

# CS6750 Team Project

Team: Big 4

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## INTRODUCTION

Managing personal finances has become an essential task users do in today's world. These users are overwhelmed with the amount of bills and subscriptions they have which often leads to overspending or unpaid bills. In this project, our team is going to design an expense tracking app that both logs their current expenses and also categorizes them automatically, making it easier for users to keep track of all their expenses. This app will also allow users to track their current spending and compare it to their current spending goals.

The goal of our project is to create an easy and seamless design where users can monitor their spending habits and also automatically track and categorize their expenses. This will allow users to avoid the tedious task of inputting their spending manually. This app allows users to gain better insight on their spending habits which can lead to less overspending.

## NEEDFINDING PLAN

### 1. Heuristic Evaluation of Existing Apps (passive)

We plan to conduct a heuristic evaluation of popular expense tracking apps currently available. We selected three of the most downloaded expense tracking applications from the Apple Store: *Budget*, *iCost*, and *Money Mgr*. We will examine key features including ease of navigation, the process of making a transaction record, clarity of data presentation, customization options, and additional functionalities such as integration with bank accounts, visual feedback, and budgeting tools. Each app will be reviewed by different team members to ensure a detailed and diverse assessment, and results will be compared to identify common strengths and weaknesses.

**Evaluation Framework:** Our heuristics will include aspects like discoverability, simplicity, consistency and flexibility. We will use a consistent set of evaluation principles, scoring each heuristic on a scale from 1-5, to compare usability across

each product. Team members will also document qualitative observations to supplement the scoring, providing more nuanced insights into the user experience.

## **2.Naturalistic observation (passive)**

In this activity, we aim to observe users interacting with their expense tracking systems in a natural setting to gain unbiased insights into their habits, frustrations, and interactions. By observing how users interact with their current expense management methods—whether through apps, manual tracking, or other means—we hope to identify unspoken challenges and opportunities for improvement that may not emerge through direct questioning.

Objectives: 1) To understand the natural behavior of users as they log, categorize, and review expenses. 2) To identify pain points in real-time, such as ease of access, speed, accuracy, and user satisfaction when recording and reviewing transactions. 3) To observe the environment or context in which users interact with their tracking methods, such as on-the-go scenarios, at home, or during work hours.

Methodology: 1) Participant Recruitment: We will recruit 3-5 individuals who use various methods for expense tracking, including mobile apps, manual methods, and others, ensuring diversity in spending habits and tracking preferences. Participants will be asked to allow observation during one of their typical expense tracking sessions. 2) Observation Process: Each session will last approximately 20-30 minutes. Observers will take notes on the user's flow of actions, any visible hesitations or frustrations, and any notable interaction patterns. For instance, observations will focus on the time taken to log a transaction, ease of categorizing expenses, and how users interact with notifications or budgeting features. 3) Environment and Contextual Cues: Observers will also document the setting in which participants engage with their expense tracking, including any environmental factors that may influence their interaction (e.g., multitasking, distractions, or constraints like device limitations).

Evaluation Framework: The observation will focus on a few key themes. 1) Ease of Use: Is the user able to perform actions without delays or excessive steps? 2) Accuracy of Entries: Are users consistent with categorization? Do they encounter errors or need to make frequent corrections? 3) Interaction Patterns: Do users

consult the app or log entries immediately after a transaction, or do they batch their entries? Do they use features like notifications, goal-tracking, or visual summaries? 4) User Satisfaction: While harder to observe directly, non-verbal cues (such as hesitation, expressions of frustration) will be noted as indicators of satisfaction or frustration.

Potential Biases:

- 1) Observer Bias: Observers may unconsciously interpret users' actions based on their own assumptions or biases. To counter this, observers will stick to objective, descriptive notes rather than subjective interpretations.
- 2) Hawthorne Effect: Participants may alter their usual behavior simply because they are being observed. We will attempt to minimize this by briefing participants beforehand and emphasizing that they should act naturally.
- 3) Environmental Bias: Observing users in specific settings may not fully represent their typical use environment, potentially skewing findings. To counter this, we'll aim for varied observation settings across participants to capture a broader range of interactions.

Expected Outcomes: We anticipate that naturalistic observations will reveal subtle but valuable insights, such as the ease or frustration of common tasks, the ways users actually interact with features, and contextual needs that may not be readily shared in interviews or surveys. These observations will be instrumental in identifying real-world challenges users face and in developing solutions that better fit their everyday contexts.

### **3. User Interviews and surveys (active)**

The objective is to Gain in-depth insights into users' financial habits, challenges with expense tracking, and preferences for automated categorization and goal-tracking.

For interviews, targeting ~5 participants, each interviewed individually for about 20 minutes. Participants will include individuals who use or have experience with existing expense tracking apps and those with varying spending habits. Use personal networks, social media, or platform-based groups like Reddit or Facebook dedicated to personal finance, budgeting, or app testing to recruit

participants. Develop a structured set of questions to explore users' existing methods of tracking expenses, pain points with current apps, and preferred features in an automated tracking system. Questions will include inquiries about how they categorize expenses, their spending goals, and how they use credit limits.

Potential biases for interviews are 1) Sampling Bias: Since participants are likely recruited through personal networks or specific finance-related groups, they may already have an interest in or preference for financial management apps. This could limit the diversity of responses and may over-represent tech-savvy users. 2) Response Bias: Participants might give answers they believe are expected or that paint their financial habits more positively, especially in an interview setting where social desirability bias is common. 3) Recall Bias: Participants may struggle to accurately recall or generalize their spending and tracking behaviors, especially if they only occasionally use tracking apps.

For surveys, we aim for ~20 participants, each spending around 10 minutes completing the survey. Recruit from a broader demographic to include diverse spending profiles. This can be achieved through social media ads, university networks, or online survey platforms (e.g., MTurk or Prolific). The survey will focus on user needs for categorizing and setting spending goals, the frequency of credit card use, and key frustrations with current expense tracking solutions. Questions will use multiple-choice, Likert scales, and short answer formats for clarity and ease of analysis. There is a risk of sampling bias if only tech-savvy individuals respond. Broad distribution across multiple channels should help diversify the sample.

Potential biases for surveys are 1) Sampling Bias: Using platforms like MTurk or Prolific may introduce sampling bias, as the participants on these platforms often represent specific demographics (e.g., frequent internet users, younger age groups). 2) Self-Selection Bias: The survey may attract people who are more financially conscientious, potentially skewing the data to favor those who actively track expenses or budget carefully. 3) Question Interpretation Bias: Variations in how respondents interpret survey questions, especially in a self-guided format, may lead to inconsistent responses. This is especially true for questions requiring subjective input (e.g., rating frustration levels).

To mitigate these biases, the plan incorporates diverse methods and recruitment channels:

- 1) **Balancing Sampling Bias:** By using both personal networks and online platforms, the study aims to reach individuals from varied backgrounds and spending habits, helping to balance potential sampling biases.
- 2) **Cross-verification of Data:** Conducting both interviews and surveys allows for triangulation, where data from the in-depth interviews can be compared with broader survey results to identify consistent patterns or outliers.
- 3) **Question Design and Format:** The structured interview and survey questions are designed to minimize leading questions and limit response bias. In surveys, using Likert scales and multiple-choice questions encourages clearer answers and easier analysis.

## **NEED FINDING RESULTS**

### **Summary of the results - User Interviews**

We successfully recruited 5 participants through personal networks and online communities dedicated to personal finance and budgeting. Each interview was conducted individually and lasted approximately 20 minutes, as planned. Although recruiting participants with a range of spending habits was initially challenging, using social media platforms like Reddit and Facebook proved effective in reaching a more diverse group.

Results: 1) **High-Level Insights:** Participants expressed common frustrations with the lack of customizable features in existing expense-tracking apps, especially around automated categorization. Many voiced the need for more intuitive interfaces that better support specific spending categories (e.g., household, travel) and customizable alerts for reaching credit limits or spending goals. 2) **Behavioral Insights:** Interviewees highlighted various methods for tracking expenses—some used dedicated apps, while others relied on manual tracking through spreadsheets. Those who used existing apps often felt limited by the lack of control over categorization and the lack of integration with credit limits.

## **Summary of the results -User Surveys**

Execution: The survey was distributed across multiple channels, including university networks, social media ads, and MTurk, and reached a broader demographic. We received 23 completed responses, slightly exceeding the target of 20 participants. The survey took respondents an average of 9 minutes to complete, which aligned well with our goal of a 10-minute survey.

Results: 1) High-Level Insights: Respondents expressed a strong need for more sophisticated categorization features and goal-setting tools in expense-tracking apps. The majority indicated they primarily use credit cards for day-to-day expenses, increasing the importance of tracking spending against credit limits. 2) Quantitative Data: On a Likert scale, 78% of respondents reported moderate to high frustration with the limitations of current expense-tracking apps, specifically with inflexible categorization and lack of customization for personal spending goals.

## **Evaluation of existing interfaces**

The 3 applications all offer categorization of the spending and tracking expenses by account, e.g. per credit card. We mainly focused on comparing the expense logging interface of the 3 apps.

### **Discoverability**

Since logging expenses is the core and most frequently used function of these apps, all three ensure that users can easily access this feature on the main interface. Each app prominently displays the logging function through clear visual indicators such as buttons or shortcuts on the home screen, ensuring that users do not need to navigate through multiple menus. This emphasis on quick accessibility helps users form a habit of consistent tracking, ultimately supporting better financial management.

### **Simplicity**

The interfaces of the three apps vary significantly in terms of simplicity. As seen in the screenshot in appendix, *Budget* offers a clean and minimal interface, with a straightforward expense input field and minimal clutter. This design choice helps reduce the cognitive load on the user, making the process of logging expenses less overwhelming and more efficient. The simplicity of this interface contrasts

with the more detailed options in the other two apps, which include multiple categories and icons, potentially making them more intimidating for new users.

### **Flexibility**

For beginner users, the apps offer the flexibility to record expenses without requiring an understanding of categorization or account management. Users can simply enter an expense amount without needing to specify detailed information, allowing them to focus on capturing spending quickly. Additionally, advanced features like setting expense limits, associating expenses with specific accounts, or customizing categories can be skipped initially, making the process approachable for users with varying levels of familiarity with financial management.

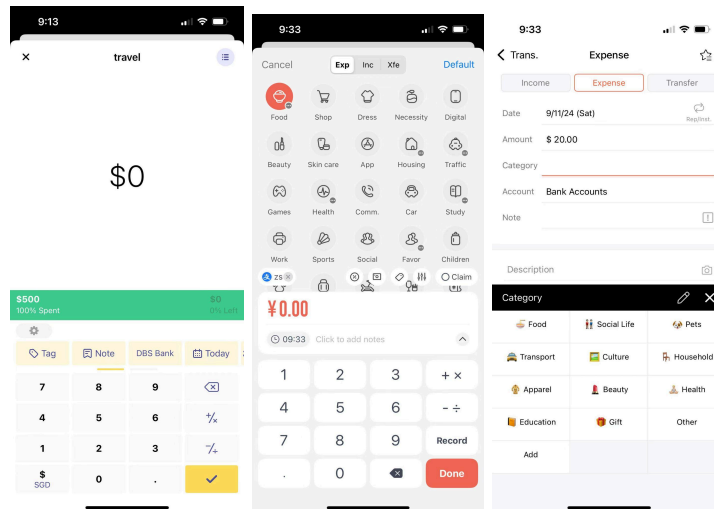
### **Insights from Needfinding Exercise**

1. **Importance of Minimalism:** A clean interface, such as the one in *Budget*, significantly reduces cognitive load, making it easier and faster for users to record their spending. This minimalist approach is likely to improve user engagement over time.
2. **Desirability of Automatic Logging:** Users value convenience and prefer not to log every transaction manually. An ideal solution would include support for automatic logging with an end-of-day review feature, allowing users to verify and adjust any auto-logged entries.

## **APPENDICES**

### **Existing Sample**

Screenshot from the existing expense tracking applications. From left to right are interface of *Budget*, *iCost* and *Money Mgr*



## Survey Questions

### 1. Demographic Information

- Age:
- Occupation:
- Income range (optional):

### 2. Financial Habits

- How do you currently track your expenses?
  - Manually (notebook, spreadsheets)
  - Expense tracking app
  - Bank statements only
  - Do not track
- How often do you review your expenses?
  - Daily
  - Weekly
  - Monthly
  - Rarely/Never

### 3. App Usage and Preferences

- Which features are most important to you in an expense tracking app?  
(Select all that apply)
  - Automated expense logging



- Categorization of expenses
  - Setting spending goals
  - Alerts when nearing spending limits
  - Budgeting insights
- How likely are you to use an app that automatically categorizes your expenses?
  - Very likely
  - Somewhat likely
  - Neutral
  - Somewhat unlikely
  - Very unlikely
- How often do you reach your monthly spending limits (either personal or credit card)?
  - Frequently
  - Sometimes
  - Rarely
  - Never
- Would you prefer to be notified when you approach your spending limit?
  - Yes, please notify me early
  - Yes, but only when I reach the limit
  - No, I don't need notifications
- What frustrates you most about your current method of expense tracking (if any)?

#### **4. Additional Feedback**

- Are there any other features you would like to see in an expense tracking app?

#### **Interview Questions**

##### **Introduction:**

"Thank you for taking the time to talk with us today! We're working on developing an expense tracking app that auto-logs expenses, categorizes them, and helps users track spending against their credit card and personal spending limits. We'd love to hear about your experiences with expense tracking, what you like, and what you find challenging."

## **1. General Financial Tracking Habits**

- Can you walk me through how you currently manage or track your expenses?
- What are some things you like or dislike about your current method?

## **2. Pain Points with Existing Solutions**

- If you use an expense tracking app, which one(s) have you tried, and what do you like/dislike about them?
- What do you find most frustrating about tracking your expenses, if anything?

## **3. Feature-Specific Questions**

- How useful would it be for you to have expenses automatically logged and categorized?
- What's your opinion on having spending notifications or alerts? Would you find them helpful or intrusive?
- Do you often find yourself nearing or exceeding your spending limits? How do you keep track of this currently?

## **4. Ideal App Functionality**

- In your ideal app, how would expense categorization work? Do you prefer to have full control, or would you trust an automated system?
- How important is it for you to set and track personal spending goals? What kind of visualizations or data would help you with this?
- Are there any features you feel are missing from current expense tracking apps?

## **5. Closing**

- If you had the chance to design an expense tracking app from scratch, what would be its top three features?
- Is there anything else you'd like to share about your expense tracking needs?

## Survey Results

Survey Questions	Survey Responses
Age Range	Mostly 25-40 years
Occupation	Students, working professionals, freelancers
Income Range (optional)	Mostly mid to high income (optional disclosure)
Expense Tracking Methods	52% app, 24% manual, 16% bank statements, 8% no tracking
Frequency of Reviewing Expenses	28% daily, 40% weekly, 20% monthly, 12% rarely/never
Important Features in Expense Tracking App	78% categorization, 65% automated logging, 60% alerts, 55% goal-setting, 45% budgeting insights
Likelihood of Using Automated Categorization	48% very likely, 25% somewhat likely, 15% neutral, 8% somewhat unlikely, 4% very unlikely
Frequency of Reaching Spending Limits	22% frequently, 42% sometimes, 25% rarely, 11% never
Notification Preferences	60% early notifications, 25% only at limit, 15% no notifications
Top Frustrations	Limited categorization options, lack of customizable goal-setting, tracking expenses across accounts
Additional Feedback	Suggested features: bank integrations, spending visualizations, customizable categorization

## Interview Results

Interview Questions	Interview Responses
General Financial Tracking Habits	Mix of manual tracking and apps, finds manual tedious
Pain Points with Existing Solutions	Frustrations with categorization and lack of personalized alerts
Automated Categorization Value	Valued if editable categories are available
Spending Notifications Preferences	Minimal intrusiveness preferred, such as summaries or threshold alerts
Tracking Spending Limits	Interest in integrated solutions with credit/bank
Ideal App Customization and Features	Customization in categorization and goal tracking; visualizations requested
Top Three Desired Features	Custom categorization, goal-setting with feedback, spending limit alerts
Additional Comments	Requests for goal-setting guidance and adaptive features