtopics and eventually, specific ideas.
- The goal here is to understand how you individually organize and associate ideas related to a topic, and sort them from largest to smallest.
- This is a great technique when you have a set high-level theme or keyword, you’re trying to create content around.



Ideation Techniques

Worst Possible Idea

To practice Worst Possible Idea, as group members we should:

1. Produce as *many* bad ideas as we can.
2. List *all* the properties of those terrible ideas.
3. List what *makes* the worst of these so very bad.
4. Search for the *opposite* of the worst attribute.
5. Consider *substituting* something else in for the worst attribute.
6. *Mix* and *match* various awful ideas to see what happens.

Ideation Techniques

SCAMPER

- SCAMPER is an idea generation technique that utilizes action verbs as stimuli.
- It is a well-known kind of checklist developed by Bob Eberle that assists the person in producing ideas either for modifications that can be made on an existing product or for making a new product.
- SCAMPER is an acronym with each letter standing for an action verb which in turn stands for a prompt for creative ideas.
  - **S** – Substitute
  - **C** – Combine
  - **A** – Adapt
  - **M** – Modify
  - **P** – Put to another use
  - **E** – Eliminate
  - **R** – Reverse

Activity
Visit the link above, read and understand the details of SCAMPER

Homework

Read

- Essential Ideation Techniques

- Article credits:
  - Mr Jagath Wickramarathne
  - Senior Lecturer, Faculty of Computing

Interaction Design

- Interaction design is the design of the interaction between users and products.
- Most often when people talk about interaction design, the products tend to be software products like apps or websites.
- The goal of interaction design is to create products that enable the user to achieve their objective(s) in the best way possible.
- The interaction between a user and a product often involves elements like aesthetics, motion, sound, space, and many more

5 DIMENSIONS OF INTERACTION DESIGN

INTERACTION DESIGN FOUNDATION | INTERACTION-DESIGN.ORG

The 5 dimensions of interaction design

- **1D: Words**
- Words—especially those used in interactions, like button labels—should be meaningful and simple to understand.
- They should communicate information to users, but not too much information to overwhelm the user.

- **2D: Visual representations**
- This concerns graphical elements like images, typography and icons that users interact with.
- These usually supplement the words used to communicate information to users.

The 5 dimensions of interaction design

- **3D: Physical objects or space**
- Through what physical objects do users interact with the product?
- A laptop, with a mouse or touchpad? Or a smartphone, with the user's fingers?
- And within what kind of physical space does the user do so? For instance, is the user standing in a crowded train while using the app on a smartphone, or sitting on a desk in the office surfing the website? These all affect the interaction between the user and the product.

- **4D: Time**
- While this dimension sounds a little abstract, it mostly refers to media that changes with time (animation, videos, sounds).
- Motion and sounds play a crucial role in giving visual and audio feedback to users' interactions.
- Also of concern is the amount of time a user spends interacting with the product: can users track their progress, or resume their interaction some time later?

The 5 dimensions of interaction design

- **5D: Behaviour**
- This includes the mechanism of a product: how do users perform actions on the website?
- How do users operate the product?
- In other words, it's how the previous dimensions define the interactions of a product.
- It also includes the reactions—for instance emotional responses or feedback—of users and the product.

Important questions for interaction designers

- **What can a user do with their mouse, finger, or stylus to directly interact with the interface?**
  - his helps us define the possible user interactions with the product.
- **What about the appearance (color, shape, size, etc.) gives the user a clue about how it may function?**
  - This helps us give users clues about what behaviors are possible.
- **Do error messages provide a way for the user to correct the problem or explain why the error occurred?**
  - This lets us anticipate and mitigate errors.

Important questions for interaction designers

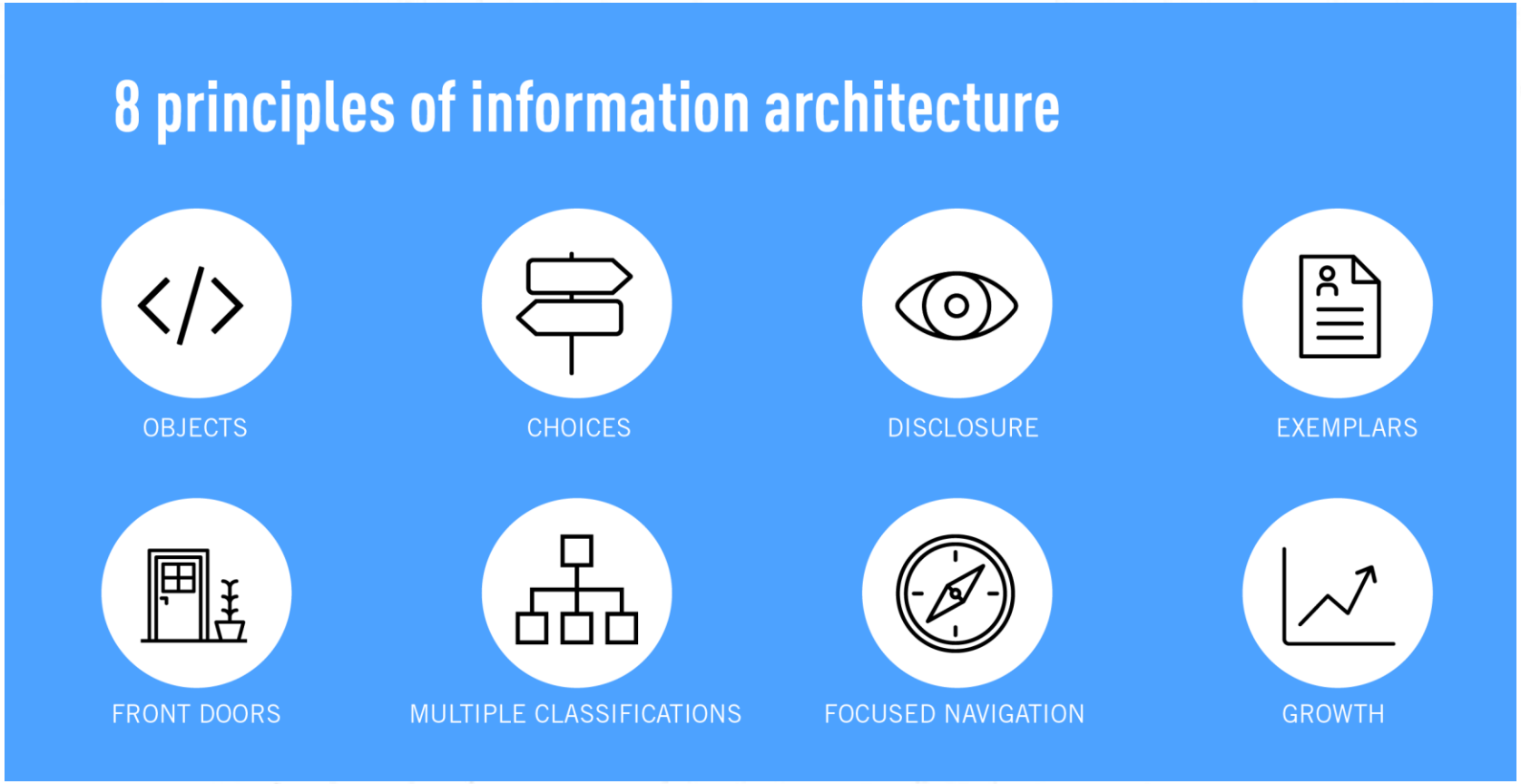
- **What feedback does a user get once an action is performed?**
  - This allows us to ensure that the system provides feedback in a reasonable time after user actions.
- **Are the interface elements a reasonable size to interact with?**
  - Questions like this helps us think strategically about each element used in the product.
- **Are familiar or standard formats used?**
  - Standard elements and formats are used to simplify and enhance the learnability of a product.

Information architecture

What's information architecture?

- Information architecture (IA) is a science of organizing and structuring content of the websites, web and mobile applications, and social media applications.
- Deciding how to arrange the parts of something to be understandable.
- **How people cognitively process information**.
- Information architecture considerations come up in any product
  - information-oriented products (like corporate information sites)
  - functionality-oriented products (like a mobile phone

Principles of Information Architecture (IA)

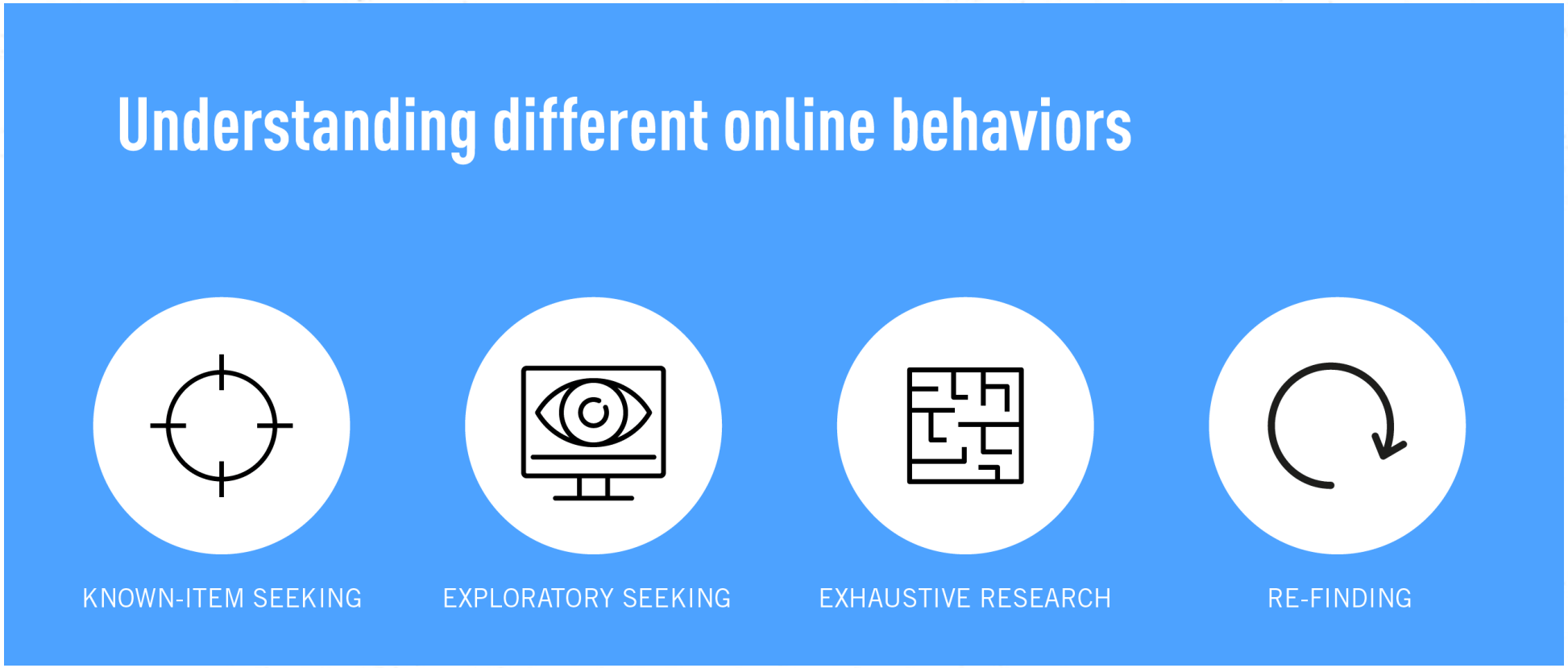


Source:https://careerfoundry.com/en/blog/ux-design/a-beginners-guide-to-information-architecture/

- The principle of objects:
  - Content should be treated as a living, breathing thing.
  - It has lifecycles, behaviors, and attributes.
- The principle of choices:
  - Less is more.
  - Keep the number of choices to a minimum.
- The principle of disclosure:
  - Show a preview of information that will help users understand what kind of information is hidden if they dig deeper.
- The principle of exemplars:
  - Show examples of content when describing the content of the categories.

- The principle of front doors:
  - Assume that at least 50% of users will use a different entry point than the home page.
- The principle of multiple classifications:
  - Offer users several different classification schemes to browse the site's content.
- The principle of focused navigation:
  - Keep navigation simple and never mix different things.
- The principle of growth:
  - Assume that the content on the (website) will grow.
  - Make sure the website is scalable.

The Value For The User



- Known-item seeking:
  - Users will come to the website to search for something desirable and known.
- Exploratory seeking:
  - Users will come to the website looking for inspiration.
  - They're looking for something desirable but not sure what exactly.
- Exhaustive research:
  - Users are in a process of an extensive research.
  - They want to find as much information as possible.
- Re-finding:
  - A user needs a desired items again and are trying to find it.

The Value For The Business

- If users and customers cannot find critical information or perform the most important tasks, businesses can lose out in many ways.
- IA can play a crucial role in the following.
  - Employee Productivity
  - Sales And Reputation
  - Acquiring New Members
  - Reducing Marketing Costs
  - Reputation And SEO Ranking
  - Reducing The Cost Of Live Help And Support Documentation

Interactions and Interfaces

- Interaction type:
  - what the user is doing when interacting with a system, e.g. instructing, talking, browsing or other

- Interface type:
  - the kind of interface used to support the mode, e.g. speech, menu-based, gesture

Interaction types

- Instructing
  - issuing commands and selecting options
- Conversing
  - interacting with a system as if having a conversation
- Manipulating
  - interacting with objects in a virtual or physical space by manipulating them
- Exploring
  - moving through a virtual environment or a physical space

1. Instructing

- Where users instruct a system and tell it what to do
  - e.g. tell the time, print a file, save a file
- Very common conceptual model, underlying a diversity of devices and systems
  - e.g. word processors, VCRs, vending machines
- Main benefit is that instructing supports quick and efficient interaction
  - good for repetitive kinds of actions performed on multiple objects

2. Conversing

- Underlying model of having a conversation with another human
- Range from simple voice recognition menu-driven systems to more complex ‘natural language’ dialogs
- Examples include timetables, search engines, advice-giving systems, help systems
- Also virtual agents, toys and pet robots designed to converse with you

Pros and cons of conversational model

- Allows users, especially novices and technophobes, to interact with the system in a way that is familiar
  - makes them feel comfortable, at ease and less scared
- Misunderstandings can arise when the system does not know how to parse what the user says

3. Manipulating

- Involves dragging, selecting, opening, closing and zooming actions on virtual objects
- Exploit's users' knowledge of how they move and manipulate in the physical world
- Can involve actions using physical controllers (e.g. Wii) or air gestures (e.g. Kinect) to control the movements of an on screen avatar
- Tagged physical objects (e.g. balls) that are manipulated in a physical world result in physical/digital events (e.g. animation)

Direct Manipulation

- Shneiderman (1983) coined the term DM, came from his fascination with computer games at the time
  - Continuous representation of objects and actions of interest
  - Physical actions and button pressing instead of issuing commands with complex syntax
  - Rapid reversible actions with immediate feedback on object of interest

Why are DM interfaces so enjoyable?

- Novices can learn the basic functionality quickly
- Experienced users can work extremely rapidly to carry out a wide range of tasks, even defining new functions
- Intermittent users can retain operational concepts over time
- Error messages rarely needed
- Users can immediately see if their actions are furthering their goals and if not do something else
- Users experience less anxiety
- Users gain confidence and mastery and feel in control

What are the disadvantages with DM?

- Some people take the metaphor of direct manipulation too literally
- Not all tasks can be described by objects and not all actions can be done directly
- Some tasks are better achieved through delegating
  - e.g. spell checking
- Can become screen space ‘gobblers’
- Moving a mouse around the screen can be slower than pressing function keys to do same actions

4. Exploring

- Involves users moving through virtual or physical environments
- Physical environments with embedded sensor technologies

Which model is best?

- Direct manipulation is good for ‘doing’ types of tasks,
  e.g. designing, drawing, flying, driving, sizing windows
- Issuing instructions is good for repetitive tasks
  e.g. spell-checking, file management
- Having a conversation is good for children, computer-phobic, disabled users and specialised applications (e.g. phone services)
- Hybrid models are often employed, where different ways of carrying out the same actions is supported at the interface - but can take longer to learn

Interface Types

1. Command-based
2. WIMP and GUI
3. Multimedia
4. Virtual reality
5. Information visualization and dashboards
6. Web
7. Consumer electronics and appliances
8. Mobile
9. Speech
10. Pen
11. Touch
12. Air-based gesture
13. Haptic
14. Multimodal
15. Shareable
16. Tangible
17. Augmented and mixed reality
18. Wearable
19. Robots and drones
20. Brain–computer interaction (BCI)

Activity
Find an example for each one using your personal experience or browsing the web

Which interaction type to choose?

- Need to determine requirements and user needs
- Take budget and other constraints into account
- Also will depend on suitability of technology for activity being supported

Paradigm

- Inspiration for a conceptual model
- General approach adopted by a community for carrying out research
  - shared assumptions, concepts, values, and practices
  - e.g. desktop, ubiquitous computing, in the wild

Examples of new paradigms

- Ubiquitous computing (mother of them all)
  - Pervasive computing
  - Wearable computing
  - Tangible bits, augmented reality
  - Attentive environments
  - Transparent computing
    - and many more….

Homework Activity 1

- Select a few interface types from the given list
- Discuss the following
  - Pros and cons
  - Future avenues of research
  - Design issues

Homework Activity 2

- Write simple menus to represent the main functions on following:
  - Digital camera screen
  - Media player
  - Notepad
  - Outlook
- Show them to someone else and see if they can understand what each represents

Homework Activity 3

- Sketch simple icons to represent the following operations to appear on a digital camera screen:
  - Turn image 90 degrees sideways
  - Auto-enhance the image
  - Fix red-eye
  - Crop the image
- Show them to someone else and see if they can understand what each represents

Summary

- Ideation
- Interaction Design
- Information Architecture
- Interaction Types
- Interface Types

different types of ~~interaction~~