

Week 2: Lab 1 - User Experience Evaluation

While understanding a user is essential for product development, we do not want to spend resources having our users tell us things that we should already know anyway. Plenty of research and work has gone into to best practices for effective user interface (UI) design for Desktop, mobile, virtual, augmented, human-machine and other interfaces. We will review these principles in this week's lab session.

Cheat Sheet: User Experience Evaluation (Desktop & Mobile UI)

Desktop UI

- **Key Considerations:**
- Account for different screen resolutions; ensure elements are not distorted.
- Support for multiple windows/dialogs; share information efficiently between them.
- Follow system rules for element placement and behavior.
- **Modal vs. Nonmodal:** Modal dialogs require user interaction before proceeding, while nonmodal allows multitasking.
- Avoid creating custom skins that deviate too much from standard OS design.

Mobile UI

- **App Types:**
- **Mobile-Specific Website:** Optimized but less popular.
- **Responsive Site:** Adapts layout for mobile.
- **Native App:** Installed directly on the device.
- **Hybrid App:** Web-based content delivered through an app interface.
- **Information Architecture Patterns:**
- **Hierarchy Pattern:** Structured navigation.
- **Hub & Spoke Pattern:** Central hub connects to different sections.
- **Nested Doll Pattern:** Progressive disclosure of information.

- **Tabbed View Pattern:** Multiple views under different tabs.
- **Bento Box/Dashboard Pattern:** Compact overview layout.
- **Filtered View Pattern:** Displaying filtered content.

Designing for Mobile

- **Usability Considerations:**
- Smaller screens require a focused interaction design.
- Ensure adequate button hit areas:
 - **Standard Screens:** 44px to 57px
 - **High-Density Screens:** 88px to 114px
- Interactive elements should be reachable and logically connected.
- **Touchscreen Interactions:**
- Reinforce interactions with visual design and ensure intuitive layouts.

Other User Interfaces

1. **Augmented Reality (AR):** Adds digital elements to a live view (e.g., Snapchat lenses).
2. **Virtual Reality (VR):** Complete immersion that blocks the physical world.
3. **Human-Machine Interface (HMI):** Interfaces for alarms and control systems, often requiring immediate attention.

Best Practices

- Follow design guidelines for compatibility with target platforms.
- Ensure usability for both desktop and mobile environments by considering unique constraints.
- Keep user interactions intuitive and accessible.
- Test interfaces on multiple screen sizes and configurations.

Week 3: Questionnaires

A simple way to understand a user's experience is simply to ask users what they think. While that sounds simple, in practice, it can be challenging to structure a survey such that you get meaningful answers to your questions. It also does not hurt to apply UX principles to the survey design...

Cheat Sheet: Surveys & Questionnaires

Definition of Survey

- A research method to collect data from a sample of individuals.
- Used to gather insights on topics, opinions, and behaviors.
- Widely employed in multiple fields like market research and UX evaluation.

Importance of Survey Design

1. **Accurate Data Collection:** Ensures reliable information.
2. **Validity & Reliability:** Data accurately reflects research goals.
3. **Minimizes Bias:** Results are more objective.
4. **Cost-Effective:** Efficient way to gather data.
5. **Increased Response Rates:** Well-designed surveys encourage participation.
6. **Improved Data Analysis:** Clean data for better insights.
7. **Informed Decision-Making:** Enables actionable outcomes.

Types of Surveys

1. **By Design:**
 - Cross-sectional surveys (one point in time)
 - Longitudinal surveys (over time)
2. **By Purpose:**
 - Descriptive, Analytical, Explanatory, and Attitude surveys
3. **Common Use Cases:**
 - Market research, Customer satisfaction, Exit, and Employee surveys

Key Steps in Survey Design

1. **Define Clear Objectives:**
 - Purpose, scope, and research questions
2. **Define Target Population:**
 - Inclusion criteria, subpopulations, and sampling methods
3. **Sampling Techniques:**
 - Random, stratified, convenience, quota, and snowball sampling

Ethical Considerations

- Informed consent and voluntary participation
- Anonymity and confidentiality

- Data security and cultural sensitivity
- Avoid harm and ensure transparency

Types of Questions

1. **Open-Ended:** Collect qualitative data
2. **Closed-Ended:** Easy to analyze (multiple choice, binary)
3. **Likert Scale:** Measure levels of agreement
4. **Ranking, Demographic, and Matrix Questions:** Organize structured data

Writing Effective Questions

1. Use simple and clear language
2. Avoid ambiguity and leading questions
3. Ask one question at a time
4. Use balanced response options
5. Pilot test the survey

Survey Structure

1. **Introduction:** State purpose and instructions
2. **Main Body:** Mix of questions
3. **Conclusion:** Thank participants and provide closing instructions

Data Collection Methods

- **Online, Mobile, Face-to-Face, and Telephone Surveys**
- Mixed-mode approaches
- Consider timing and frequency of surveys

Data Analysis

- Develop coding systems
- Descriptive statistics
- Inferential statistics for deeper insights
- Rectify errors and handle missing data

Reporting Results

- Use charts, graphs, and narrative summaries
- Ensure clarity in presenting findings

Week 4: Personas

When we look into a "user" from a business perspective, we often mean "users" and a lot of them because more users means more sales. Unfortunately, this approach almost never works, because targeting every user means no one is understood at the level where a product meets their needs. One strategy to resolve this is the persona - a character based on a desired user with a particular problem or set of goals they want to achieve. This lesson explores what a persona is and how to generate one with user research.

Cheat Sheet: Personas in UX Design

Definition of Personas

- "A persona is a fictional, yet realistic, description of a typical or target user of the product." — Kate Kaplan, Nielsen Norman Group
- **Introduced:** Publicly introduced by Alan Cooper in 1999.

Key Benefits of Personas

1. **Understanding Users:** Gain insights into user goals and pain points.
2. **Informed Decision-Making:** Align product development decisions with user needs.
3. **Prioritization:** Focus on the features that matter most to users.
4. **Enhanced UX:** Create intuitive interfaces that meet user expectations.
5. **Testing and Validation:** Use personas as a reference for usability testing.

Creating Effective Personas

1. **Data Collection:**
 - Surveys
 - Interviews
 - Usability tests
 - Sales and marketing data
2. **Steps:**
 - Define objectives
 - Conduct user research
 - Identify patterns and trends
 - Segment the audience
 - Create detailed personas using real quotes and stories
 - Validate and prioritize information

- Update iteratively

Types of Personas

1. **Primary Personas:** Main target users.
2. **Secondary Personas:** Less critical but relevant users.
3. **Negative Personas:** Users who are intentionally excluded.
4. **Persona Spectrums:** Users with varying characteristics.
5. **Proto-Personas:** Based on assumptions rather than research.
6. **Role-Based, Goal-Oriented, Demographic, Behavioral, Novice vs. Expert Personas**

Common Pitfalls

- **No Leadership Buy-In:** Lack of support from decision-makers.
- **Siloed Creation:** Developed without cross-team collaboration.
- **Communication Failures:** Not shared effectively with stakeholders.
- **Underutilized Personas:** Created but not integrated into design processes.

Pros of Personas

- Build empathy for users
- Align stakeholders
- Guide decision-making
- Humanize UX research findings

Cons of Personas

- Time-consuming to create
- Require multiple resources
- Can be inaccurate if based on limited data

Best Practices

- Avoid stereotypes; focus on research-based archetypes.
- Ensure personas remain dynamic, updated, and validated.
- Integrate personas into every stage of the design process.

Week 5: ' Heuristic Evaluation '

- "A heuristic is a mental short-cut that allows us to make quick decisions when there is not a lot of time to do in-depth research. Heuristic evaluation involves examining a product from the perspective of common principles that have been demonstrated to be helpful from years of solid research. Often a heuristic evaluation is easy to do, fast and catches many of the most common errors in user-interface design."

1. What is Heuristic Evaluation?

- A **usability inspection method** where evaluators check a user interface against predefined usability principles (**heuristics**).
- Helps **identify design problems** early in development.
- Cost-effective, fast, and catches common UI errors.
- **Key researchers:** Jakob Nielsen & Rolf Molich (1990).

2. Why Use Heuristic Evaluation?

Early detection of usability issues

- Guidance for designers** to improve UI
- Cost-effective** compared to user testing
- Enhances user satisfaction**
- Supports iterative design**

3. Nielsen's 10 Usability Heuristics:

1. **Visibility of System Status** – Keep users informed with immediate feedback.
2. **Match Between System & Real World** – Use user-friendly, natural language.
3. **User Control & Freedom** – Provide "undo" & "exit" options to prevent mistakes.
4. **Consistency & Standards** – Follow platform conventions for consistency.
5. **Error Prevention** – Design UI to prevent errors before they occur.
6. **Recognition Rather than Recall** – Reduce memory load; make elements visible.
7. **Flexibility & Efficiency of Use** – Allow shortcuts for expert users.
8. **Aesthetic & Minimalist Design** – Avoid unnecessary information.
9. **Help Users Recognize, Diagnose, & Recover from Errors** – Use clear, constructive error messages.
10. **Help & Documentation** – Provide useful, easy-to-find documentation.

4. Steps in Conducting a Heuristic Evaluation

1. Prepare

- Select evaluators, train them, and define the scope.

- Decide how evaluations will be documented.

2. Evaluate Independently

- Review the system, identify usability issues.

3. Consolidate Issues

- Rate severity:
 - **0:** Not a usability issue
 - **1:** Cosmetic problem (low priority)
 - **2:** Minor issue (fix if time allows)
 - **3:** Major issue (fix needed)
 - **4:** Critical usability issue (must be fixed before release)

5. Alternative Usability Principles

- **Shneiderman's Eight Golden Rules**
- **Gerhardt-Powals' Cognitive Engineering Principles**
- **Norman's Design Principles**
- **Gestalt Principles**
- **Hick's Law & Miller's Law**

6. Pros & Cons of Heuristic Evaluation

Pros:

- ✓ Quick & cost-effective
- ✓ Expert-driven insights
- ✓ Unbiased evaluation
- ✓ Detects common usability problems

Cons:

- ✗ Subjective (depends on evaluator's expertise)
- ✗ Lacks real user input
- ✗ Not comprehensive (misses some usability issues)
- ✗ Difficult to prioritize issues

Cheat Sheet for UX Design Patterns & Principles (Weeks 2, 3, 4)

General UX Design Concepts

- **Design Principles:** Define the bounds for design choices (e.g., color schemes).
- **Design Patterns:** Proven solutions for recurring design problems (used in software engineering).
- **Anti-Patterns:** Poor design practices, often due to lack of experience (e.g., deeply nested if-else statements).
- **Dark Patterns:** Deliberately harmful design choices benefiting businesses (e.g., gambling site tricks).

Key Insight: Patterns and principles help evaluate and predict user experiences when user testing is not feasible.

Week 2: Fitts' Law

- **Problem:** How to assess a user's ability to move an item on a screen from one location to another.
- **Solution:**
 - **Formula:** $ID = \log_2(DW + 1)$
 - DDD = Distance, WWW = Width of the target
 - Larger targets make interactions easier.
- **Example:** Moving a beach ball is easier than moving a needle due to size differences.
- **Application:** Ensure touch targets on UIs are large enough for user-friendly interaction.

Week 3: Perception Bias in UX Research

Problem: How to avoid biases in research.

Common Perception Biases

1. **Confirmation Bias:**
 - Quick conclusions from data that match expectations.
 - **Solution:** Use proper hypothesis testing; double-check results.
2. **Framing Effects:**
 - Survey responses influenced by preceding positive/negative language.

- **Solution:** Keep pre-survey content neutral.

3. Anchoring:

- Preceding information (e.g., "Was this 5/5?") biases responses.
- **Solution:** Use straightforward, neutral language.

4. Yes (or No) Tendency:

- Respondents follow the same pattern without reading thoroughly.
- **Solution:** Include reverse-phrased questions.

Week 4: The IKEA Effect

Problem: How to encourage users to engage with a new product.

Solution:

- **The IKEA Effect:** People value products more when they contribute to their creation.
- **Example:** Assembling IKEA furniture increases perceived value.
- **Key Points:**
 - Only works if tasks are fully completed.
 - Perceived value correlates with effort.
 - Expertise doesn't significantly impact the effect.

Caution: This effect relates to the **sunk cost fallacy**—people irrationally justify continued investment due to past efforts.