1 USABILITY GOALS, USER EXPERIENCE GOALS, DESIGN PRINCIPLES

Goals and Tasks:

- 当我们想要 evaluate 一个 interface 的时候, 我们必须要考虑到用户的 goal
- Goal 是可以随时间而改变的 (time invariant), task 是和当下 available 的科技有关的
- Goal 和 task 的关系: 需要完成很多 task 来达到目标 goal

Interaction Design:

- Develop usable products – Usability 代表了 easy to learn 易学易懂, effective to use 真实有效, provide enjoyable experience 给人带来享受得使用过程
- Optimize user interaction with a system
- 在设计得过程中 involve users (UCD)
- Specify usability, user experience goals, documented and agreed in beginning of the project
- Iteration (requirements + alternatives + prototyping + evaluation)
- 需要考虑到用户的需求并且考虑到用于群, 青年和成年人的需求可能并不一样, 不要随便对用户群做出一些没有根据的假设 (unwarranted assumptions), 了解用户的 capabilities

Usability Goals:

- Effective to use – Effective
  - 系统是否在做其应该做的事情 how well does the product do what its supposed to do
    - Does the system help users to carry out the tasks effectively, allow them to access the information that they need, or buy the goods that they want?
  - 是否有帮助用户去达到目标 goal
- Efficient to use – Efficiency
  - Help user to carry out their tasks with minimal steps
  - 去掉没有必要的 tasks
- Safe to use – Safety
  - 物理上来说 – 不伤害用户
  - 避免用户犯错, 给予 undo/ recover 的选项, 或当用户做一些不正确操作时显示 warning message
- Have good utility – Utility
  - Does the product have functions that the user needs to achieve the goals, 但是太多的功能可能会造成 feature bloat
    - 例如邮件网站是应该支持用户发邮件的
- Easy to learn – Learnability
  - 系统应该是容易使用的 easy to use, 不会花太久去 become productive
  - 尽量地给新用户带来最小化的疑惑 confusion 或是 cognitive load
  - Similar tasks have similar interactions
- Easy to remember how to use – Memorability
  - 在第一次使用了系统过后, 第二次不应该给用户一种完全陌生的感觉
  - 考虑用户使用此系统的频率

User Experience: 是和用户的 emotional connection, 有正面和负面 (desirable + undesirable)

Design Principles: Think about different aspects of design / dos & don'ts / what to (not) provide at interface

- Visibility 可见性
  - Helps users to understand what to do with the system 更好的了解可以在系统上做什么
  - Helps users to get to know how to interact with the system 了解如何操作系统
    - 例如感应的水龙头有的时候会使用户产生疑惑
- Feedback 及时的反馈
  - 和可见性 visibility 高度相关
  - 如果用户做了一些操作去和系统 react, 系统应该给一些反馈 signal
  - 反馈可以让用户知道可以做什么, 刚才发生什么, 正在发生什么 和 即将发生什么

- Constraints 约束和限制 – limit the possibility to avoid things go wrong
  - Physical
    - 例如一把钥匙开一扇门, 把手的大小适中, 可回收垃圾桶的形状只能放下瓶子或易拉罐
  - Semantic – the meaning of things / what we normally expect 需要用户对世界有基础知识来了解
    - 例如一般司机都是朝前方道路看的
  - Cultural – socially acceptable behavior (might differ from another country)
    - 和 social norm 很像, 人们在自己生长的环境里了解到的文化可能会影响对系统的理解
    - 例如用红色代表 warning, 或者用红色三角形代表警告
  - Logical – logical / reasoning, related to people's everyday common sense reasoning
- Consistency 一致性
  - Similar operations and elements for achieving similar tasks
  - 例如网页大体的界面需要保持一致性, 或操作的过程保持一致性
  - 这样用户会学地比较快, 并且少反很多错误
- Affordance – to give a clue
  - You know what to do by just looking at it 可以使人一眼就看出如何使用系统

Natural Mappings:

- Spatial relationship between the controls and outcome 是一个控制和结果的空间关系 (movement & result)
- 这个空间关系需要有一个 logical 的 sequence, 这样用户更容易理解, 而不是多次尝试(random search)犯错过后才明白如何使用 -> 例如灶台的排列, 或是音乐的前进后退按钮

2 USABILITY PRINCIPLES ⇔ HEURISTICS EVALUATION

- **Visibility for system status**: 系统当前状态的可视化
  - Feedback:
    - 给予用户反馈告知现在系统正在做什么
    - show status with minimal delay, feedback should be appropriate and meaningful
  - Rule of Thumb: 经验法则 -> 系统应该 continuously 告知用户系统正在做什么
    - 小于 0.1 秒 – 不用提供特殊的 feedback
    - 大于 1 秒 – 提供 feedback
    - 大于 10 秒 – 允许用户做别的 task 而不是停留在现在的步骤上
  - 例子: 亚马逊的买单步骤显示
- **Match between system and the real world**:
  - "Speak the user's language" – 确保使用的语言/concept 是用户可以轻易理解的 (不要使用专业术语 jargon)
    - Use icons, the trash bin in system for deleted files…
  - 使用 understandable, applicable, translatable 的 metaphor
  - 确保系统里的 workflow reflected
- **User control and freedom：**
  - 确保系统的操作是可预见的 predictable, 并且不是全自动化的 not automatic
  - 确保用户感觉到是他们自己在操作 in control of the interaction
  - 永远都给用户提供出口 exit, logout
- **Consistency and Standards:**
  - Helps user to understand what they should do 例如 login 一般都在右上角, 这样用户就可以从已经有的 acquired knowledge 里面找到信息而不用重新学习
  - Make sure the terminology means the same thing & sequence of actions 例如手机和电脑版的同步
- **Help and Documentation:**
  - 确保信息是很容易被搜索到的 -> search function / help function in noticeable position
  - 确保 help function 里面的教程是易理解易掌握的

- **Help users recognize, diagnose, and recover from errors:** 当系统出现问题时, 帮助用户处理问题
    - 使用简单的 plain language 来描述 error message 出现问题的地方 -> 简单概述出现问题的原因 -> 问题的细节 -> 解决问题的方法
- **Error Prevention:**
    - 尽可能地避免用户犯错
    - 可以提供 labelling 告知用户或者是使用灰色来 unable 掉一些可能会造成错误的选项
- **Recognition rather than Recall:**
    - 如果是要 recall 的话人们需要从 LTM 中读取信息并取出相对来说比 recognition 困难许多
    - 提供一些选项供用户选择, 但不要太多可能会造成 cognition overload
- **Flexibility and efficiency of use:**
    - 确保有经验的用户和新用户都可以使用系统
    - 为有经验的用户提供更快捷的方法去 accomplish task, 例如提供快捷键
- **Aesthetic and Minimalist design:**
    - 如果是不相关或者没有用的信息尽量不要放到网页上
    - 检查什么是 unnecessary steps to accomplish tasks

3 DESIGNING FOR ACCESSIBILITY

Universal Access:

- Access services/product by everyone (equal opportunity), regardless of social class, ethnicity, background or social disabilities
    - Over 18% Australians have disability, between 10-20% in most countries. Disabilities increase with age.
    - Anti-discrimination laws -> disability act
- Accessibility makes user interface perceivable, operable, and understandable for people with a wild range of abilities. Include temporary disability conditions.
- Accessibility support – technologies, product, services need to designed in a way that user agents including assistive technologies can access all the information they need to present the content to users.
- Disabilities – Visual, Auditory, Physical, Cognitive/Learning 学习/理解障碍, Literacy 识字障碍
- Technology – Slow connection, no sound card, older browser/technology, no plug-ins

Personas vs Scenario as design tools:

- Persona can be used to capture user characteristics, it synthesized 综合 from real user characteristics.
- Persona can include name, characteristics, goals, background based on the research.
- Persona describes attributes of a person and aspect of their personality while scenario describes the activities and context of use.

Assistive Technologies:

- Screen readers
    - Have audio or braille output, used by individuals who are blind
- Screen magnification software 放大镜
    - Used by individuals with low vision that magnifies a portion of the screen for easier viewing
- Variety of keyboard/mouse options
    - Alternate keyboards/switches are for people with physical disabilities (extra-small/extra-large)
- Voice input/voice recognition software
  Head pointers
- Braille displays 盲人的阅读盘

Accessibility Interaction Design Considerations:

- Label and controls
    - Ensure that they are properly placed
    - Ensure that place-holding characters explain what is entered
- Dynamic content – ensure dynamic content is updated

- Tables
    - Ensure to identify row and column headers
    - Do not use table for layout unless in makes sense when linearized
- Screen flickering 闪烁的
    - Avoid to use blinking text or scroll text, and allow users to control it
- Frames – title each frames (identification and navigation)
- Provide keyboard shortcut to important links (clearly identify target of each link), allow users to skip repetitive navigation links
- Use simple language, and provide summaries for tables, appropriate to use flash, pdfs, pop-up windows.
- Provide alternatives to color coding

Evaluation Techniques:

- Automatic validation tolls – the website can verify the syntax of the page are correct
    - WAVE, W3C validators, web accessibility checker
- Human review method
    - Run on different browsers, turn-off graphics/sounds/stylesheets/frames/scripts
    - Check color contrast by viewing in grayscale, increase font size to the largest size.
    - Try to use assistive technologies, try keyboard-only navigations
    - Cascading style sheets – allow users to change color preferences and text size preferences
- Usability testing with disable users