

INFO3315: Human Computer Interaction
Course Information
Lecture 1

I would like to acknowledge the Gadigal people of the Eora Nation, the traditional custodians of this land and pay my respects to the Elders both past and present. I extend that respect to Aboriginal and Torres Strait Islander peoples here today.

About me



Dr. Zhanna Sarsenbayeva

- Human-Computer Interaction
- Ubiquitous Computing
- Accessibility
- Affective Computing

- Lecturer School of Computer Science, University of Sydney from 2022 (HCI INFO3315, Usability Engineering COMP5427/4427)
- Postdoc at FEIT, School of Computing and Information Systems, University of Melbourne (2020-2022)
- PhD in Engineering (Human-Computer Interaction), The University of Melbourne (2020)
- MSc Computer Science and Engineering, University of Oulu, Finland
- BSc Computer Science, University College London, UK
- Google PhD Fellow in HCI (2019)

Agenda

Human Computer Interaction
- What?
- Why?
- Who?

The Unit
- Community
- Learning Outcomes
- Assessment Overview
- Weekly Routine
- Study Tips

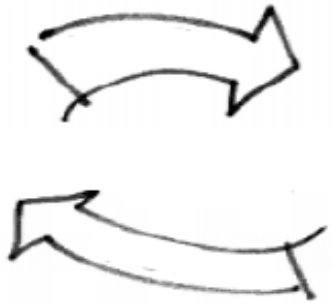
- Interaction Design Goals
  - •Usability
  - •User Experience

- Interaction Design Rules
  - •Standards
  - •Guidelines
  - •Principles
  - •Patterns

Human-Computer Interaction

- Human-Computer Interaction (HCI) is a discipline concerned with the design, evaluation, and implementation of interactive computing systems for human use and with the study of major phenomena surrounding them.
  - From ACM SIGCHI Curricula for Human-Computer Interaction (1992)







Human-Computer Interaction

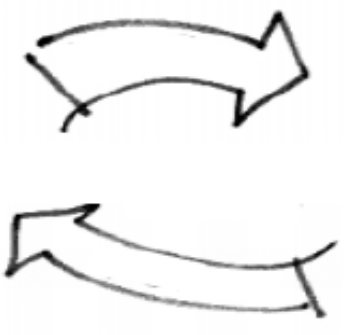
Why do we perform studies?

- Understanding good ways of interaction, and why they are successful
- Designing and Developing good user interfaces
- Evaluating the quality of a user interface
- Improving the user interfaces and developing new ways of interaction

Quick Questions - Emails

- How many e-mail accounts do you have?

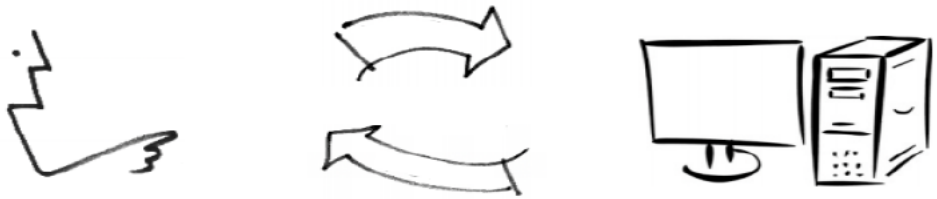






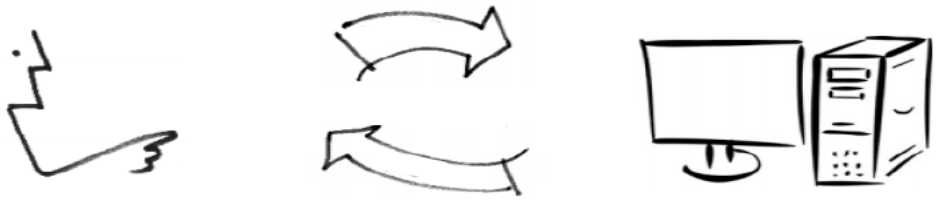
Quick Questions - Emails

- What do you use each e-mail account for on a daily basis?



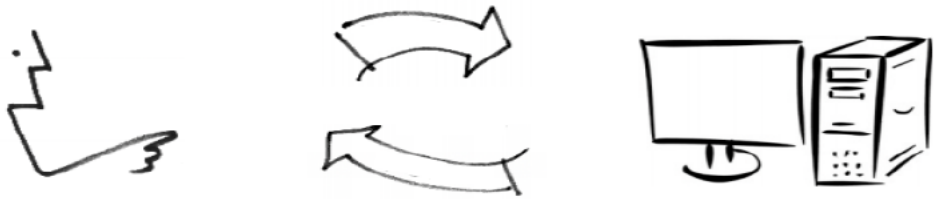
Quick Questions - Emails

- What type of email messages do you read and send?



Quick Questions - Emails

- Which device do you use to read your email messages?



Example HCI Research 1

- First thoughts when you look at this paper?

Bentley, F., Daskalova, N., & Andalibi, N. (2017, May). " If a person is emailing you, it just doesn't make sense" Exploring Changing Consumer Behaviors in Email. In *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems* (pp. 85-95). https://dl.acm.org/doi/abs/10.1145/3025453.3025613

"If a person is emailing you, it just doesn't make sense": Exploring Changing Consumer Behaviors in Email

Frank Bentley, Nediyana Daskalova, Nazanin Andalibi
Yahoo
Sunnyvale, CA, USA
[fbentley, nediyana, nazanin]@yahoo-inc.com

ABSTRACT
Much of the existing research literature on email use focuses on productivity or work settings. However, personal use of email has rarely been studied in depth. With the growth of messaging platforms being used for an increasing amount of personal communication, yet email use remaining high, we were interested in learning what Americans are using email for in their daily lives in 2016. To explore this topic, we use qualitative data from over 150 interviews with personal email users as well as quantitative data from several larger survey-based studies. We will show that personal email use is very different from what has been previously studied by workplace researchers and that daily use is largely focused on receiving and viewing B2C messages such as coupons, deals, receipts, and event notifications with personal communication over email diminished to a rarer, less-than-daily occurrence. We discuss the implications of this for the design of email and communications clients and present a design and prototype for an application that seeks to support these more frequent uses of consumer email.

Author Keywords
Email; Consumer; B2C; Deals; Coupons; Communication; Mobile Devices; Messaging.

ACM Classification Keywords
H.4.3 Communications Applications: Electronic Mail; H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous

INTRODUCTION
The past ten years have brought many changes to the broader communication landscape. Messaging applications such as WhatsApp and Facebook Messenger, along with SMS, have become the platform of choice for the majority of person-to-person communication. [3, 6] However, email remains a frequent daily habit for billions of people throughout the world. We wanted to gain a better picture of what people are using email for in their everyday lives, outside of work contexts, and to use this information to help design applications that better serve the needs of personal email users.

There exists a wide variety of research on email use, going back many years. However, the vast majority of this work focuses on business use of email or productivity and interruption impacts of using email throughout the day in an office setting. Where they exist, studies of consumer email use focus largely on users' organization strategies and not on the types of content sent and received and how email is currently used in everyday life. This lack of an exploration of current email behaviors led us to the following research questions, which motivated the studies presented in this paper:

1) What are the main uses of personal email accounts in people's daily lives?
2) What types of messages do users read and send?
3) What devices are users using to access email, and in particular what causes them to use email on a computer?
4) How are other communications services complementing email use?

We will address these questions through data from over 150 interviews with a wide demographic range of personal email users from San Francisco, Chicago, Champaign, New York City, and Silicon Valley as well as extensive survey data about current practices from representative samples of Americans. Wherever possible we will support our quantitative findings with explanations and quotes from our qualitative interviews as well as go the other way to demonstrate where interview themes generalize to percentages of the larger American population.

With this combination of data, we will show how consumer email has rapidly changed from a person-to-person communication platform, as often studied in the 90s and early 2000s to a business-to-consumer (B2C) platform where users mainly receive a variety of coupons, deals, political subscriptions, receipts, events, confirmations, and other system-generated messages, many of which are extremely useful to them. Where personal communication still exists in email, it is largely professional messages,

Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. Copyrights for components of this work owned by others than ACM must be honored. Abstracting with credit is permitted. To copy otherwise, or republish, to post on servers or to redistribute to lists, requires prior specific permission and/or a fee. Request permissions from Permissions@acm.org.

CHI 2017, May 06-11, 2017, Denver, CO, USA
© 2017 ACM. ISBN 978-1-4503-4655-9/17/05…$15.00
DOI: http://dx.doi.org/10.1145/3025453.3025613

Example HCI Research 2

COMPASS: Rotational Keyboard on Non-Touch Smartwatches

Xin Yi[1], Chun Yu[1†], Weijie Xu[1], Xiaojun Bi[2], Yuanchun Shi[1]
[1]Key Laboratory of Pervasive Computing, Ministry of Education
Tsinghua National Laboratory for Information Science and Technology
Department of Computer Science and Technology, Tsinghua University, Beijing, 100084, China
[2]Department of Computer Science, Stony Brook University, Stony Brook, NY, United States
{yix15,xu-wj13}@mails.tsinghua.edu.cn {chunyu,shiyc}@tsinghua.edu.cn xjunbi@gmail.com

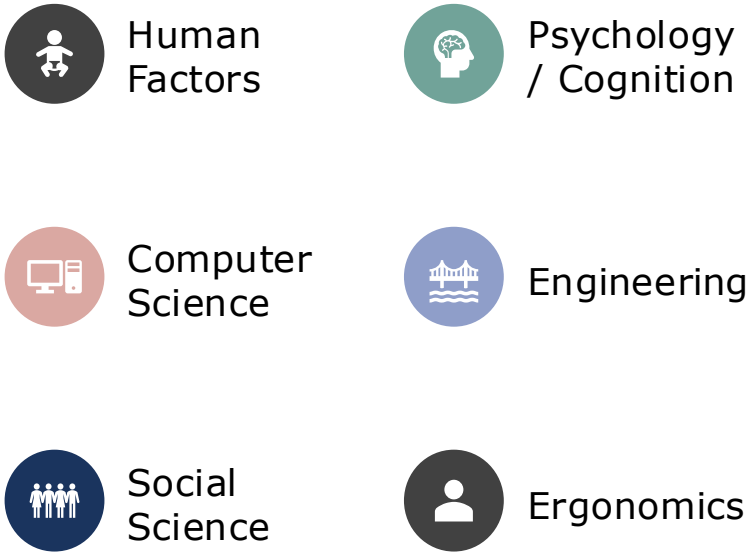


Figure 1: A storyboard illustrating a user entering "an" with *COMPASS*. (a) The keyboard shows three cursors at initial locations, the user rotates the bezel counterclockwise to hit 'a' with a nearby cursor. (b) The user presses the physical button to select 'a'. (c) Upon selection, the keyboard changes the location of the cursors so as to minimize the expected rotational distance for the next key. As there is already a cursor on 'n', the user presses again to select 'n' without rotating. The color of each key indicates the probability of it being the next selection. (d) The user long-presses the physical button to enter word selection mode. Dimmed keys are not possible for the next selection. (e) The user presses the button to select "an".

Yi, X., Yu, C., Xu, W., Bi, X., & Shi, Y. (2017, May). Compass: Rotational keyboard on non-touch smartwatches. In *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems* (pp. 705-715). https://dl.acm.org/doi/abs/10.1145/3025453.3025454

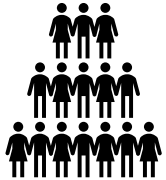
Who is involved in HCI?

- Multi-disciplinary team.
- Advantages:
  - •Knowledge from different disciplines useful to understand and solve the problem.
  - •More ideas and designs.
- Disadvantages:
  - •Communication challenges.



The Unit – Community

People you will See + Hear + Read:



You

- Bachelor of Advanced Computing
- Bachelor of Engineering Honours
- Bachelor of Science
- Bachelor of Advanced Studies
- Bachelor of Design Computing
- Bachelor of Economics
- Bachelor of Liberal Arts and Science
- Undergraduate Exchange Program



Teaching Team

- Coordinator / Lecturer
- Tutors

About you

- Different stages in your degree…



- Each heading towards different goals in life:
  - Software Developer
  - UX Designer
  - Product Designer…

About Teaching Team

- Lecturer/Coordinator: Zhanna Sarsenbayeva

- Tutors:
  - Junjie Zhou
  - Daria Podrezova
  - Shakyani Jayasiriwardene
  - Jinxu Lin
  - Zheyuan Kuang
- If you are e-mailing us, please add “[INFO3315-2025]” as the first word in subject and state your group/workshop session.

INFO3315 People

- Lecturer/Coordinator:
    - Dr. Zhanna Sarsenbayeva
        - Email: zhanna.sarsenbayeva@sydney.edu.au
        - Please contact me for:
            - Administrative issues
                - Emergencies
                - Illness or misadventures
                - Rules and policies
                - Group difficulties
            - Content matters

INFO3315 People

- Tutors (depends on your tutorials, please check your timetables):
    - Junjie Zhou
    - Daria Podrezova
    - Shakyani Jayasiriwardene
    - Jinxu Lin
    - Zheyuan Kuang

- Please contact your tutor first for all matters except emergencies
- All contact details are posted to Canvas.

INFO3315 Resources

- Canvas eLearning:
  - Login using UniKey and your password
  - Canvas website is: https://canvas.sydney.edu.au/courses/59429
  - Learning resources – lecture notes, videos, eReserves, worksheets
    - Reading list each week
    - Assignment instructions
    - Submission of assignments
    - View your grades, etc.
  - Discussion forum on Ed (link via Canvas)

The Unit – Learning Outcomes

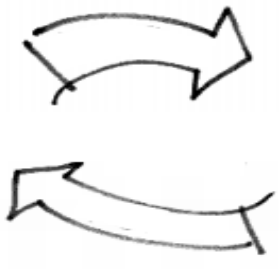
- **LO1**. select suitable techniques for establishing user groups and their requirements for an interface, including the usability requirements, and be able to make use of these techniques
- **LO2**. apply standard design approaches to creating a user interface
- **LO3**. evaluate interfaces, based upon both discount and user-based techniques, and be able to select the most appropriate technique for a particular situation and to justify this
- **LO4**. explain how human factors influence aspects of design of interfaces
- **LO5**. demonstrate knowledge of the main methods of interface design and evaluation and the relative strengths and weaknesses of each and their most appropriate uses
- **LO6**. use a prototyping tool to create low fidelity prototypes
- **LO7**. demonstrate knowledge of the broad range of interfaces, such as social, NUI, emotion-aware interfaces, ubiquitous devices that are carried, work or embedded in the environment
- **LO8**. present the design and evaluation of a prototype interface, defining the requirements, describing the design processes and evaluation and use the evidence gathered in established methods to draw conclusions about it's strengths, and weaknesses of the interface.

The Unit – Overview



- Understanding Humans (W1-2)

LO4 – Influence of human factors on interface design
- **Reflective Summary 1**



- Design Process (W3)
- Requirements Gathering (W4-5)
- Design and Prototyping (W6-7)
- Evaluation (W8-10)



- Interface Technology (W12)

LO7 – Range of interfaces
- **Final Exam**
- **(Indirect) Group Project**

Group Project
- **LO - 1, 2, 3, 5, 6, 8**
- **Design and study interface to solve a problem of choice**

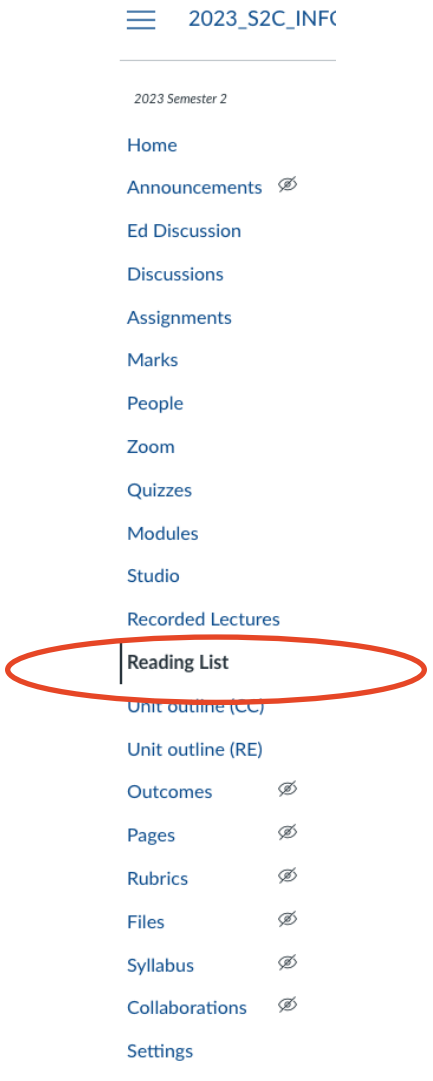
Individual

LO1 – (K+A) Requirements Techniques
- **Reflective Summary 2**

LO5 – (K+A) Design and Evaluation
- **Reflective Summary 3**

INFO3315 Reference books

- Main reference book:
  - Interaction Design: Beyond Human-Computer Interaction, 5th Edition
    - Helen Sharp, Jennifer Preece, Yvonne Rogers
    - ISBN: 978-1-119-54730-3 April 2019, 656 Pages
- Recommended books included in Reading list
  - Optional reading
  - Books used to generate contents of the lecture notes
- All accessible via reading list on Canvas



Expectations

- Students attend scheduled face-to-face sessions (lecture & workshop), and devote an extra 4-6 hrs per week
    - doing assessments
    - preparing and reviewing for classes
    - revising and integrating the ideas
    - practice and self-assess

- Students are responsible learners
    - Participate in classes, constructively
    - Respect for one another (criticize ideas, not people)
    - Humility: none of us knows it all; each of us knows valuable things
    - Check Canvas site at least once a week!
    - Notify academics whenever there are difficulties
    - Notify group partners honestly and promptly about difficulties

Special considerations (University policy)

- If your performance on assessments is affected by illness or misadventure
- Follow proper bureaucratic procedures
    - Have professional practitioner sign special USyd form
    - Submit application for special consideration online, upload scans
    - Note you have only a quite short deadline for applying
    - http://sydney.edu.au/current_students/special_consideration/
- Also, notify coordinator by email *as soon as anything begins to go wrong*
- There is a similar process if you need special arrangements e.g., for religious observance, military service, representative sports

Academic Integrity (University policy)

- “The University of Sydney is unequivocally opposed to, and intolerant of, plagiarism and academic dishonesty.
    - Academic dishonesty means seeking to obtain or obtaining academic advantage for oneself or for others (including in the assessment or publication of work) by dishonest or unfair means.
    - Plagiarism means presenting another person’s work as one’s own work by presenting, copying or reproducing it without appropriate acknowledgement of the source.” [from site below]
- http://sydney.edu.au/elearning/student/EI/index.shtml
- Submitted work is compared against other work (from students, the internet, etc)
    - TurnitIn for textual tasks (through Canvas), other systems for code
- Penalties for academic dishonesty or plagiarism can be severe
- Complete self-education AHEM1001

The Unit – Weekly Routine

Lecture Preparation
- Review materials
- List of questions
- Complete reading



Workshop Preparation
- Attempt worksheet questions
- Preparation for group project discussion



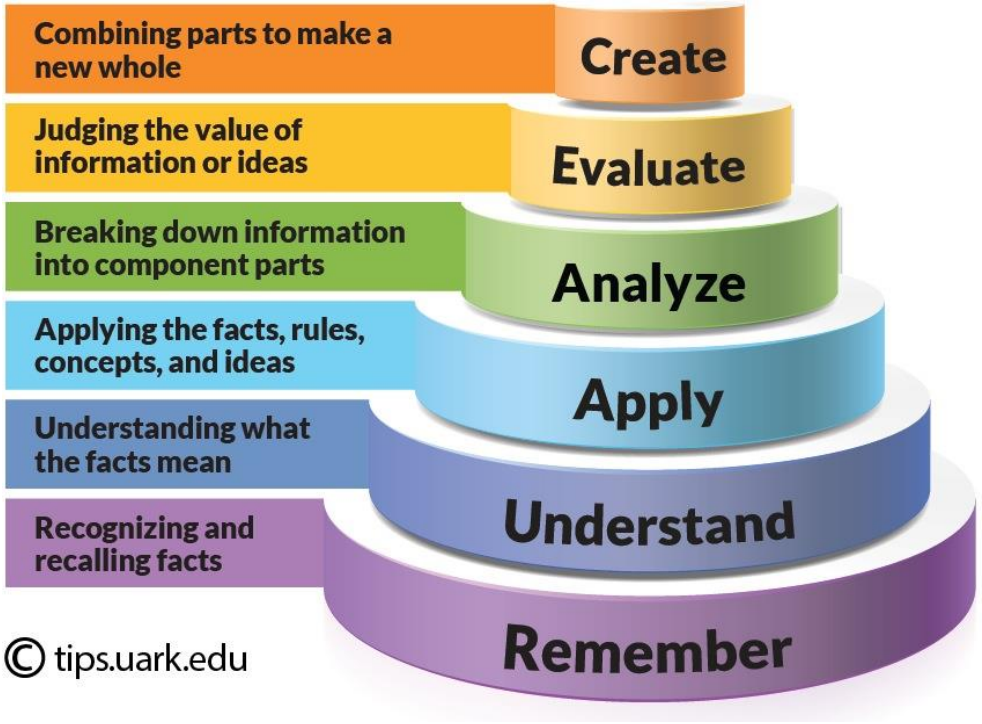


Lecture (Wed, 12pm-2pm)
- Sound 'bites' of contents
- In-class Activities
- Recorded
- 2 Hrs

Workshop (Wed to Fri)
- Discussion of Worksheet
- Group Project update and discussion
- Not Recorded
- 2 Hrs

Discussion/ Questions
- On Ed (link through canvas)

Study Tips



1. Read books, articles or watch videos.
2. Apply the concept by looking around you (people and environment) and practice the techniques.
3. Reflect on the knowledge – where can I use this in my own practice? What can I do to make it better?
4. Make your own notes of important points.

https://tips.uark.edu/using-blooms-taxonomy/

Course information – more details

- Admin slides

Summary

- Introduction to HCI
  - Multi-disciplinary field
  - Design, evaluation, and implementation of interactive computing systems for human use and with the study of major phenomena surrounding them

- The unit.
  - Syllabus coverage
  - Assessments
  - Study tips

Introduction to Interaction Design



Why Is User Interface Important?



One of the most critical parts of a system



Directly influence success of a product



Bad user interfaces are costly (time, money, lives, …)



User interfaces are hard to get right

Quality of Interactive System

- **Usability**
  - •Extent to which a product can be used by specified users to achieve specified goals with **effectiveness**, **efficiency** and **satisfaction** in a specified context of use**.**

- **User experience**
  - •Quality of experience a person has when interacting with a specific design
  - •ISO 9241-210: User experience is defined as "**a person's perceptions and responses** that result from the use of a product, system or service"



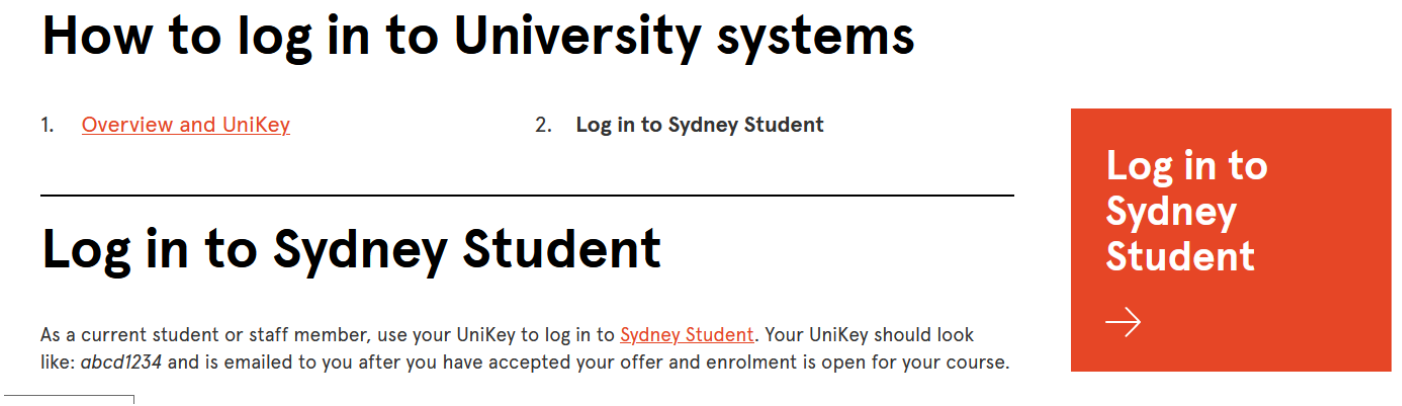
A B C D

Interaction Design Goals – Usability Goals

- **Effectiveness** – must be able to do what it is designed to do.
- **Efficiency** – supports users in carrying out the tasks.
- **Safety** – protects users from dangerous conditions.
- **Utility** – extent to which the product provides the right kind of functionality
- **Learnability** – learn the system through self-exploration
- **Memorability** – remember how to use the system, once learned

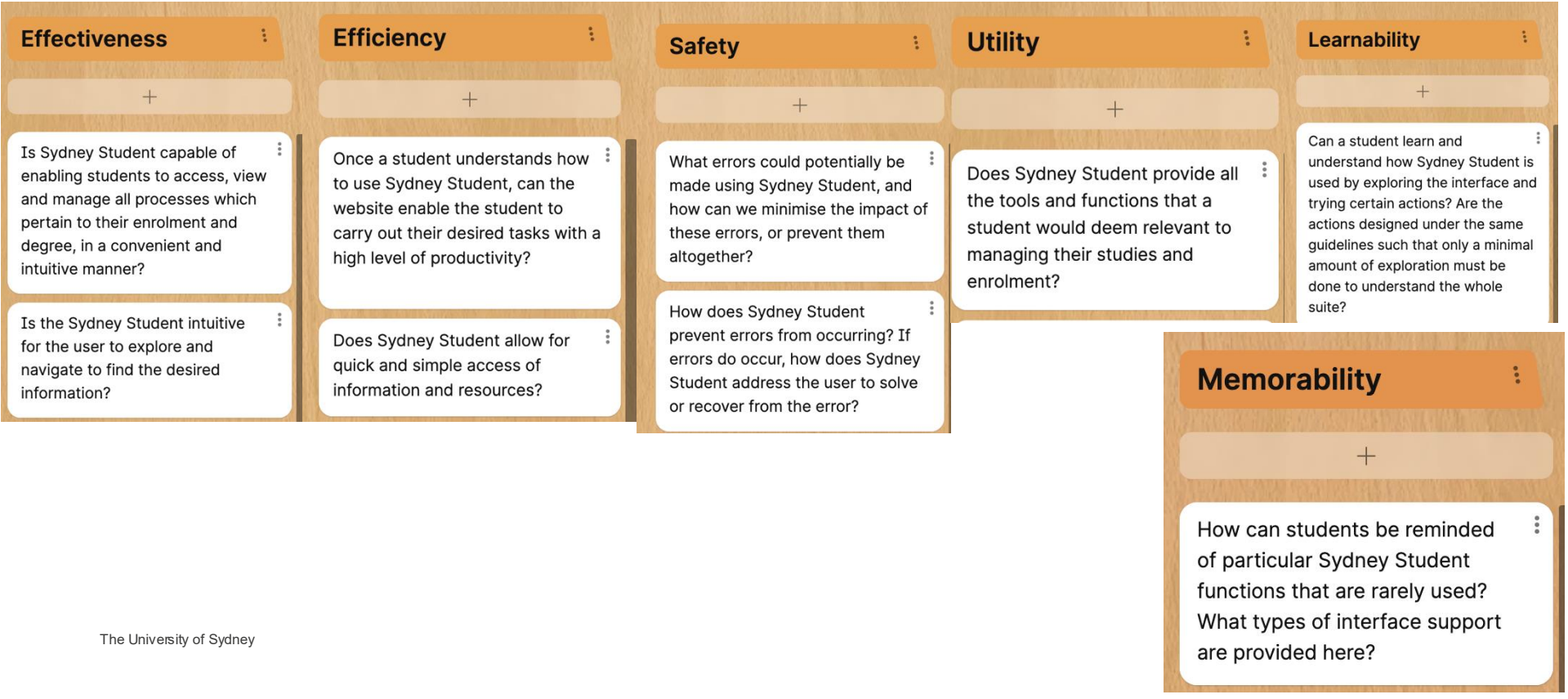
Case Study – Sydney Student – In-class activity in pairs (10 min)

- Translate each goal into **ONE** specific question that you can use to evaluate the web application.

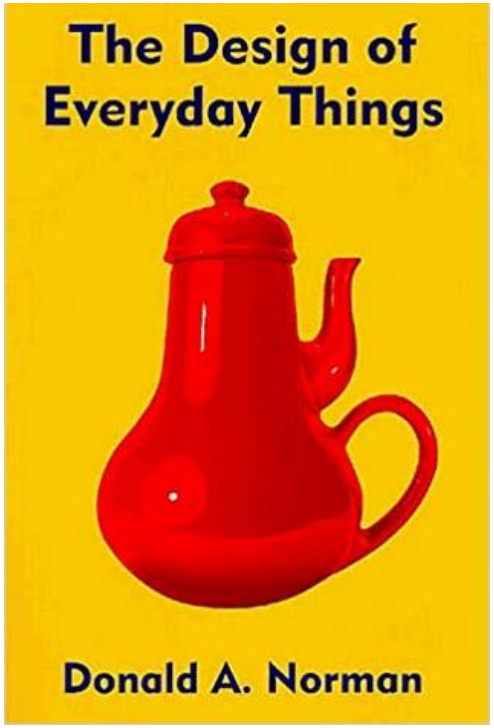


Link: https://www.sydney.edu.au/students/log-in-to-university-systems/sydney-student.html

Case Study – Sydney Student (example questions)



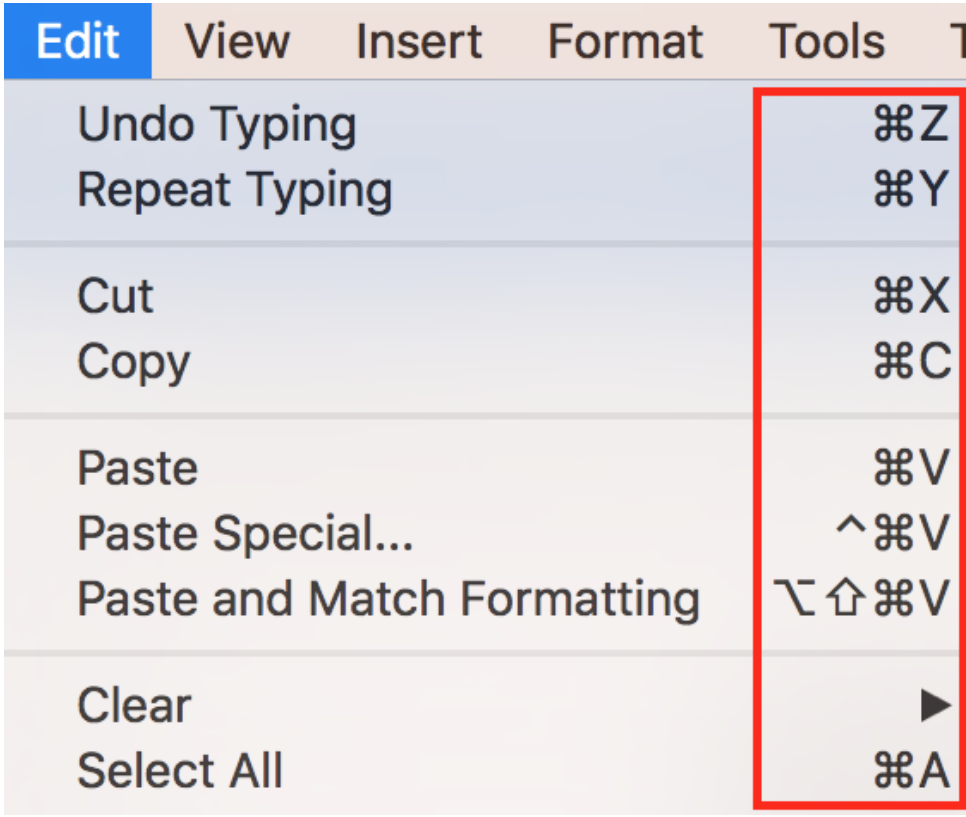
Effective to use (effectiveness)



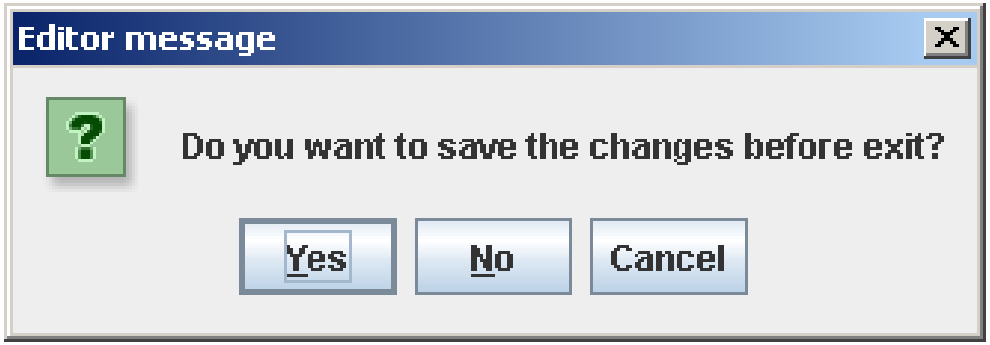
- Does the teapot allow you to pour tea?
- Does the teapot allow you to refill the water in the teapot?

Efficient to use (efficiency)

- Once users have learned how to use a product, can they sustain high level of productivity?



Safe to use (safety)



- What is the range of errors that are possible using the product?
- What measures are there to permit users to recover easily from them?

Having good utility (utility)

- Does the product provide an appropriate set of functions that will enable users to carry out all their tasks in the way they want to them?







Easy to learn (learnability)

- Is it possible for the user to work out how to use the product by exploring the interface?
- How hard will it be to learn the whole set of functions in this way?



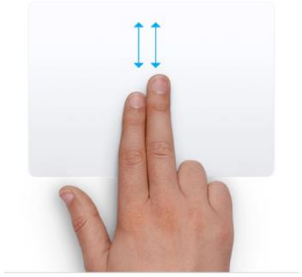
Tap to click
Tap with one finger to click.



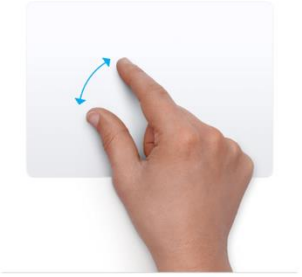
Secondary click (right-click)
Click or tap with two fingers.



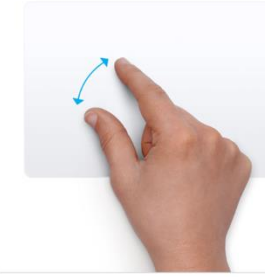
Smart zoom
Double-tap with two fingers zoom in and back out of a webpage or PDF.



Scroll
Slide two fingers up or down to scroll.[1]



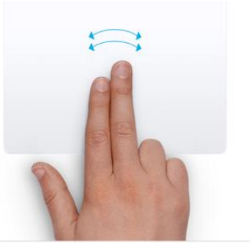
Zoom in or out
Pinch with two fingers to zoom in or out.



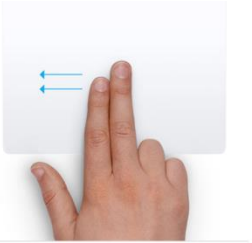
Rotate
Move two fingers around ea other to rotate a photo or other item.

Easy to remember how to use (memorability)

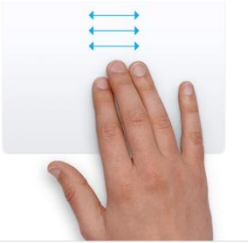
- What kind of interface support have been provided to help users remember how to carry out tasks, especially for products and operations they use infrequently?



Swipe between pages
Swipe left or right with two fingers to show the previous or next page.



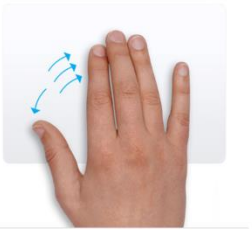
Open Notification Center
Swipe left from the right edge with two fingers to show Notification Center.



Three finger drag
Use three fingers to drag items on your screen, then click or tap to drop. Turn on this feature in Accessibility preferences[2].



Look up and data detectors
Tap with three fingers to look up a word or take actions with dates, addresses, phone numbers, and other data.



Show desktop
Spread your thumb and three fingers apart to show your desktop.



Launchpad
Pinch your thumb and three fingers together to display Launchpad.

Usability Goals in Practice

- All the goals cannot be achieved in one design.
- Must understand trade-offs and prioritize goals.
- Provide quantitative indicators to measure performance of design.

Example: Usability Metrics

Usability objective	Effectiveness measures	Efficiency measures	Satisfaction measures
Overall usability	• Percentage of tasks successfully completed • Percentage of users successfully completing tasks	• Time to complete a task • Time spent on non-productive actions	• Rating scale for satisfaction • Frequency of use if this is voluntary (after system is implemented)
Meets needs of trained or experienced users	• Percentage of advanced tasks completed • Percentage of relevant functions used	• Time taken to complete tasks relative to minimum realistic time	• Rating scale for satisfaction with advanced features
Meets needs for walk up and use	• Percentage of tasks completed successfully at first attempt	• Time taken on first attempt to complete task • Time spent on help functions	• Rate of voluntary use (after system is implemented)
Meets needs for infrequent or intermittent use	• Percentage of tasks completed successfully after a specified period of non-use	• Time spent re-learning functions • Number of persistent errors	• Frequency of reuse (after system is implemented)
Learnability	• Number of functions learned • Percentage of users who manage to learn to a pre-specified criterion	• Time spent on help functions • Time to learn to criterion	• Rating scale for ease of learning

Source: ISO 9241-11:1998 Ergonomic requirements for office work with visual display terminals (VDTs), extract of Table B.2

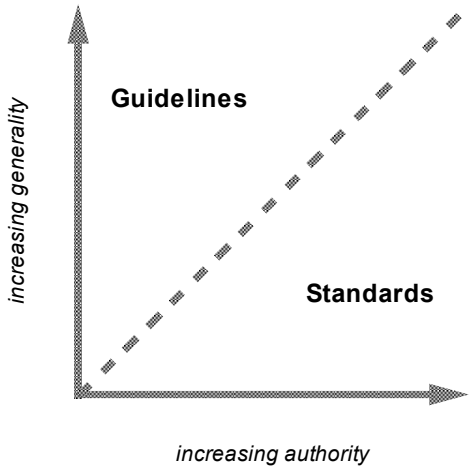
Design Goals: User Experience

Desirable aspects		
Satisfying	Helpful	Fun
Enjoyable	Motivating	Provocative
Engaging	Challenging	Surprising
Pleasurable	Enhancing sociability	Rewarding
Exciting	Supporting creativity	Emotionally fulfilling
Entertaining	Cognitively stimulating	Experiencing flow
Undesirable aspects		
Boring	Unpleasant	
Frustrating	Patronizing	
Making one feel guilty	Making one feel stupid	
Annoying	Cutesy	
Childish	Gimmicky	

Source: Interaction Design: Beyond Human-Computer Interaction, 5th Edition

Design Rules

1. **Design Standards**
   - •Govern large communities
   - •Low generality
2. **Design Guidelines**
   - •Best practices and recommendations
   - •Technology-oriented
3. **Design Principles**
   - •Abstract
   - •Low authority
4. **Design Patterns**
   - •Generative collection of common practice
   - •Not necessary good practice



Design Standards

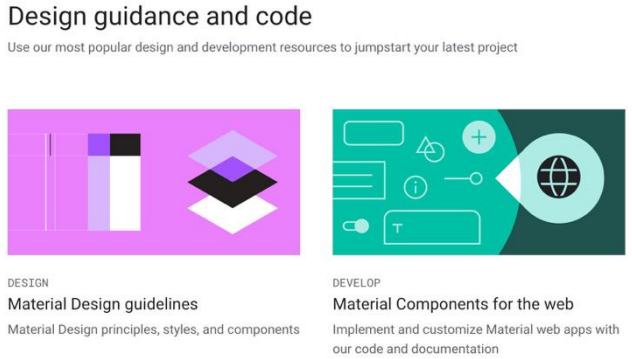
- Standards specific for hardware and software
- Usually talk about processes, specifications or definitions that are established based on concrete theories.
- ISO9241-11:2018 Ergonomics of HCI – Part 11
  - •provides a framework for understanding the concept of usability and applying it to situations where people use interactive systems, and other types of systems (including built environments), and products (including industrial and consumer products) and services (including technical and personal services).

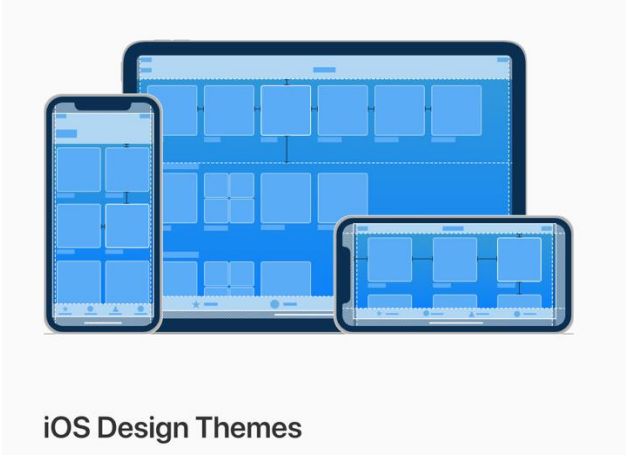
Your task:

- Read: https://interactions.acm.org/archive/view/march-april-1999/hci-standards1
- There are many standards out there. Which standard is the most relevant for you to know?

Design Guidelines

- Recommendations and good practices.
- Can be technology-oriented or interface design in general
- Promote consistency among similar products within the same company
- Guidelines for Mobile App Development:
  - iOS Human Interface Guidelines
  - Google Material Design
- Guidelines for Interface Design:
  - Schneiderman Eight Golden Rules
  - Nielsen 10 Usability Heuristics
  - Apple design guidelines: https://developer.apple.com/design/human-interface-guidelines





Design Guidelines Comparison

Schneiderman Eight Golden Rules	Nielsen 10 Usability Heuristics
• Strive for consistency • Enable frequent users to use shortcuts • Offer informative feedback • Design dialogs to yield closure • Offer error prevention and simple error handling • Permit easy reversal of actions • Support internal locus of control • Reduce short-term memory load	• Visibility of system status • Match between system and real world • User control and freedom • Consistency and standards • Error Prevention • Recognition rather than recall • Flexibility and efficiency of use • *Aesthetic and minimalist design* • Help users recognize, diagnose and recover from error • Help and documentation

Your task:

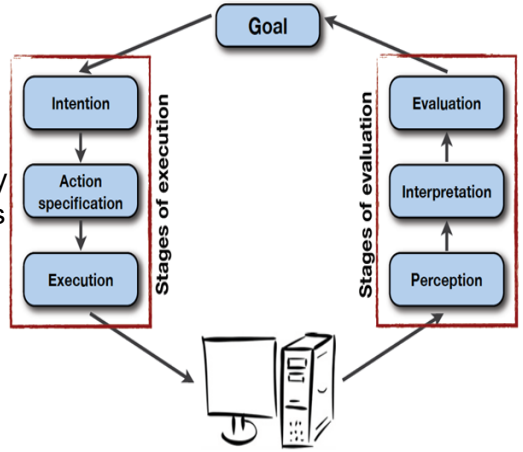
- Can you spot the similarities between both sets of guidelines?

Design Principles

- Derived from mix of theory, experience and common sense
- Can be applicable to many design situations
- Notable principles:

1. Visibility
2. Consistency
3. Affordances
4. Feedback
5. Constraints
6. Mapping

Learnability
- Visibility
- Consistency
- Affordances
- *Familiarity*

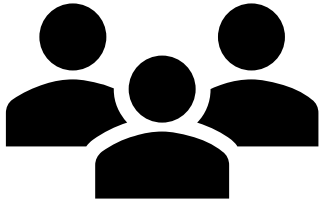


Sense of Control
- Feedback
- Control (Mapping)
- *Navigation*

Safety
- Constraints
- *Recovery*

Design Patterns

- A pattern describes a problem, a solution and where this solution has found to work.
- Will evolve as people use them, experience increase and user's preference changes.
- Depreciate when it becomes outdated.
- Example: https://ui-patterns.com/
- Anti-pattern – design approaches that represent poor practice.
- Dark patterns – designs to trick people, championing stakeholder value over user value.



Summary

- First set of tools to evaluate interactive systems.
  - Design Goals
  - Design Rules

- Not all rules are created equal. Must value the goals and rules to determine which is most applicable to your current design situation.

- Practice the tools by evaluating interactive systems in real-life.


Thank you!
zhanna.sarsenbayeva@sydney.edu.au