Project on: easypaisa

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Headings

1. Problems from phase one(survey, interview, opposing HCI rules)
2. Logical Reasoning Behind the Redesigned Interface Using HCI Principles and Theories
3. How different user groups are catered
4. Evaluation of our modified user interface

Note: the screens picture before and after changes are in the ppt (given in the links)

https://docs.google.com/presentation/d/1aCplwIwTadWRpBTf4QM-r508VRJ__2Acn-DdX431ED0/edit#slide=id.p

1. Problems from phase one(survey, interview, HCI design flaws)

- Misaligned Affordances and Confusing Metaphors: Icons and interface elements were unclear.
- Lengthy Task Flows: Overly complex process for common tasks like sending money.
- Cluttered Home Page: Too many options and small icons, hard to navigate.
- Lack of Error Prevention and Unclear Messages: Errors were not prevented or explained well.
- Difficulty Clearing Input Fields: No easy way to clear entered values.
- Unclear Navigation Path: Users were unsure of their location in the app.
- No Shortcuts for Quick Navigation: Lack of shortcuts for frequent actions.
- Inaccessibility for Disabled Users: No voice support for visually impaired users.
- Missing Search in Key Areas: No search function in areas like "View All."
- Confusing "My Account" Layout: Disorganized and unclear sections.
- Aesthetic Imbalance: Poor visual design, hard to focus on important content.
- Inefficient Transaction History: Not enough details or useful information.
- Unclear Error Codes in Pop-Ups: Technical codes without clear explanations.
- Inaccessible Help Options: Help buried in settings, hard to find.
- Disorganized Mini-Apps: Cluttered with a horizontal scroller, hard to navigate.
- Inadequate Task History for Packages: No clear view of ongoing/completed tasks.

2. Logical Reasoning Behind the Redesigned Interface Using HCI Principles and Theories

Design Phase

How We Arrived at Our Novel Idea

The redesign of Easypaisa's interface was driven by the challenges and usability issues identified in the first phase of the project. Comprehensive user research, including surveys and usability testing, highlighted pain points faced by user groups such as senior citizens, disabled individuals, and illiterate users.Based on these findings, we employed a user-centered design approach guided by HCI principles, usability heuristics, and feedback from diverse user groups. The redesign aimed to improve accessibility, task efficiency, and overall usability, addressing the unique needs of each user group.

Many users were satisfied with the easypaisa's service but there were some issues that users mentioned and to keep all those issues under consideration we have done changes in easypaisa user interface which is one by one discussed below in detail.

Design Rationale

1. **Affordance and Metaphors**:
   ○ **Issues Identified**: Misaligned affordances and confusing metaphors hindered user understanding.
   ○ **HCI Principle**: Followed **match between system and real world** to ensure interface elements align with real-world concepts. Also adhered to **recognition rather than recall** for intuitive design.
   ○ **Solution**: Redesigned interface elements to reflect real-world metaphors. There were some icons not clearly mentioned to show clear metaphor so we changes them especially in the settings options

2. **Streamlined Send Money Task**:
   ○ **Issues Identified**: The process was overly lengthy.
   ○ **HCI Principle**: Addressed **task conformance**, ensuring the interface supports **task adequacy** by meeting user expectations for efficiency and reducing unnecessary steps.
   ○ **Solution**: Reduced unnecessary steps and implemented shortcuts for frequent recipients, significantly improving task efficiency.

3. **Pop-Ups and Error Prevention**:
   ○ **Issues Identified**: Lack of error prevention and unclear error messages.
   ○ **HCI Principle**: Integrated **error prevention**, **error recovery**, and **dialogue initiative** heuristics.
   ○ **Solution**: Introduced clear error messages with actionable hints. Validation prompts were added to tasks like sending money or easy load. **Dialogue initiative** was applied where the system proactively confirms critical actions, such as large transactions, through pop-ups before submission.

4. **Undo Option**:
   ○ **Issues Identified**: Difficulty clearing input fields.
   ○ **HCI Principle**: Followed the **user control and freedom** principle.
   ○ **Solution**: Added an undo button to clear entered amounts in one step, providing flexibility for error correction. And also if the user after going many steps wants to go directly to home page can have the home option which makes the user less frustrated

5. **Navigation Clarity**:
   ○ **Issues Identified**: Users were unsure of their current location or navigation path.
   ○ **HCI Principle**: Ensured **visibility of system status** and **consistency**.

- ○ **Solution**: Every screen now displays breadcrumbs and indicators showing the user's current position, previous screens, and next steps.

6. **Shortcuts and Task Simplification**:
   - ○ **Issues Identified**: Lack of shortcuts hindered quick navigation.
   - ○ **HCI Principle**: Leveraged the **flexibility and efficiency of use** principle.
   - ○ **Solution**: Added shortcuts for tasks like "Send Money," allowing users to quickly access desired screens.

7. **Voice Enabler for Disabled Users**:
   - ○ **HCI Principle**: Addressed **accessibility** to ensure inclusivity for disabled users.
   - ○ **Solution**: Implemented a voice-enabled option for visually impaired users to interact with the app seamlessly.

8. **Search Functionality**:
   - ○ **Issues Identified**: Missing search options in key areas like "View All."
   - ○ **HCI Principle**: Applied the **recognition rather than recall** heuristic.
   - ○ **Solution**: Added a search bar to "View All," enabling users to locate specific options quickly.

9. **My Account Redesign**:
   - ○ **Issues Identified**: Confusing layout and excessive options.
   - ○ In easy paisa two options of accounts and settings are defined and both have different options which can confuse the user which options are in which account setting so we made it standard and kept both the same and added the remaining option of setting in the others option and which user can explore further without getting confused .
   - ○ **HCI Principle**: Emphasized **consistency and standards**.
   - ○ **Solution**: Organized the "My Account" section into logical categories (e.g., General, Advanced) and grouped less frequently used options under "Others."
   - ○ **Enhancements**: Introduced a dedicated profile section to centralize user settings, following patterns from other popular applications.

10. **Golden Ratio Application**:
    - ○ **HCI Concept**: Ensured **aesthetic and minimalist design** by creating visually balanced screens where the body content is more prominent than headers and borders.

11. **Fitts' Law**:
    - ○ **HCI Concept**: Optimized touch targets on the home screen and other critical screens to make interactions more intuitive and efficient.

12. **Affordance:**
    - ○ The options in the home page are in 3d shape for applying affordance which makes it visible for users to understand that it is clickable.

13. **Home Page**: the issue was that it was cluttered and more changes of sips because the sizes of options were very small and we solved it by making sizes bigger and also

minimized the options. We added the options for customize to add the options in the screen which are important for user and also added the search option in the customize and view all to minimize the time taken by user to find their targeted options

14. We have also changed the **transaction history screen**. We added multiple things to make it more informative for users like users can download the statement of a particular time period, users can also see the difference in balance during each transaction, and also used metaphors to clearly mention the sent and received actions performed.

15. Users also mentioned that the **errors in easypaisa are not clea**r and code given on error pop up which confuses users and users have to search what that error means so we also modified the user to mention the error in wording for clarifying the error to users.

16. We have implemented different changes to show **users status** and what they can do in that particular screen by using different affordances like searching cursor, highlighting the option when clicked etc.

17. **Mini-Apps Categorization:** Mini-apps were grouped into categories like **food**, **games**, and **Entertainment**, replacing cluttered scrollers with a **grid view** for easier access. A **search bar** and **Favorites** section were added for quick navigation, aligning with **Recognition Over Recall** and **Minimalist Design** principles.

18. **Task Adequacy in Packages:** To address the issue of disappearing packages, the "Recent" section was replaced with a **History** tab, offering a comprehensive view of **recent**, **ongoing**, and **completed tasks**. Clear status labels, such as **"In Progress"** and **"Completed,"** were introduced to improve task tracking and ensure better usability, aligning with **Consistency** and **Visibility of System Status** principles.

19. **Help Option**:
    ○ **Issues Identified**: Lack of accessible help options.
    ○ One of our interviewer said that he faced issue when he first time used the app and needed guidance for learning the main features of app so we added the feature to sow the tutorial video when user gets login and then also have added the help option in the home page for user without going and struggling finding the help and support option in the settings. And also during transaction or any critical process we have added help icons on the side of header so that user can easily get help without leaving that page to go for help option.
    ○ **HCI Principle**: Addressed **help and documentation** heuristic.
    ○ **Solution**: Added a help button on important screens to assist users in real time.

3. Accessibility for Disabled and Illiterate Users

The redesign of the Easypaisa interface takes into account the specific needs of disabled and illiterate users, ensuring a more inclusive and user-friendly experience for everyone.

For Disabled Users:

1. Color Blindness:
   - Challenge: Users with color blindness often face difficulties distinguishing between certain colors or identifying relevant elements in the interface.
   - Solution:
     - Theme Customization: To address this, we introduced customizable themes, allowing users to adjust the app's color scheme according to their preferences. Users can choose from a set of high-contrast color themes or customize individual elements like backgrounds, text, and button colors to make the app more accessible.
     - Font Size Adjustment: We also included an option to adjust the font size, making it easier for users with visual impairments to read text without straining their eyes.
2. Voice Option:
   - Challenge: Visually impaired users often struggle to navigate interfaces that require visual inputs.
   - Solution:
     - Voice Assistance: We implemented a voice-enabled feature that allows visually impaired users to interact with the app using voice commands. This feature reads out interface elements, text, and instructions, helping users navigate the app hands-free. Additionally, the system responds to voice commands, such as "send money" or "check balance," making the app more intuitive for users with visual disabilities.

For Illiterate Users:

1. Clearer Metaphors and Icons:
   - Challenge: Illiterate users may find it difficult to understand text-heavy interfaces or navigate apps with complex labels.
   - Solution:
     - Intuitive Icons: We replaced many text-based labels with clear, universally recognized icons that better communicate the function of each element. For instance, a dollar sign icon represents money transactions, a phone icon represents mobile top-up, and a home icon indicates the home screen.

This ensures that illiterate users can easily understand what each function does without reading.

- ■ Enhanced Metaphors: We applied real-world metaphors to the design to help users associate the app's functions with familiar objects or actions. For example, the "Send Money" button now features an image of a wallet, which makes it clear to the user that they can send money from there.

2. Voice Assistance:
   - ○ Challenge: Illiterate users may have difficulty navigating the app and understanding instructions.
   - ○ Solution:
     - ■ Voice Guidance: We integrated a voice assistance system that reads aloud the names of buttons, options, and transaction steps. This feature helps illiterate users navigate the app more easily by providing auditory guidance at every step.
     - ■ Audio Cues: To assist users during transactions, we implemented audio cues that confirm actions, such as "transaction successful" or "balance updated." These cues provide feedback without requiring users to read or understand written content.

3. Language Changing Option:
   - ○ Challenge: Many users may speak languages other than the default language (e.g., Urdu, Punjabi, etc.) or may be more comfortable using the app in a language they understand.
   - ○ Solution:
     - ■ Multi-Language Support: To further enhance accessibility, we added an option to change the language of the app. Users can switch to their preferred language (such as Urdu, Punjabi, or Pashto) from the settings. This ensures that even users with limited literacy skills can understand the app's content in a language they are familiar with.
     - ■ Language Customization: This language option is not limited to text alone; it also applies to the voice-assisted features. For instance, if a user chooses Urdu as their language, the voice assistant will provide instructions and read out options in Urdu, making it easier for non-literate users to interact with the app.

4. Evaluation Phase

Evaluation

To ensure that our Easypaisa prototype provides an optimal user experience, we evaluated it using various evaluation techniques. These evaluations helped us identify the strengths and weaknesses of our design and led to potential improvements. The key evaluation techniques used were:

1. **Heuristic Evaluation**
2. **Cognitive Walkthrough**

Heuristic Evaluation Using Nielsen's Principles

1. Visibility of System Status

- Navigation Clarity: Added breadcrumbs and indicators showing the user's current position, previous screens, and next steps.
- Pop-Ups and Error Prevention: Introduced confirmation prompts for critical actions like large transactions.
- Transaction History Redesign: Added clear visual indicators for sent and received transactions, along with balance changes.
- Help Option: Included help icons on critical screens to provide real-time guidance.

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2. Match Between System and the Real World

- Affordance and Metaphors: Redesigned interface elements and icons to reflect real-world concepts, ensuring intuitive usage.
- Transaction History Metaphors: Used clear and universally understood symbols to differentiate sent and received transactions.

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3. User Control and Freedom

- Undo Option: Added undo functionality to clear entered amounts and navigate directly to the home page.
- Task Simplification: Allowed users to customize the home screen with frequently used features.

4. Consistency and Standards

- My Account Redesign: Standardized account settings and categorized them logically to reduce user confusion.
- Error Messages: Ensured consistent error descriptions instead of codes, providing clear instructions for resolution.
- Navigation Consistency: Maintained a uniform layout and style for all pages to create a seamless experience.

5. Error Prevention and Recovery

- Pop-Ups for Error Prevention: Added validation prompts before critical tasks like sending money or recharging.
- Clear Error Messages: Replaced error codes with user-friendly descriptions, ensuring clarity in problem resolution.

6. Recognition Rather Than Recall

- Search Functionality: Added search bars in "View All" and customization sections for faster navigation.
- Streamlined Send Money Task: Simplified the process by introducing shortcuts and frequently used recipient lists.
- Affordance Cues: Highlighted clickable elements (e.g., using 3D shapes and hover effects) to minimize guesswork.

7. Flexibility and Efficiency of Use

- Shortcuts: Added quick access options like "Send Money" and customizable home screens for frequent tasks.
- Task Simplification: Minimized the number of steps for complex actions like money transfers.

8. Aesthetic and Minimalist Design

- Golden Ratio Application: Ensured visual balance by reducing clutter and emphasizing key content areas.
- Home Page Redesign: Decluttered the interface, resized elements, and added customization for a personalized look.

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9. Accessibility

- Voice Enabler for Disabled Users: Added voice-enabled interaction to support visually impaired users.
- Help Option: Included tutorial videos for first-time users and help buttons on critical screens for real-time assistance.

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10. Help and Documentation

- Help Option: Centralized help features on the home page and added context-specific help icons on critical tasks.
- Tutorials for New Users: Provided onboarding videos to familiarize first-time users with the app's functionality.

Cognitive Walkthrough of Easypaisa App Redesign

1. Login Screen and Home Page Navigation

Scenario: A new user logs into the app for the first time.

- **Step 1**: The user is greeted with a clean, uncluttered login screen. The option to use biometric authentication (face or fingerprint) is clearly visible, ensuring easy access for frequent users.
- **Outcome**: This aligns with the **HCI principle** of "visibility of system status," as the user instantly knows how to log in. The biometric authentication streamlines the login process, enhancing convenience and reducing friction.
- **Step 2**: After successful login, the home page loads. The interface is no longer cluttered with numerous small icons. The items on the screen are now larger, and unnecessary options have been minimized.
- **Outcome**: Users can immediately focus on essential tasks without feeling overwhelmed. The **Golden Ratio** is applied to maintain a balanced, minimalist design where the content is more prominent than the headers and borders.

- **Step 3**: A "Customize" option is available for the user to tailor their homepage. Users can add frequently accessed options, enhancing task efficiency and personalization.
- **Outcome**: The **flexibility and efficiency of use principle** is applied here, allowing users to create a custom interface that aligns with their preferences.

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2. Send Money Task

Scenario: A user wants to send money to a recipient.

- **Step 1**: The user taps the "Send Money" button, which now appears as a larger, more prominent option on the home page (thanks to the redesigned interface).
- **Outcome**: The **Fitts' Law** principle ensures that the button is easy to tap, with a larger touch target increasing efficiency.
- **Step 2**: The user is presented with a streamlined interface for entering recipient details and amounts. The number of steps has been reduced significantly, and frequently used contacts are accessible via a shortcut.
- **Outcome**: **Task conformance** is achieved as the user is no longer required to navigate through a long, complex flow. The simplified process aligns with user expectations for task adequacy, improving efficiency.
- **Step 3**: Validation prompts and pop-ups appear to confirm large transactions before submission, helping users avoid errors.
- **Outcome**: **Error prevention** principles are implemented, offering real-time validation and ensuring that users can take corrective action before mistakes are finalized.
- **Step 4**: If the user makes an error while entering details, a clear error message with actionable hints is displayed.
- **Outcome**: The **error recovery** and **dialogue initiative heuristics** ensure users are guided toward correcting the mistake, increasing trust and usability.

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3. Error Prevention and Undo Functionality

Scenario: A user accidentally enters the wrong amount while sending money.

- **Step 1**: The user notices an incorrect amount displayed in the input field.
- **Step 2**: The user taps the newly added "Undo" button, which clears the entered amount in one step.
- **Outcome**: The **user control and freedom** principle is supported, as users are given the ability to quickly and easily correct their actions without frustration.

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4. Transaction History

Scenario: A user wants to review their transaction history.

- **Step 1**: The user taps on the "Transaction History" section, where they are now presented with a clear, organized list of their recent transactions.
- **Outcome**: The information is structured so that each transaction clearly shows the balance difference and the type of transaction (sent or received). The use of metaphors for "sent" and "received" actions enhances the user's ability to quickly understand the information.
- **Step 2**: The user notices the ability to download transaction statements for specific time periods.
- **Outcome**: The **recognition rather than recall** heuristic is used here, allowing users to quickly recognize options without having to remember specific details or dates.

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5. Help and Support

Scenario: A user needs assistance while using the app for the first time.

- **Step 1**: Upon logging in, the user is presented with a tutorial video explaining the app's main features.
- **Outcome**: This aligns with the **help and documentation** heuristic, ensuring that new users can easily understand the app's functionality without frustration.
- **Step 2**: While using the app, the user encounters a complex task and notices a "Help" icon in the corner of the screen.
- **Outcome**: The **real-time help** feature allows users to access assistance without leaving the page they are on, improving usability and ensuring that users do not feel lost during critical tasks.

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6. Voice Enabler for Disabled Users

Scenario: A visually impaired user wants to perform a transaction.

- **Step 1**: The user activates the voice-enabler option, which reads out the options and instructions on the screen.
- **Outcome**: The **accessibility** principle is addressed, making the app more inclusive and ensuring that users with disabilities can perform tasks independently.

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7. Mini-Apps Categorization

Scenario: A user wants to access the "Mini-Apps" section.

- **Step 1**: The user taps on the "Mini-Apps" category, which is now neatly grouped into sections like "Food," "Games," and "Entertainment."
- **Outcome**: The **Recognition Over Recall** principle is applied by grouping apps into logical categories, reducing cognitive load and helping users find what they need more quickly. The search bar and Favorites section further enhance navigation efficiency.

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8. Packages and History Tab

Scenario: A user wants to track their ongoing packages.

- **Step 1**: The user accesses the "History" tab to view their recent and completed packages.
- **Outcome**: The **Consistency** and **Visibility of System Status** principles are reflected in the clear status labels (e.g., "In Progress" and "Completed") that provide users with real-time feedback about their tasks.

Positive Outcomes

1. **Improved Usability**: The overall app experience has become more intuitive, with streamlined tasks, accessible navigation, and personalized options.
2. **Increased Efficiency**: Task flows are shorter, and essential features are now easily accessible, leading to faster transactions.
3. **Error Reduction**: Clear error messages and proactive validation ensure users avoid mistakes and correct them if they occur.
4. **Enhanced Accessibility**: The voice-enabler and help features provide users with disabilities a seamless experience.
5. **Increased User Satisfaction**: Feedback from users suggests that the redesigned interface is easier to navigate, more efficient, and tailored to their needs, particularly for diverse groups such as senior citizens and illiterate users.