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COLLEGE OF ENGINEERING AND INFORMATION TECHNOLOGY

DEPARTMENT OF INFORMATION TECHNOLOGY

In Partial Fulfillment of
COSC 75A: Software Engineering II

A Proposal of

*BudgetHive: Empowering Student Financial Management with an
Expense and Income Tracker Mobile Application*

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Table of Contents

	Page
INTRODUCTION	4
1.1 Background	5
1.2 Statement of the Problem	6
1.2.1 Main Problem	6
1.2.2 Specific Problem	7
1.3 Objectives	10
1.3.1 General Objectives	10
1.3.2 Specific Objectives	11
1.4 Discussion of Existing and Proposed System	13
1.4.1 Existing System	13
1.4.2 Proposed System	15
1.5 Scope and Limitation	16
 SYSTEM REQUIREMENTS SPECIFICATIONS	 18
2.1 Introduction	19
2.1.1 Purpose	19
2.1.2 Scope	19
2.1.3 Overview	20
2.2 Overall Description	21
2.2.1 Product Perspective	21
2.2.2 Product Features/Functions	21
2.2.3 User Classes and Characteristics	22
2.2.4 Assumption and Dependencies	24
2.3 Specific Requirements	25
2.4 External Interface Requirements	27
2.5 Other Non-Functional Requirements	29

METHODOLOGY	31
3.1 Overview	32
3.2 Project Organization	33
3.3 Work Plan	35
3.3.1 Schedule Allocation	35
3.4 Project Deliverables	35
3.4.1 Prototype Flow	37
3.5 Quality Control	38
3.5.1 Unit Testing	38
3.5.2 System Testing	45
3.5.3 Acceptance Testing	45
3.6 Lesson Learned	45
CONCLUSION	47
REFERENCES	49
APPENDICES	52

INTRODUCTION

1.1 Background

Long ago, when people wanted to discern the shape of things to come, they looked to the stars: today they look at the budget and they are right, because budgets represent choices made in the present that will determine and influence decisions of the future. Future historians will find budgets and budget processes rich sources for discovery of fateful turning points, accumulating changes, the emergence of the new, and the waning of the old (Caiden, 1988, p.43). Managing one's income and expenses over a predetermined period is known as budgeting. Maintaining good financial habits depends on how one organizes their daily transactions and expenses. Young people are beginning to turn into responsible adults, particularly Gen Z. Sadly, most colleges and universities do not offer a course on personal finance to teach students the value of creating daily budgets, making them ignorant of how to manage their finances, including how to deal with debt.

In today's fast-paced world, individuals often struggle with time constraints, and writing down detailed records of all income and expenditures can become tedious. Owing to the volume of homework and personal responsibilities students have during the day, it can be challenging for them to remember the precise cost of each purchase they make if they don't record it right away. As a result, there has been a decrease in keeping track of finances, which makes tracking expenses more complex in the future.

An intuitive mobile application designed for tracking income and expenses has been developed to encourage the habit of recording daily transactions among young adults and offer the approach of keeping track of income and expenditures enjoyable and easy to use. With the assistance of the proposed mobile application, users can track and update the sources of their income and view their financial statements over a specified period through an intuitive expense-tracking user interface that may take the initiative to embark on their income and expense tracking journey.

1.2 Statement of the Problem

1.2.1 Main Problem

A person's financial well-being is greatly influenced by how well they can handle and track their income and expenses. While navigating the complexities of academic life, managing finances can be particularly challenging for students. A common challenge in student finances is the absence of sufficient tracking of income and expenses. Without a detailed tracking system in place, students may encounter difficulties in prioritizing their expenditures, ultimately resulting in financial instability. In today's rapidly evolving financial environment, the traditional method of tracking income and expenses using pen and paper is being recognized as insufficient. While once considered a reliable standard, this approach fails to meet the demands of modern financial tracking, highlighting the

need for more comprehensive methods to manage personal finances.

The drawbacks of the pen-and-paper approach become more evident as people adopt digital solutions at a growing rate and technology has been integrated more into daily life. Modern substitutes offer a more effective, accessible, and flexible way to manage personal finances, such as online tools and mobile budgeting apps.

1.2.2 Specific Problem

By conducting a survey and looking at a broader context, having 50 CvSU Students of the Don Severino de las Alas Campus as the respondents, the team has observed significant issues with today's existing budgeting mobile application. Several issues include the following:

Expense Familiarity among Students

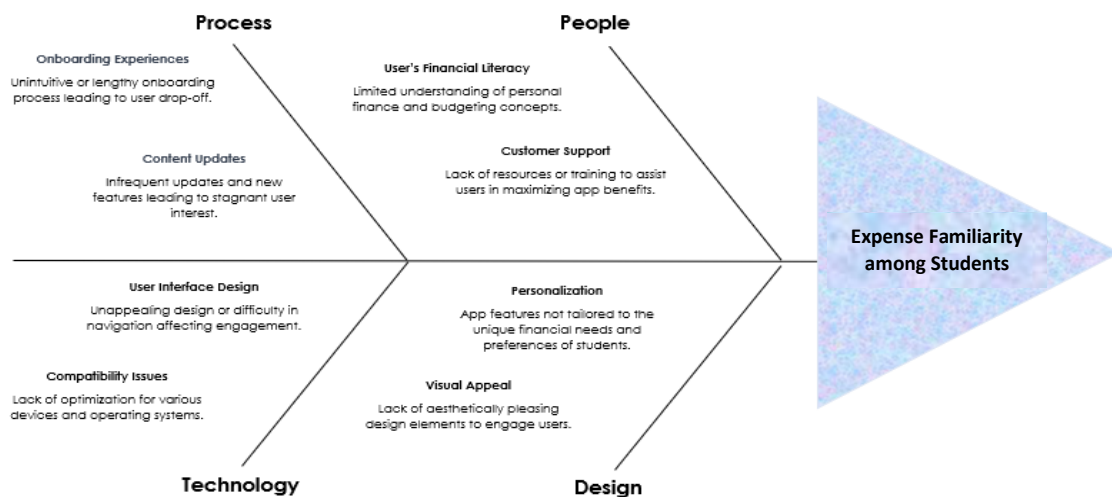


Figure 1. Expense Familiarity among Students

Based on the conducted survey among the students of Cavite State University Delas Alas Campus, it was observed a consistent pattern focused on essential aspects of student life. Predominantly, the survey highlights that a significant portion of students' expenditures is allocated to fundamental necessities such as food, transportation, rent, and textbooks. These expenses, identified as key pillars in the financial landscape of student living, collectively represent a substantial portion of their budgetary allocations. Food expenses encompass not only grocery purchases but also dining out or ordering in, reflecting the varied dietary needs and preferences of students. Transportation costs encompass commuting expenses, including public transportation fares, fuel costs for those with personal vehicles, or ride-sharing services. Rent constitutes a substantial portion of student expenses, covering accommodation fees for both on-campus dormitories and off-campus housing arrangements. Additionally, textbooks represent a crucial academic expenditure, encompassing the costs of required course materials and academic resources essential for student learning and success. Overall, the survey underscores the significance of these common expenses in shaping the financial landscape of students' lives, providing valuable insights into their spending patterns and budgetary priorities.

Difficulty in Tracking Expenses

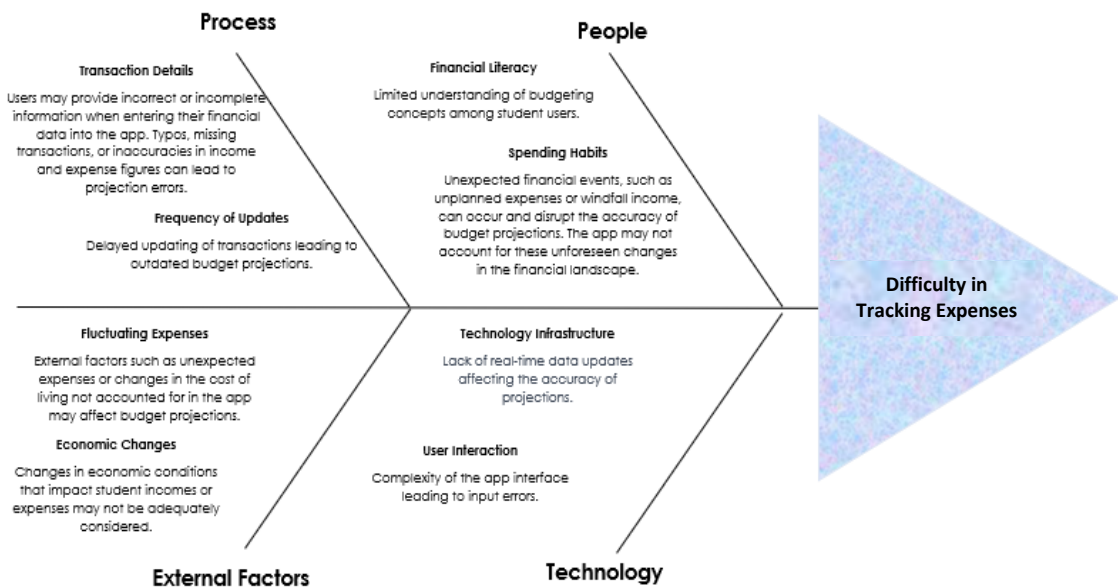


Figure 2. Difficulty in Tracking Expenses

In accordance with the conducted survey, the majority of the students stated that most of the challenges they face when it comes to budgeting and managing their money is “Unpredictable Expenses” which can significantly affect the difficulty of tracking expenses.

Paper-based Financial Tracking

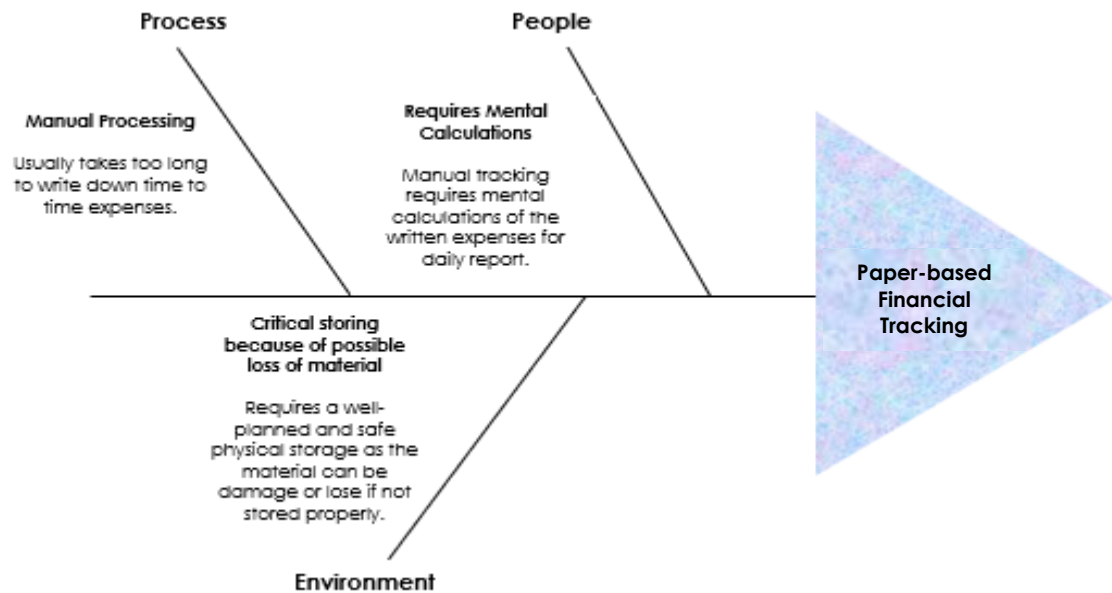


Figure 3. Paper-based Financial Tracking

Additionally based on the conducted survey most of the students used pen and paper to track their expenses. They use manual financial tracking which seems to be inefficient and can cause complications into different circumstances.

1.3 Objectives

1.3.1 General Objectives

The main goals of the study were to create a mobile app customized for students, focusing on detailed tracking of income and expenses. This app is all about giving students handy tools for managing money, helping them make smart choices and develop good spending habits. It's designed to be user-friendly and cover all

the bases, perfectly suited to students' needs when it comes to keeping an eye on their finances. The main idea is to make it easy for individuals to stay on top of their money while they're studying, making sure they not only do well academically but also learn important financial skills with a little help from the app.

1.3.2 Specific Objectives

Specifically, BudgetHive caters to the unique financial needs of students at Cavite State University – Don Severino delas Alas Campus, aiming to:

1. To develop a user-friendly interface for easy and efficient recording
2. Prioritize the categorization of student daily expenses.
3. To provide a mobile application to address paper-based financial tracking.
4. To create a tool for users to input and manage various sources of income including part-time jobs and allowances.
5. Prioritize user privacy and instill confidence in the security of sensitive financial information.
6. Implement balance alerts to notify users when their spending approaches predefined limits, encouraging them to maintain responsible financial habits.

7. Adhere to strict data protection standards to guarantee the confidentiality and privacy of user financial information.
8. The application ensures transparency in financial transactions, empowering users to make informed decisions based on a trustworthy representation of their expenditures and income.

The proposed system consists of multiple modules, each tailored to fulfill specific functions aimed at assisting students in effectively tracking their income and expenses.

Expense Management Module. This module enables users to input and categorize their daily expenses, providing a thorough analysis of the allocation and utilization of their financial resources.

Income Management Module. This module enables users to record diverse sources of income, including allowances, part-time employment, or scholarships, affording them a comprehensive overview of their financial resources.

Alert and Notifications Module. In this module it issues reminders and notifications to users when they surpass predetermined spending

limits. This functionality aids users in maintaining awareness and control over their financial commitments.

Budget Analysis and Reporting Module. This module produces detailed reports and analytics that provide valuable perspectives on expenditure trends. This feature supports users in making smart financial decisions.

1.4 Discussion of Existing and Proposed System

1.4.1 Existing System

Deciding that you'll start managing your finances more responsibly is simple. However, once you begin to follow the right course of action, you'll realize that it's not as simple as it seems. Pen and paper budgeting provides a concrete, hands-on method that helps develop a stronger bond with money. On the other hand, automatic functions, real-time tracking, and convenience are offered by mobile applications. Although those who seek a more tactile approach could find comfort in the conventional approach, digital technologies improve overall financial management through their efficiency and accessibility.

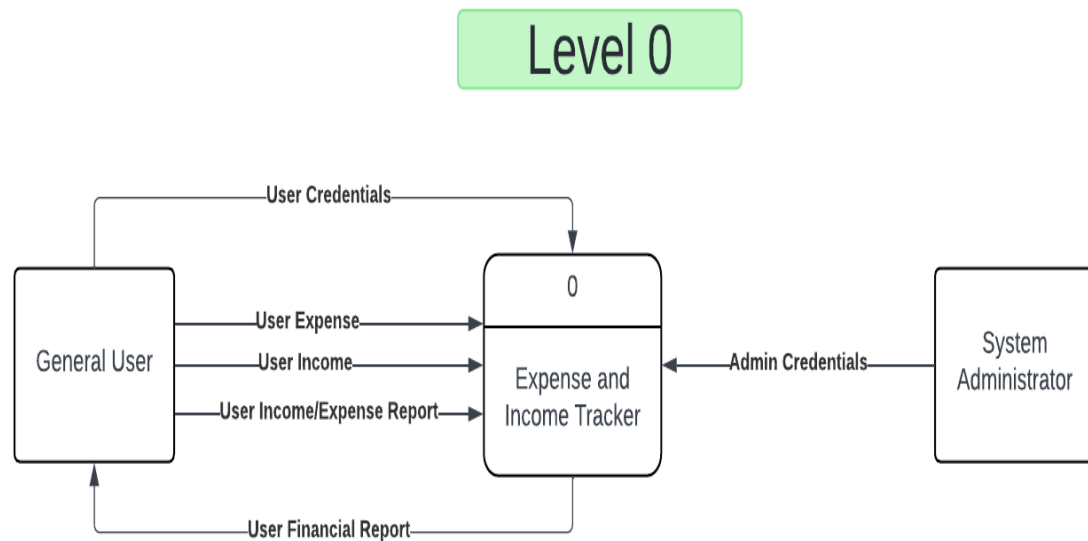


Figure 4. Data Flow Diagram of Income and Expense Tracker at Level 0

As shown in Figure 3, the System Design of Income and Expense Tracker, conducted by Kumar, Harini, and Thenmullai (2022), the studies focused on the needs of general potential users. In essence, the research is exploring and addressing the needs of both individual users and certain organizational aspects in the context of budgeting. The application can perform basic functionalities such as user login, adding income and expense, filtering transactions, and generating graphical reports.

1.4.2 Proposed System

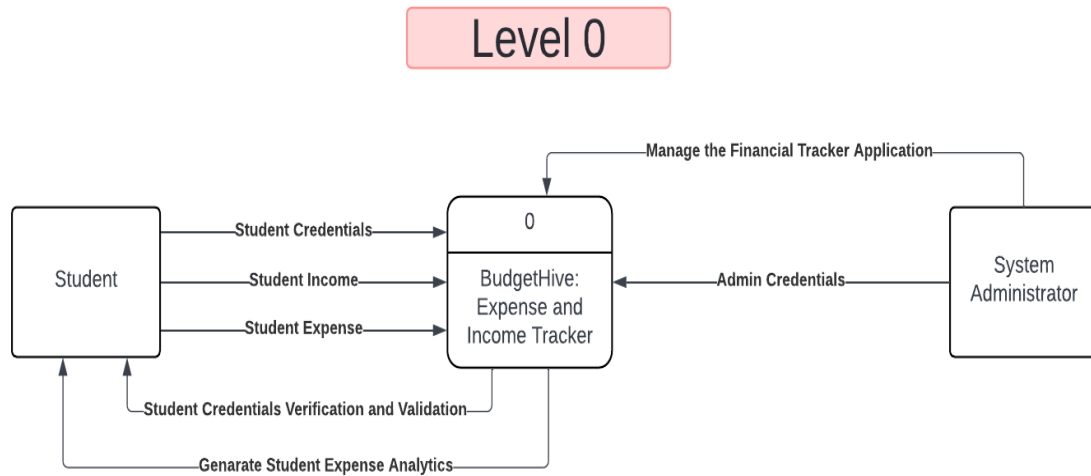


Figure 5. Data Flow Diagram of BudgetHive at Level 0

The proposed system titled BudgetHive: Empowering Student Financial Management with an Expense and Income Tracker Mobile Application aims to make tracking of expenses easy and more accessible to students with different levels of financial knowledge by implementing a user-centric design. The proposed system has two main features, which are (1) income tracking, and (2) expenses tracking. Income tracking allows students to input and track various sources of income, such as part-time jobs, allowances, scholarships, or any other sources of funds they receive regularly or occasionally. It enables students to categorize their income sources and record details such as the amount received, date of receipt, and any associated notes, while Expense tracking is a feature that enables

students to input and track their expenses across different categories relevant to their student lifestyle. Students can categorize their expenses into default categories such as food, rent, transportation, textbooks, tuition, school fees, and others. They can then record details such as the amount spent, date of expenditure, and notes for reference. The app may also provide visual representations of spending patterns and summaries of expenses over specific periods to help students understand their spending habits and make informed financial decisions.

BudgetHive provides a user-friendly mobile application designed to empower students in tracking their income and expenses. This simplified platform enables students to manage their finances with ease and certainty, promoting a sense of control and financial wellness.

1.5 Scope and Limitations

The researchers expected to accomplish a handy mobile app for tracking student income and expenses, helping them make smart financial choices. This app is all about providing students with a simple and user-friendly way to manage their money. By focusing on students, the goal is to address the common income sources and expenses that a typical student encounters. Students usually have limited income from part-time jobs, allowances from parents, scholarships, and other sources. So, they need to be careful about how they spend their money on things like food, rent,

transportation, textbooks, tuition, and school fees. The app comes with features that let students easily categorize their expenses and keep track of their spending in these areas. With its easy-to-use interface and helpful tools, students can stay on top of their finances and make responsible money decisions. Furthermore, the developer aims to offer an application that provides a breakdown of common expenses among students based on percentages

The developers will create a mobile application designed to meet the requirements of student's financial management, accompanied by the following set of limitations:

1. The students from Cavite State University – Don Severino delas Alas Campus will be the users of the application.
2. The application omits complex investment tracking and management functionalities to prioritize a straightforward approach to budgeting.
3. The application specifies the supported currency which is Philippines Peso by default.
4. Only Android-powered smartphones will be able to access the application.
5. The system requires internet access to function effectively.
6. The system only does income and expense tracking.

SYSTEM REQUIREMENTS SPECIFICATION

2.1 Introduction

2.1.1 Purpose

System Requirements Specification is used to delineate the functional requirements and features of BudgetHive that an income/ expense tracking mobile application must possess. System Requirement Specification serves as a roadmap to ensure that the application incorporates all essential functionalities to meet user expectations. Additionally, this document will comprehensively explain and illustrate the flow of the application and the operation of an income and expenses tracking system.

2.1.2 Scope

BudgetHive, a purpose-built mobile application, is crafted to address the unique needs of CvSU students, providing them with a streamlined approach to efficient income and expense tracking. This application serves as a valuable tool for proficient student tracker mobile application.

BudgetHive incorporates essential components to empower students in effective financial management:

1. User Registration and Authentication - Enables students to securely create and manage their accounts, prioritizing data privacy and confidentiality.

2. Dashboard - A centralized hub where students can effortlessly monitor their financial status, providing key metrics for a comprehensive overview.
3. User Profile - Enables the students to change account password or delete the account.
4. Income Tracking - Allows students to seamlessly add, categorize, and monitor their sources of income, ensuring a detailed understanding of their financial inflows.
5. Expense Tracking - Facilitates the addition, categorization, and tracking of expenses, providing students with a clear picture of their spending patterns.

2.1.3 Overview

Budgeting mobile applications serve as invaluable tools, aiding students in developing robust financial habits and effectively managing their finances throughout their educational journeys. BudgetHive, in particular, is poised to support CvSU students in meticulously tracking their income sources and expenses. It enables students to categorize various income streams, including earnings from part-time jobs, allowances from parents, scholarships, and more, alongside categorizing expenses such as food, rent, transportation fees, tuition, school fees, and miscellaneous items. By transforming abstract financial goals into actionable plans, this

application empowers students to take control of their financial futures with confidence.

2.2 Overall Description

2.2.1 Product Perspective

The essence of BudgetHive lies in an unwavering commitment to user-centric design. Our innovative solution addresses the challenge of navigating complex financial management, offering users a streamlined approach to efficiently manage their future financial resources. The user interface is thoughtfully crafted for intuitiveness, delivering a seamless and engaging experience. This design ensures that students, regardless of their financial proficiency, can effortlessly grasp the intricacies of tracking income and expense, making the complex subject accessible and fostering a user-friendly financial management journey.

2.2.2 Product Features/Functions

In line with our dedication to provide a thorough financial tracking experience, the proposed expense and income tracker application incorporates the following features:

1. User Registration and Authentication - a feature of a budget app involves the process by which students create accounts, verify their identities, and subsequently log in securely.

2. Expense Tracking - designed to help student monitor and manage their spending. This feature allows students to record and categorize their expenses, providing a detailed overview of their financial transactions.
3. Income Tracking - allows the student to oversee and handle their sources of income. This feature is designed to help students keep track of the money they receive, whether it's from part-time jobs, allowances, scholarships, or any other sources
4. Expense Analytics - provides a graphical representation of expense data, offering a student a visual and insightful overview of their spending patterns.
5. Change Password and Delete Account - allows the student to update their existing password for enhanced security or permanently remove their account and associated data from the app.

2.2.3 User Classes and Characteristics

USER CLASSES	USER ROLE	ACCESSIBLE FEATURES
System Administrator	Responsible for the management of the Budget Application.	1.0 Operate the System 1.1 Monitor the system performance 1.2 System Maintenance 1.3 Fixing/ Troubleshooting 1.4 Backup and Recovery 2.0 Security Management 2.1 Manage User Account 2.1.1 Validate and Verify user account

		<ul style="list-style-type: none"> 2.1.2 Notify user account confirmation <ul style="list-style-type: none"> 2.1.2.1 Notify via email 2.2 Manage User Authentication <ul style="list-style-type: none"> 2.2.1 Validate and Verify user credentials 2.3 Managing data security, privacy and integrity
Students	The primary user of the Budget Application.	<ul style="list-style-type: none"> 1.0 Sign Up <ul style="list-style-type: none"> 1.1 Create an Account <ul style="list-style-type: none"> 1.1.1 Email Address 1.1.2 Add Password 1.2 Sign Up 1.3 Email Confirmation <ul style="list-style-type: none"> 1.3.1 Notify via Email 2.0 Log In Account <ul style="list-style-type: none"> 2.1 Enter Login Details <ul style="list-style-type: none"> 2.1.1 Enter Email Address 2.1.2 Enter Password 2.2 Log In 3.0 Management of Income Tracking <ul style="list-style-type: none"> 3.1 Manage Income Transaction <ul style="list-style-type: none"> 3.1.1 Select Date 3.1.2 Select Type 3.1.3 Input Income Description 3.1.4 Input Income amount 3.2 Add Income Entry 3.3 Edit Income Entry 3.4 Remove Income Entry 4.0 Management of Expense Tracking <ul style="list-style-type: none"> 4.1 Manage Expense Transaction <ul style="list-style-type: none"> 4.1.1 Select Date 4.1.2 Select Type 4.1.3 Input Expense Description 4.1.4 Input Expense Amount 4.2 Add Expense Entry 4.3 Edit Expense Entry 4.4 Remove Expense Entry

		5.0 Management of User Profile <ul style="list-style-type: none"> 5.1 Manage Email Account <ul style="list-style-type: none"> 5.1.1 View Email Account 5.2 Manage Account Password <ul style="list-style-type: none"> 5.2.1 Change Password <ul style="list-style-type: none"> 5.2.1.1 Enter Current Password 5.2.1.2 Enter New Password 5.2.2 Save 5.2.3 Email Confirmation <ul style="list-style-type: none"> 5.2.3.1 Notify via email 5.3 Manage Account Deletion <ul style="list-style-type: none"> 5.3.1 Remove Account 6.0 Dashboard Management <ul style="list-style-type: none"> 6.1 Manage Income/Expense <ul style="list-style-type: none"> 6.1.1 View Income/Expense Log 6.1.2 Add Income/Expense 6.1.3 Edit Income/Expense Log 6.1.4 Remove Income/Expense Log 6.2 Manage Expense Analytics <ul style="list-style-type: none"> 6.2.1 View Daily Expense Data
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1.0.1 Assumption and Dependencies

An effective mobile application for expense and income tracker must be developed, deployed, and maintained by acknowledging and controlling these assumptions and

dependencies. To ensure that these elements are aligned with users' changing needs.

1. The users have basic understanding of financial terms and concepts.
2. The users provide accurate and truthful financial information.
3. Users have access to the internet, if necessary.
4. The implemented security measures are effective in safeguarding user's financial data.
5. The users will actively engage with the application over time.
6. Compatibility with the latest versions of Android.
7. Continuous user feedback and testing cycle

1.1 Specific Requirements

1.1.1 User Registration and Authentication

- 1.1.1.1** The system shall record the user's email address.
- 1.1.1.2** The system shall record the user's password.
- 1.1.1.3** The system shall allow the user to log in using their login credentials.

1.1.2 Dashboard

- 1.1.2.1** The system shall allow the user to view total income, expense, navigation drawer, history of income and expense.

- 1.1.2.2** The system should be able to generate reports, including charts and graphs, to visualize the user's financial data.

1.1.3 User Profile

- 1.1.3.1** The system shall allow the user to view the user email
- 1.1.3.2** The system shall allow the user to change password.
- 1.1.3.3** The system shall allow the user to delete the account.

1.1.4 Expense Tracking

- 1.1.4.1** The system shall allow the user to manually input their expenses.
- 1.1.4.2** The system shall allow the user to select date of income log.
- 1.1.4.3** The system shall allow the user to select expense type.
- 1.1.4.4** The system shall allow the user to input some description of the expense.
- 1.1.4.5** The system shall allow the user to input amount of expense.

1.1.5 Expense Fragment

- 1.1.5.1** The system shall allow the user to view their expense log.
- 1.1.5.2** The system shall allow the user to edit entries in their expense log.
- 1.1.5.3** The system shall allow the user to remove entries in their expense log.

1.1.6 Income Tracking

- 1.1.6.1** The system shall allow user to manually input their sources of income.

1.1.6.2 The system shall allow the user to select date of income entry.

1.1.6.3 The system shall allow the user to input type of income.

1.1.6.4 The system shall allow the user to input some description of the income.

1.1.6.5 The system shall allow the user to input the amount of income.

1.1.7 Income Fragment

1.1.7.1 The system shall allow the user to view their income log.

1.1.7.2 The system shall allow the user to edit entries in their income log.

1.1.7.3 The system shall allow the user to remove entries in their income log.

1.2 External Interface Requirements

1.2.1 BudgetHive Screen

1.2.1.1 Introduction screen of our application

1.2.2 Registration

1.2.2.1 User may register and fill up the needed information.

1.2.2.2 User may set password

1.2.3 Login

1.2.3.1 User may enter the credentials for login

1.2.4 Dashboard

1.2.4.1 The user can browse the income and expense segments in the dashboard. shows the total revenue and expense.

By clicking on the floating button, the user can add details about new income and expenses.

1.2.5 Drawer Layout

1.2.5.1 Options to navigate through income, expenses, and dashboard fragments are available in the drawer layout.

1.2.6 Insert Data Layout

1.2.6.1 User can insert details of new income and expense like amount, type and note.

1.2.7 Income Fragment

1.2.7.1 Displays data of total income and separate details of each income.

1.2.8 Expense Fragment

1.2.8.1 Displays data of total expense and separate details of each expense.

1.2.9 Layout of Profile

1.2.9.1 Display the user's personal information

1.2.9.2 This feature helps the user to update their existing password for enhanced security or permanently remove their account and associated data from the app.

1.2.10 Delete Account Alert

1.2.10.1 This function facilitates account deletion for the user.

1.2.11 Layout of Change Password

1.2.11.1 This feature allows the user to modify their password.

1.2.12 Logout Alert

1.2.12.1 The user may logout their account

1.2.13 Alert for low balance

1.2.13.1 This feature warns the user when there is less than 10% of their balance left, indicating that their expenses are higher than their income. The user needs to manage his spending.

1.2.14 Dashboard Fragment (Per day Expenses Bar Chart)

1.2.14.1 This shows the dashboard fragment's bar chart of daily expenses that the user has expensed. After checking it, the user learns how much he is spending and how he needs to cut back.

1.3 Other Non-Functional Requirements

1.3.1 Performance

1.3.1.1 The system must respond to user input within 2 seconds, ensuring a responsive user experience

1.3.2 Usability

1.3.2.1 The system must adhere to mobile design standards and guidelines, ensuring an intuitive and consistent user experience.

1.3.3 User-Friendly Interface

1.3.3.1 The system must be intuitive and user-friendly interface that makes it easy for users to navigate and understand their financial information.

1.3.4 Compatibility

- 1.3.4.1** The system must be compatible with android devices supporting various screen sizes

1.3.5 Security

- 1.3.5.1** The system shall employ secure login and strong authentication mechanism during giving access.
- 1.3.5.2** The system shall implement rigorous data validation checks to maintain the integrity of financial data

1.3.6 Logging and Auditing

- 1.3.6.1** The system shall maintain comprehensive logs of user activities and system transactions for auditing purposes.

METHODOLOGY

3.1 Overview

The process of creating a working prototype of a software product that has all of the essential features is known as prototyping, and it originated from the need to properly describe specifications. The prototype is employed to improve requirements as they serve as a starting point for discussions between the users and the team. The prototype isn't intended to be the final software product itself but serves as a dynamic foundation for further refinement. Prototypes ought to be constructed quickly and sufficiently.

In developing the proposed system BudgetHive tailored for CvSU students, the implementation of prototype methodology proves instrumental. This approach ensures that unique financial needs and user preferences are accurately addressed. Initially, a rapid prototype of the application is created, offering a tangible representation of key features such as expense and income tracking. By involving users early in the development process, their insights and feedback are gathered, guiding subsequent iterations. This iterative cycle facilitates a tailored user experience, aligning the application closely with the financial behaviors and goals specific to users.

3.2 Project Organization

Project Manager

The Project Manager plays a crucial role in overseeing the development team and is tasked with the management of the software project. Their main duties include supervising the achievement of project goals and maintaining a comprehensive understanding of the "who, what, when, and why" aspects of the software plan.

System Analyst

System analysts are in charge of carrying out feasibility studies to make sure that the features of the application match the specific demands of the campus while also taking into account the preferences of the student audience.

Web Developers

Web Developers play a vital role in ensuring functionality, crafting user interfaces, and coding. They are instrumental in the development and success of digital products, collaborating within teams to implement features and address issues. The developer roles are categorized into front-end, back-end, and full-stack developers.

Database Administrator

Database Administrator are essential to software development because they oversee and improve the database systems that provide as the foundation for applications. Their responsibilities encompass the creation, functionality, accuracy, and safety of the system's database. They work with development teams to match database designs to the needs of applications, and they might also help with the design and execution of features that deal with data.

UI/UX Designer

UI/UX Designer is in charge of creating the user interfaces of the system. They examine features that are meant for the end user as well as the functionality that the application should have. They suggest the layout of the interface and specify its graphic style, interaction flows, visual content arrangement, and navigation strategy.

Quality Assurance Analysts

Quality Assurance Analyst ensure the final system meets quality and functionality standards. Their responsibilities include devising test strategies, identifying defects, and collaborating with developers. The QA team, supports projects by confirming the use of

best practices during development, aiming to ensure quality at the process level in projects.

3.3 Work Plan

3.3.1 Schedule Allocation

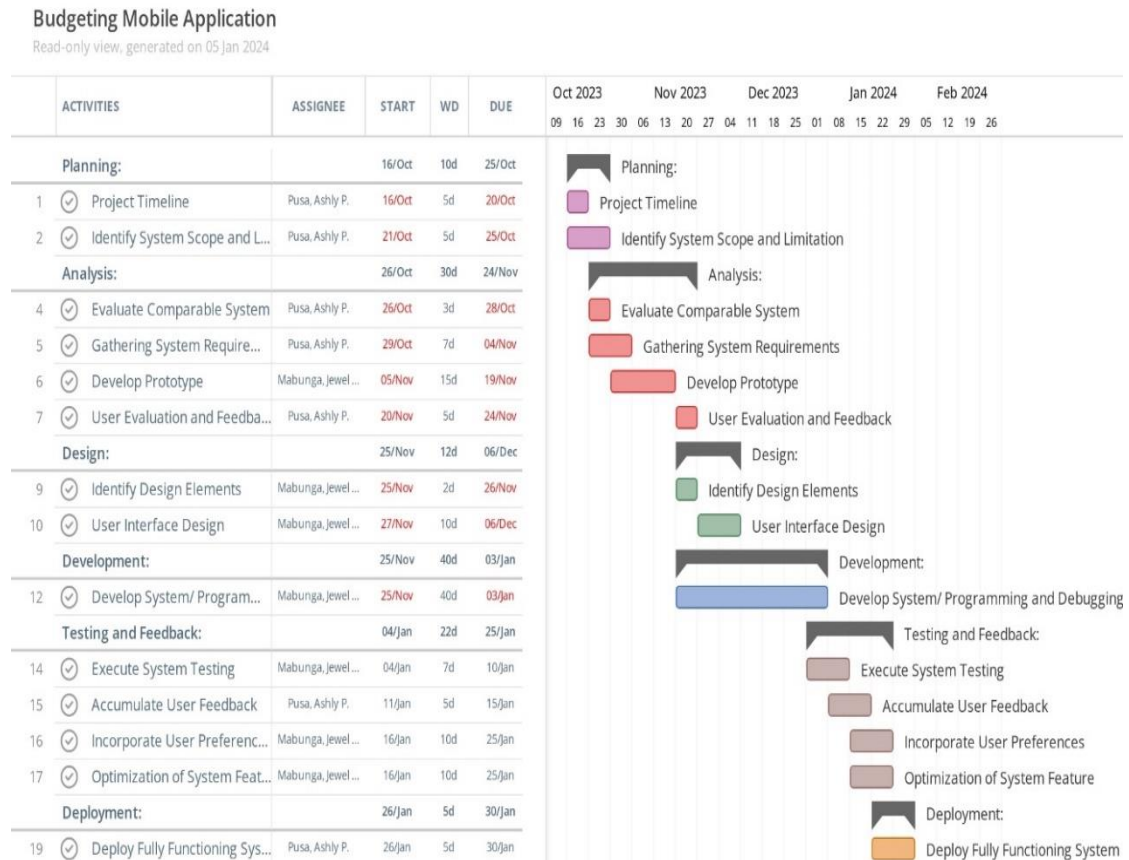


Figure 4. Gantt Chart

3.4 Project Deliverables

1. Project Initiation - carefully outlined, including an overview of all deliverables, deadlines, and project's limits and stating its objectives. As well as gathering the functional and non-functional requirements.

2. Documentation - we meticulously documented our design decisions and interactions, and further established a comprehensive style guide for future development, promoting consistency and efficiency across the project's lifecycle.
3. User Interface Design Completion - ensures an intuitive and visually appealing platform, enhancing the overall user experience and facilitating effective financial management for students.
4. Prototype Development - constructing an interactive prototype of the budget app that includes all essential elements.
5. Backend Development – Concluding the construction of the backend infrastructure, which underpins functionalities such as user account generation, data storage, and robust login mechanisms for students.
6. Integration of Student-Specific Features - One step toward improving the app's relevancy is to include features specifically designed with students in consideration, such as tracking costs for study tools, textbooks, and leisure.
7. Unit Testing - ensuring every component works as it should before smoothly merge them and thoroughly testing the system to ensure optimal efficiency

3.4.1 Prototype Flow

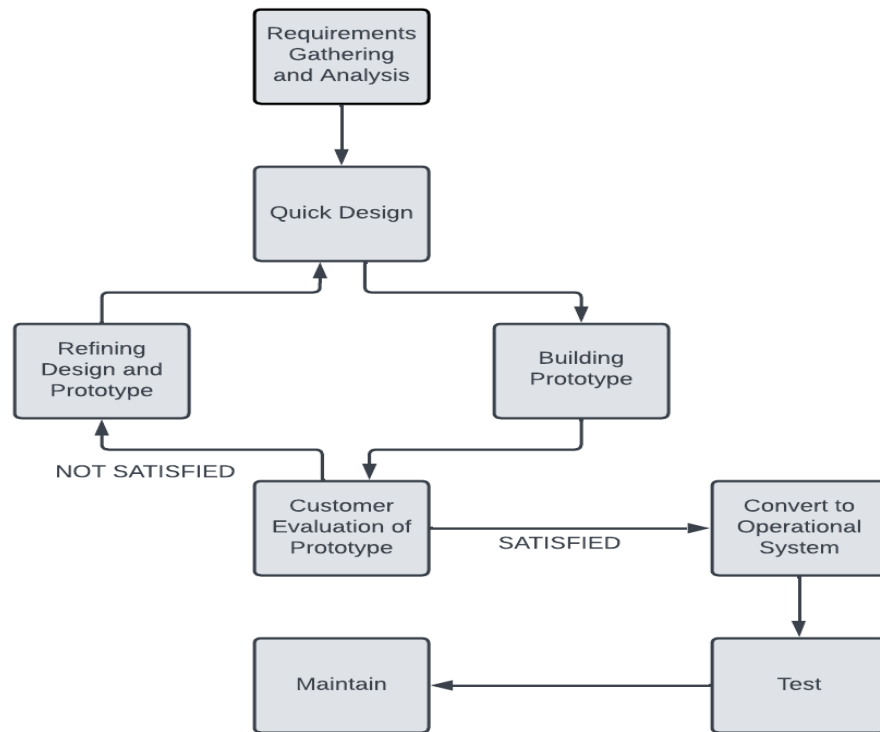


Figure 3.4.1. Prototype Model Diagram

The prototype methodology's sequential processes are broadly outlined in the figure, starting with the collection and analysis of requirements. This phase is followed by the design and development of the initial prototype, often depicted as low-fidelity wireframes or sketches. User testing and feedback gathering are the following steps, which result in revisions and improvements in later cycles. The figure highlights the prototype model's iterative nature by showing how user testing input is fed back into the prototype to enable continual development. Until the prototype satisfies the required standards for functionality, usability, and stakeholder satisfaction. All things considered, the prototype model diagram

emphasizes user input and participation throughout, giving a visual depiction of the dynamic and changing character of the development process.

3.5 Quality Control

3.5.1 Unit Testing

Unit testing is a method of software testing in which distinct parts or units of an application are tested separately to make sure they function as intended. Every unit undergoes independent testing to identify errors within its limits. The purpose of unit testing is to ultimately contribute to the delivery of a high-quality and robust software product.

TEST CASE ID	TEST CASE	EXPECTED RESULT	RESULT SHOWN	RESULT
1	Signing up with a valid email address.	The sign-up process should be successful, and the user should be registered with the provided email address.	<i>Registration Successful. Verification mail sent successfully</i>	Success
2	Signing up with an invalid email format.	The budget app should reject the sign-up attempt and display an error message indicating that the email format is invalid.	<i>Signup failed</i>	Success
3	Signing up using an email that is	The budget app should reject the sign-up	<i>Error occurred sending</i>	

	already registered.	attempt and display an error message indicating that the email address is already in use.	<i>verification email</i>	
4	Signing up with empty email field.	The budget app should reject the sign-up attempt and display an error message indicating that the email field is required.	<i>Email Required...</i>	Success

Table 1. User - Sign Up

TEST CASE ID	TEST CASE	EXPECTED RESULT	RESULT SHOWN	RESULT
1	Signing in using a valid sign in credentials	The user should be successfully logged into their account.	<i>Login Successful</i>	Success
2	Signing in using an email that is not registered.	The budget app should display an error message indicating that the email is not registered.	<i>Login Failed</i>	Success
3	Signing in with incorrect password	The budget app should display an error message indicating that the password is incorrect.	<i>Login Failed</i>	Success
4	Signing in with an empty password field.	The budget app should display an error message indicating that	<i>Password required...</i>	Success

		the password field is required.		
5	Clicking the "Remember Me" button Unchecked.	The budget app should remember the user's login credentials for future sign-ins.	<i>Remember me Checked...</i>	Success
5	Clicking the "Remember Me" button Checked.	The budget app should remember the user's login credentials for future sign-ins.	<i>Remember me Unchecked...</i>	Success

Table 2. User - Sign In

TEST CASE ID	TEST CASE	EXPECTED RESULT	RESULT SHOWN	RESULT
1	Valid Income/Expense Logging.	The income/expense entry is successfully logged.	<i>Added Successfully</i>	Success
2	Logging Income/Expense without type.	An error message indicating missing type is displayed, and the entry is not logged.	<i>Required field...</i>	Success
3	Logging Income/Expense without selecting date.	The budget app should display an error message indicating that the date field is required.	<i>Required field...</i>	Success
4	Entering a negative amount.	An error message indicating invalid amount is displayed, and the entry is not logged.	<i>Invalid input...</i>	Success

5	Clicking the "update" button.	The budget app should successfully update the logged income or expense entry with any modifications made by the user.	<i>Updated Successfully</i>	Success
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Table 3. User – Income and Expense Logging

TEST CASE ID	TEST CASE	EXPECTED RESULT	RESULT SHOWN	RESULT
1	Display income entries	The Income Fragment should show a list of income sources with their respective details, including names, amounts, and date.	Displayed in Income History	Success
2	Add new income entry.	After adding a new income source, it should be displayed in the Income Fragment's list of income data with the correct details.	Displayed in Income Recycler Data	Success
3	Edit an existing income source.	The changes should be reflected in the Income Fragment, updating the details of the edited income source accordingly.	Displayed in Income Recycler Data	Success

4	Delete an existing income source.	It should be removed from the Income Fragment, and the list of income sources should update accordingly, excluding the deleted source.	Removed in Income Recycler Data	Success
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Table 4. User – Income Fragment

TEST CASE ID	TEST CASE	EXPECTED RESULT	RESULT SHOWN	RESULT
1	Display expense entries.	The Expense Fragment should show a list of expenses with their respective details, including names, amounts, and date.	Displayed in Expense Data Dashboard	Success
2	Add new expense entry.	After adding a new expense source, it should be displayed in the Expense Fragment's list of expense entry with the correct details.	Displayed in Expense Recycler Data	Success
3	Edit an existing expense entry.	The changes should be reflected in the Expense Fragment, updating the details of the edited expense entry accordingly.	Displayed in Expense Recycler Data	Success

4	Delete an existing expense entry.	It should be removed from the Expense Fragment, and the list of expense entries should update accordingly, excluding the deleted entry.	Removed in Expense Recycler Data	Success
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Table 5. User – Expense Fragment

TEST CASE ID	TEST CASE	EXPECTED RESULT	RESULT SHOWN	RESULT
1	Verify that the user cannot delete their account if they haven't confirmed the action.	The user receives a prompt to confirm the account deletion action before proceeding.	<i>Are you sure? Deleting this account will result in completely removing your account from BudgetHive and you will no longer be able to access this account. In future if you wish to use the same email then you need to register again.</i>	Success
2	Verify that the user can delete their account successfully	The user's account is deleted from the system, and they receive a confirmation message indicating successful deletion.	<i>Account Deleted</i>	Success

Table 6. User – Delete Account Module

TEST CASE ID	TEST CASE	EXPECTED RESULT	RESULT SHOWN	RESULT
1	Attempting to change password with invalid current password.	User should receive an error message indicating that the current password entered is incorrect.	<i>Something wen wrong. Please try again later..</i>	Success
2	Attempting to change password with empty fields.	User should receive an error message indicating that all fields are required.	<i>Required field...</i>	Success
3	Attempting to change password with new password matching password confirmation.	User should successfully change their password when new password matches the password confirmation field.	<i>Something wen wrong. Please try again later..</i>	Success
4	Attempting to change password with mismatched password confirmation.	User should receive an error message indicating that the new password and password confirmation do not match.	<i>Something wen wrong. Please try again later..</i>	Success
5	Attempting to change password with less than 6 characters	User should receive an error that the new password does not have the minimum required character	<i>Must contain at least 6 characters..</i>	Success

Table 7. User – Change Password Module

3.5.2 System Testing

The process of assessing and validating a software system's or application's overall behavior, performance, and functionality is known as system testing. It entails the system's integrated parts and interactions to the test to ensure that it satisfies requirements and functions as intended in practical situations. To ensure that the program is ready for deployment and end-user usage, system testing focuses on evaluating the system's compliance with user expectations, and quality standards. System Testing is conducted after the integration testing and before acceptance testing

3.5.3 Acceptance Testing

Acceptance testing marks the final phase in the software testing journey, where the system is carefully evaluated to ensure it meets user expectations. This testing method, often led by end-users or their representatives, meticulously assesses real-world scenarios and user interactions to ensure that the software seamlessly meets their requirements and operates at the expected standards.

3.6 Lesson Learned

Mabunga, Precios Jewel M.

The prototype methodology's sequential processes are broadly outlined in the figure, starting with the collection and analysis of requirements. This phase is followed by the design and

development of the initial prototype, often depicted as low-fidelity wireframes or sketches. User testing and feedback gathering are the following steps, which result in revisions and improvements in later cycles. The figure highlights the prototype model's iterative nature by showing how user testing input is fed back into the prototype to enable continual development. Until the prototype satisfies the required standards for functionality, usability, and stakeholder satisfaction. All things considered, the prototype model diagram emphasizes user input and participation throughout, giving a visual depiction of the dynamic development process

Pusa, Ashly P.

Participating in this project has offered me valuable insights and learning experiences as a student. One of the key lessons I learned while working on this system proposal was the importance of documentation. It acts as a fundamental element fostering clear communication and mutual understanding among team members. It not only serves as a robust reference but also plays a crucial role in elucidating requirements, design choices, and functional aspects throughout the development journey. Moreover, this experience has underscored that comprehensive documentation not only aids in the current project phase but stands as an enduring asset for future endeavors, offering valuable insights for maintenance, troubleshooting, and scalability.

CONCLUSION

The developers conclude that this expense and income tracker application will greatly assist students once it is deployed and fully utilized, enhancing the effectiveness and enjoyment of their daily financial tracking. Wherever you may be, with a financial tracker application like BudgetHive, listing expenses, and income becomes more convenient without the fear of misplacing it.

By incorporating this technology into the educational setting, we tackle a significant aspect of the student experience and provide them with the necessary tools to make educated financial choices. Throughout students' educational journey, the system will always be a relevant and helpful resource owing to its capacity to adjust to their individual needs. Consequently, this helps students manage their academic obligations skillfully and cultivates enduring financial responsibility habits that prepare them for a more stable and knowledgeable financial future. It could be argued that a student financial tracking system is a major contributor to raising students' financial literacy and equipping them with the necessary skills to confidently negotiate the challenges of personal finance.

To sum up, the developers conclude that the financial tracker mobile application is a valuable instrument for tracking students' expenses and income. This system can continuously improve the financial decision-making quality of each Cavite State University Delas Alas Campus student in the future.

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APPENDICES

Appendix A

Figures

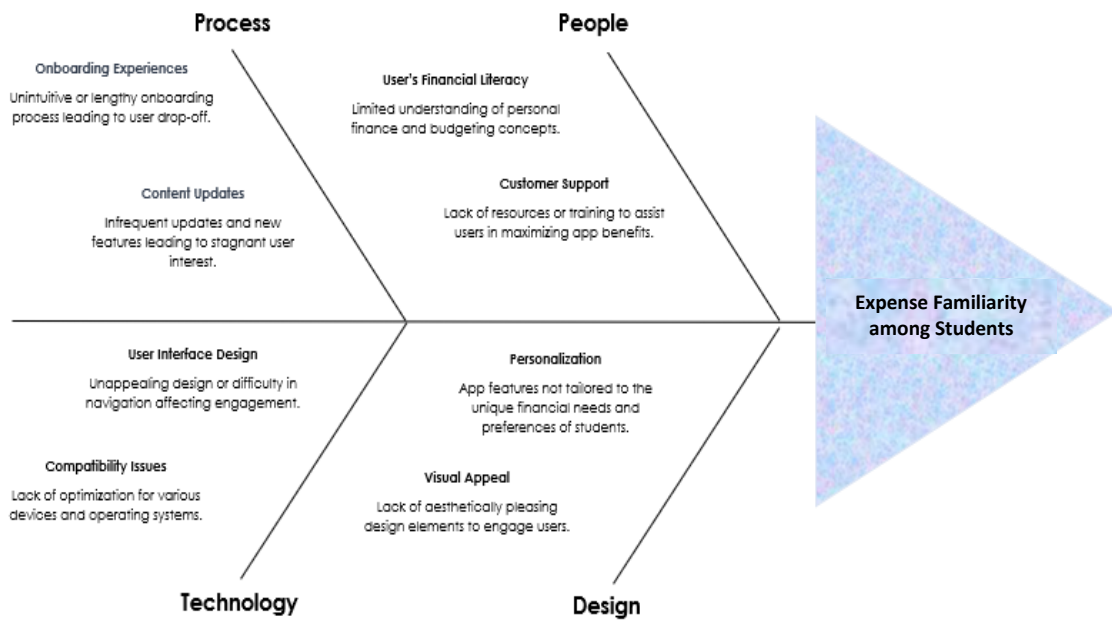


Figure 1. Expense Familiarity among Students

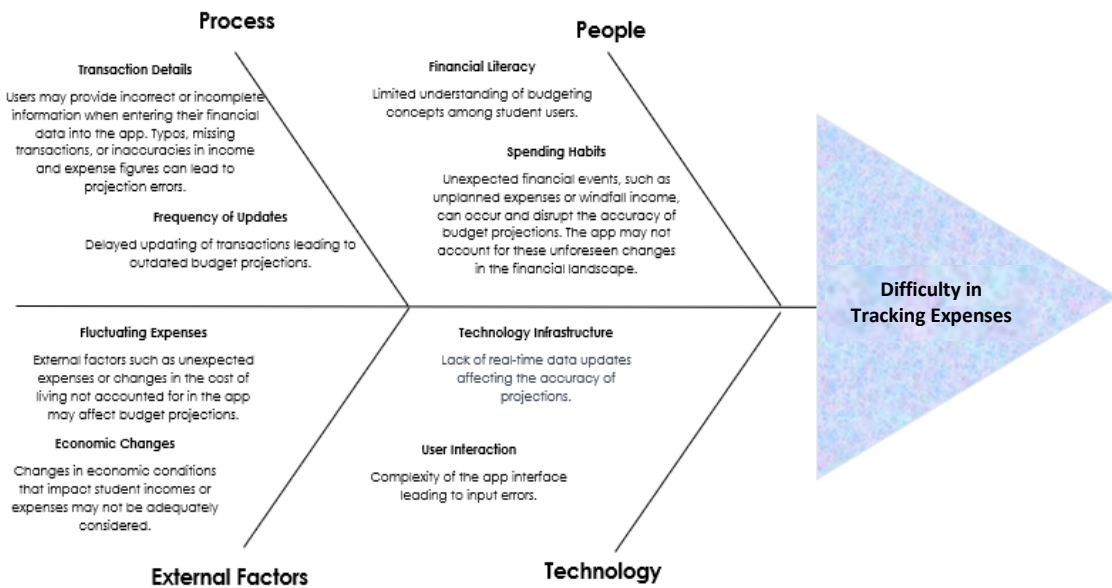


Figure 2. Difficulty in Tracking Expenses

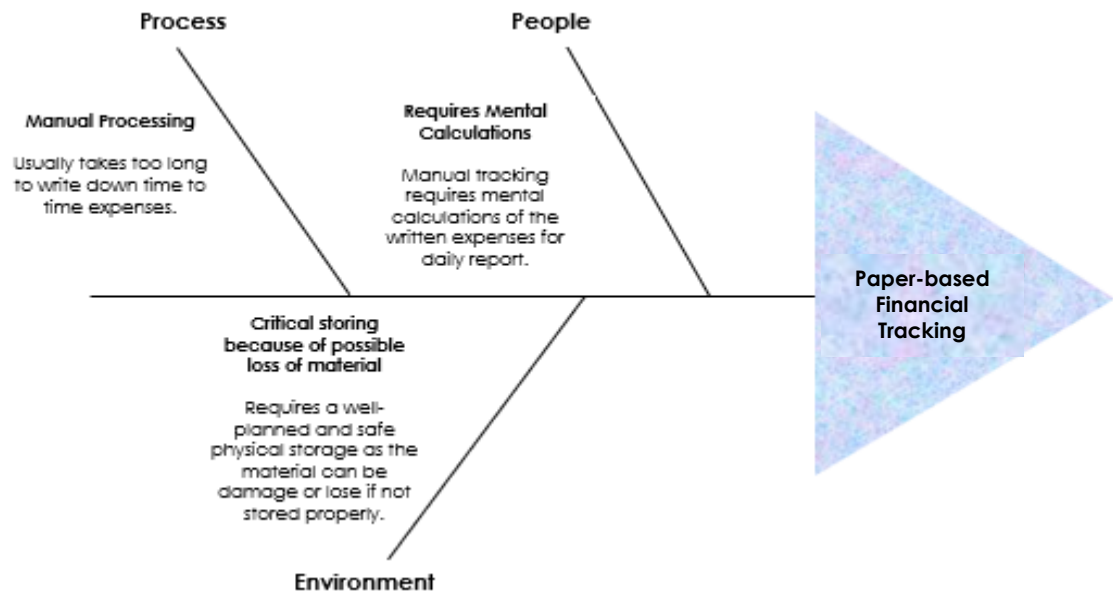


Figure 3. Paper-based Financial Tracking

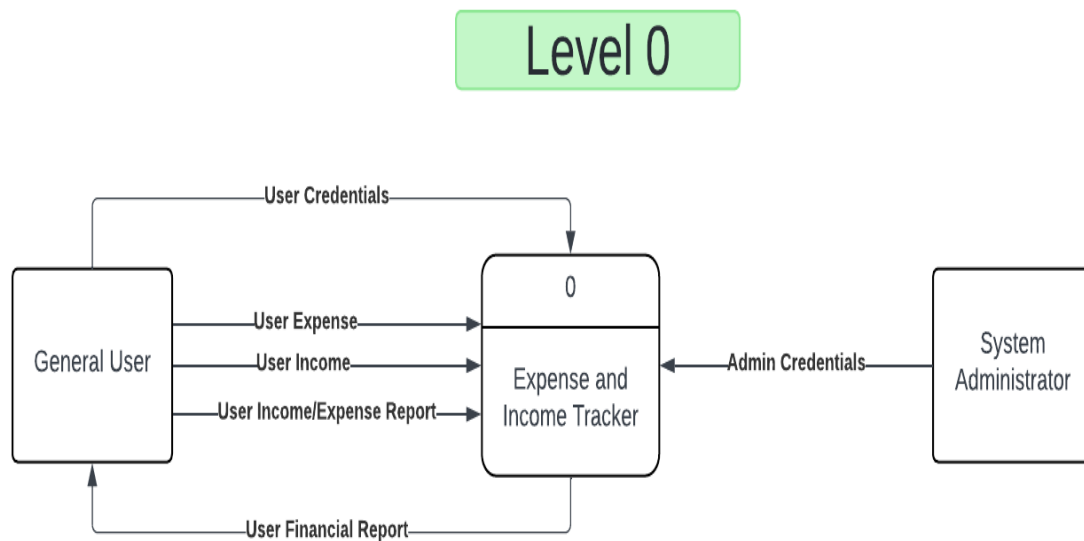


Figure 4. Data Flow Diagram of Expense and Income Tracker at Level 0

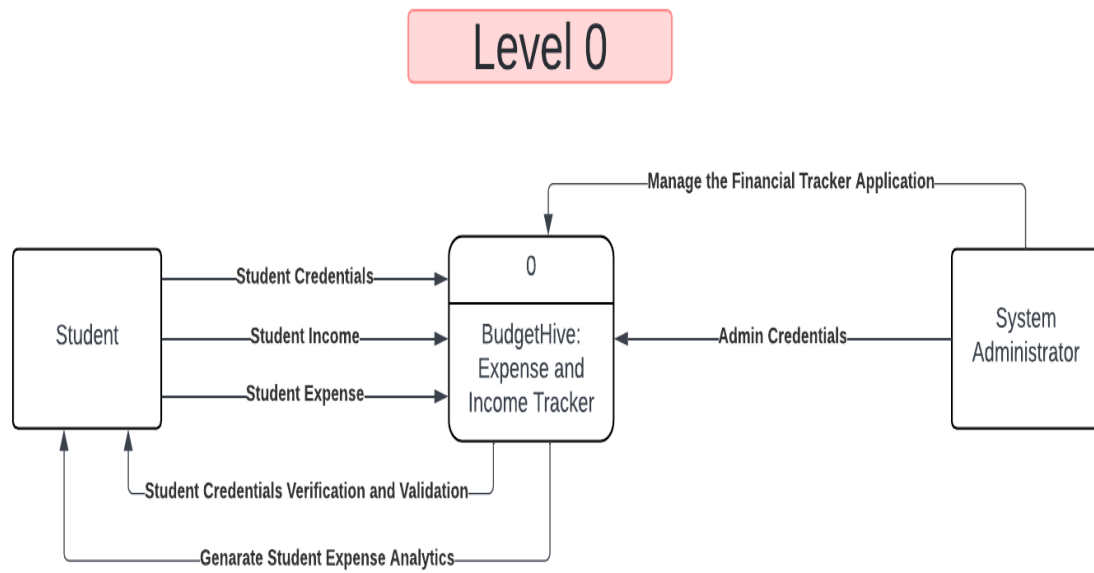


Figure 5. Data Flow Diagram of BudgetHive at Level 0

Appendix B

Tables

Budgeting Mobile Application

Read-only view, generated on 05 Jan 2024

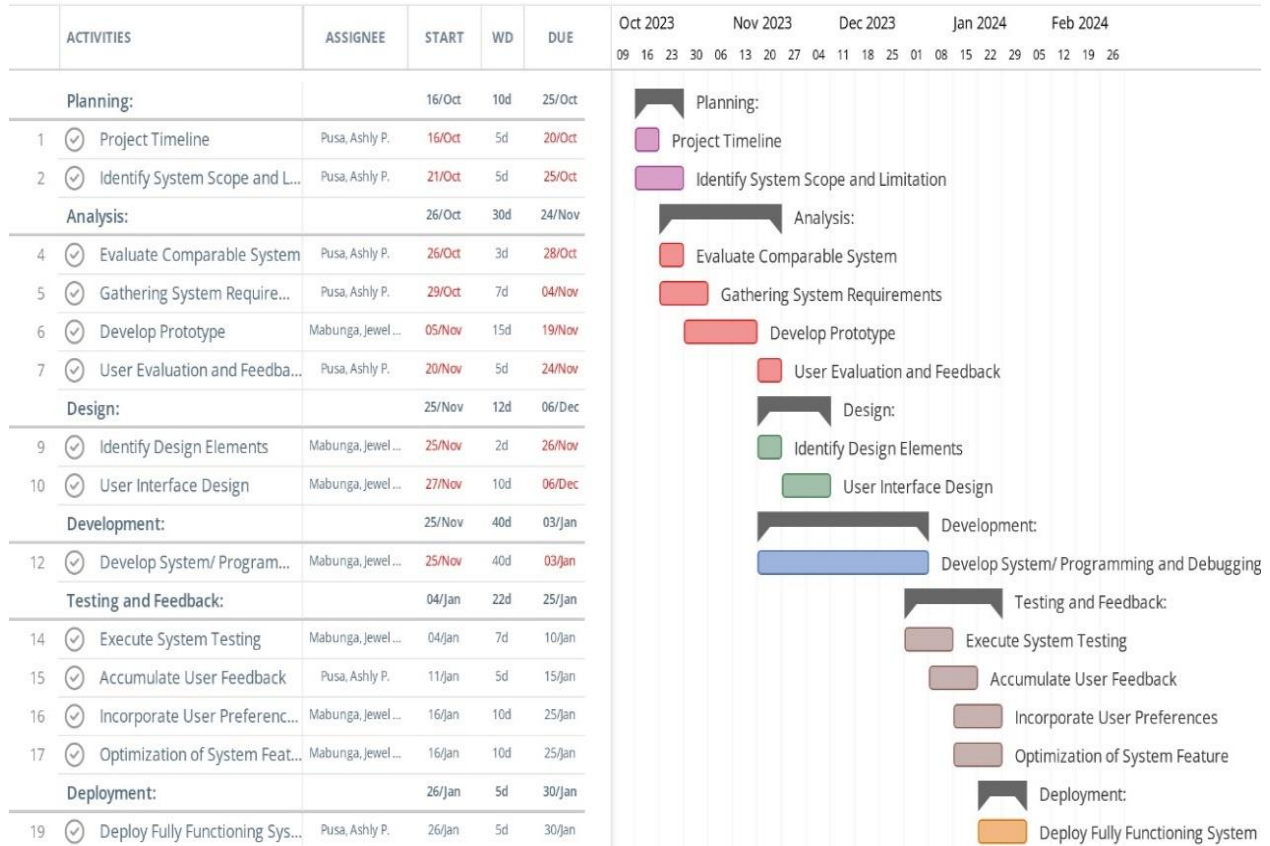


Table 1. Gantt Chart

Appendix C

Test Cases

TEST CASE ID	TEST CASE	EXPECTED RESULT	RESULT SHOWN	RESULT
1	Signing up with a valid email address.	The sign-up process should be successful, and the user should be registered with the provided email address.	<i>Registration Successful. Verification mail sent successfully</i>	Success
2	Signing up with an invalid email format.	The budget app should reject the sign-up attempt and display an error message indicating that the email format is invalid.	<i>Signup failed</i>	Success
3	Signing up using an email that is already registered.	The budget app should reject the sign-up attempt and display an error message indicating that the email address is already in use.	<i>Error occurred sending verification email</i>	
4	Signing up with empty email field.	The budget app should reject the sign-up attempt and display an error message indicating that the email field is required.	<i>Email Required...</i>	Success

Table 1. User - Sign Up

TEST CASE ID	TEST CASE	EXPECTED RESULT	RESULT SHOWN	RESULT
1	Signing in using a valid sign in credentials	The user should be successfully logged into their account.	<i>Login Successful</i>	Success
2	Signing in using an email that is not registered.	The budget app should display an error message indicating that the email is not registered.	<i>Login Failed</i>	Success
3	Signing in with incorrect password	The budget app should display an error message indicating that the password is incorrect.	<i>Login Failed</i>	Success
4	Signing in with an empty password field.	The budget app should display an error message indicating that the password field is required.	<i>Password required...</i>	Success
5	Clicking the "Remember Me" button Unchecked.	The budget app should remember the user's login credentials for future sign-ins.	<i>Remember me Checked...</i>	Success
5	Clicking the "Remember Me" button Checked.	The budget app should remember the user's login credentials for future sign-ins.	<i>Remember me Unchecked...</i>	Success

Table 2. User - Sign In

TEST CASE ID	TEST CASE	EXPECTED RESULT	RESULT SHOWN	RESULT
1	Valid Income/Expense Logging.	The income/expense entry is successfully logged.	<i>Added Successfully</i>	Success
2	Logging Income/Expense without type.	An error message indicating missing type is displayed, and the entry is not logged.	<i>Required field...</i>	Success
3	Logging Income/Expense without selecting date.	The budget app should display an error message indicating that the date field is required.	<i>Required field...</i>	Success
4	Entering a negative amount.	An error message indicating invalid amount is displayed, and the entry is not logged.	<i>Invalid input...</i>	Success
5	Clicking the "update" button.	The budget app should successfully update the logged income or expense entry with any modifications made by the user.	<i>Updated Successfully</i>	Success

Table 3. User – Income and Expense Logging

TEST CASE ID	TEST CASE	EXPECTED RESULT	RESULT SHOWN	RESULT
1	Display income entries	The Income Fragment should show a list of income sources with their respective details, including names, amounts, and date.	Displayed in Income History	Success
2	Add new income entry.	After adding a new income source, it should be displayed in the Income Fragment's list of income data with the correct details.	Displayed in Income Recycler Data	Success
3	Edit an existing income source.	The changes should be reflected in the Income Fragment, updating the details of the edited income source accordingly.	Displayed in Income Recycler Data	Success
4	Delete an existing income source.	It should be removed from the Income Fragment, and the list of income sources should update accordingly, excluding the deleted source.	Removed in Income Recycler Data	Success

Table 4. User – Income Fragment

TEST CASE ID	TEST CASE	EXPECTED RESULT	RESULT SHOWN	RESULT
1	Display expense entries.	The Expense Fragment should show a list of expenses with their respective details, including names, amounts, and date.	Displayed in Expense Data Dashboard	Success
2	Add new expense entry.	After adding a new expense source, it should be displayed in the Expense Fragment's list of expense entry with the correct details.	Displayed in Expense Recycler Data	Success
3	Edit an existing expense entry.	The changes should be reflected in the Expense Fragment, updating the details of the edited expense entry accordingly.	Displayed in Expense Recycler Data	Success
4	Delete an existing expense entry.	It should be removed from the Expense Fragment, and the list of expense entries should update accordingly, excluding the deleted entry.	Removed in Expense Recycler Data	Success

Table 5. User – Expense Fragment

TEST CASE ID	TEST CASE	EXPECTED RESULT	RESULT SHOWN	RESULT
1	Verify that the user cannot delete their account if they haven't confirmed the action.	The user receives a prompt to confirm the account deletion action before proceeding.	<i>Are you sure? Deleting this account will result in completely removing your account from BudgetHive and you will no longer be able to access this account. In future if you wish to use the same email then you need to register again.</i>	Success
2	Verify that the user can delete their account successfully	The user's account is deleted from the system, and they receive a confirmation message indicating successful deletion.	<i>Account Deleted</i>	Success

Table 6. User – Delete Account Module

TEST CASE ID	TEST CASE	EXPECTED RESULT	RESULT SHOWN	RESULT
1	Attempting to change password with invalid current password.	User should receive an error message indicating that the current password entered is incorrect.	<i>Something wen wrong. Please try again later..</i>	Success

2	Attempting to change password with empty fields.	User should receive an error message indicating that all fields are required.	<i>Required field...</i>	Success
3	Attempting to change password with new password matching password confirmation.	User should successfully change their password when new password matches the password confirmation field.	<i>Something wen wrong. Please try again later..</i>	Success
4	Attempting to change password with mismatched password confirmation.	User should receive an error message indicating that the new password and password confirmation do not match.	<i>Something wen wrong. Please try again later..</i>	Success
5	Attempting to change password with less than 6 characters	User should receive an error that the new password does not have the minimum required character	<i>Must contain at least 6 characters..</i>	Success

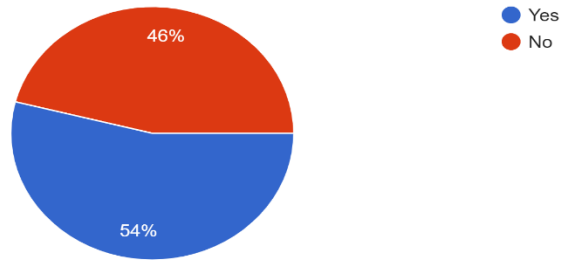
Appendix D
Survey Summary

Summary of Survey Questionnaire for CvSU Students

Part I.

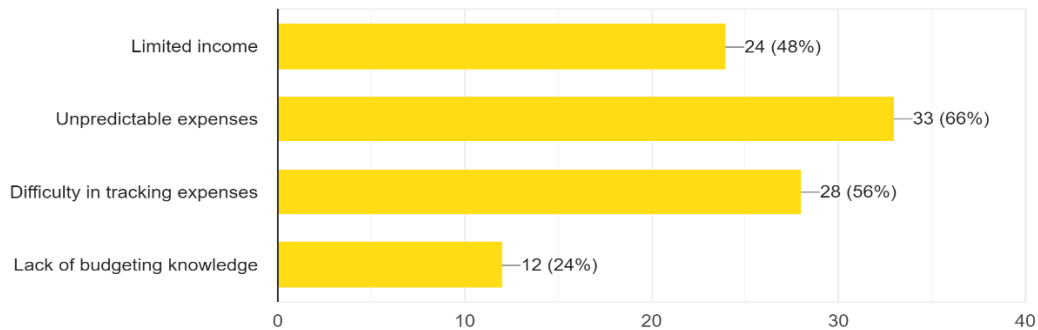
Have you ever created a financial tracker to manage your finances as a student?

50 responses



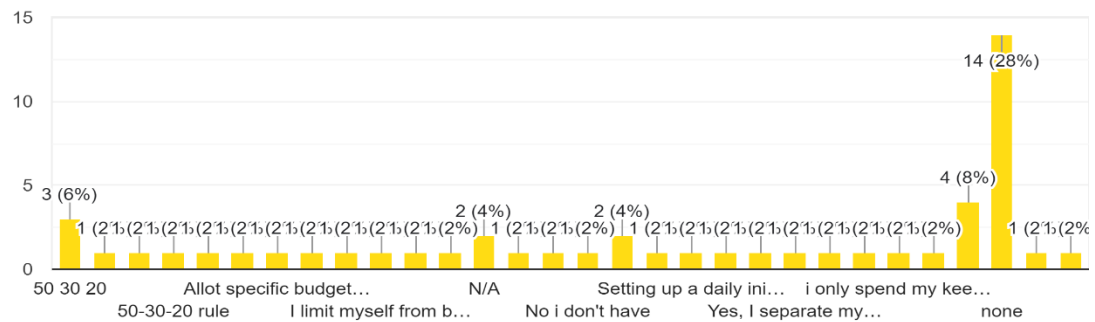
What are the biggest challenges you face when it comes to tracking your expenses and managing your money as a student? (check all that may apply)

50 responses



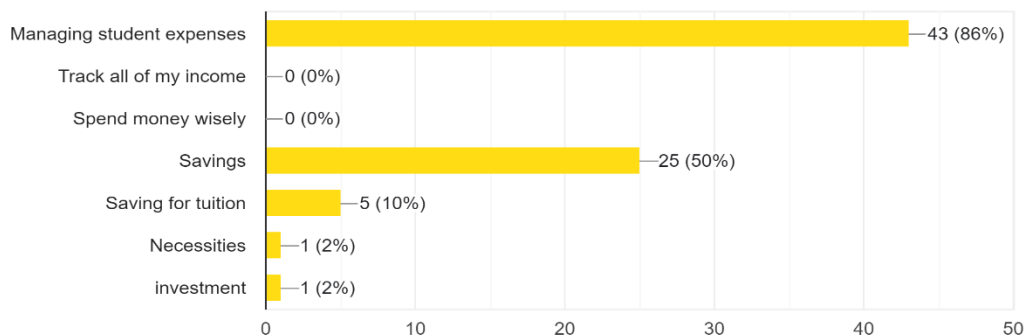
Do you have a strategy or method for saving money while pursuing your studies? If so, please describe it.

50 responses



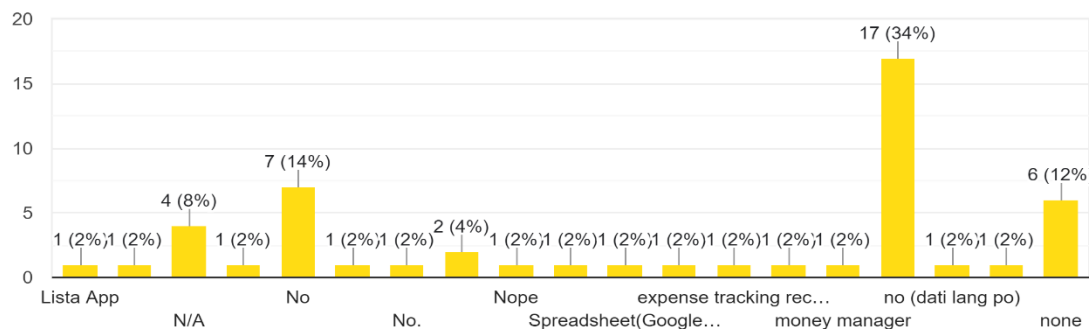
What are your financial goals and priorities as a student? (check all that may apply)

50 responses



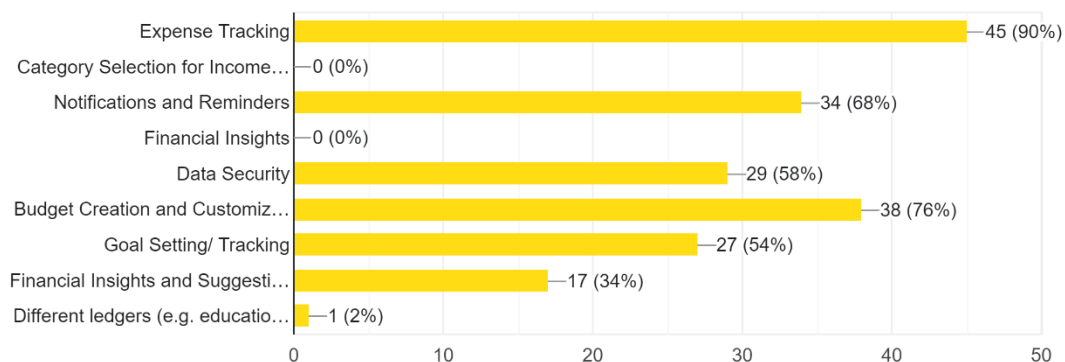
Are you currently using an income and expense tracker app or tool? If so, which one? (specify app/tool on the space provided)

50 responses



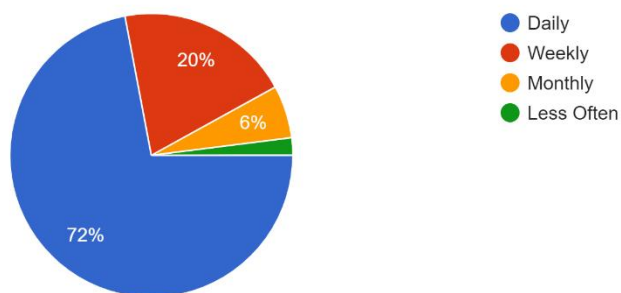
What features do you believe are essential in an income and expense app designed for students? (check all that may apply)

50 responses



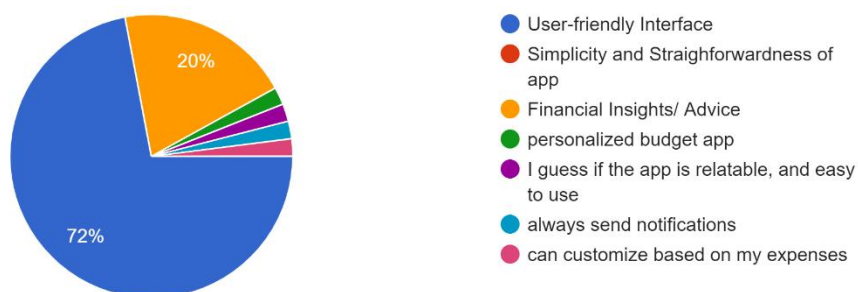
How frequently do you prefer to track and update your income and expenses?

50 responses



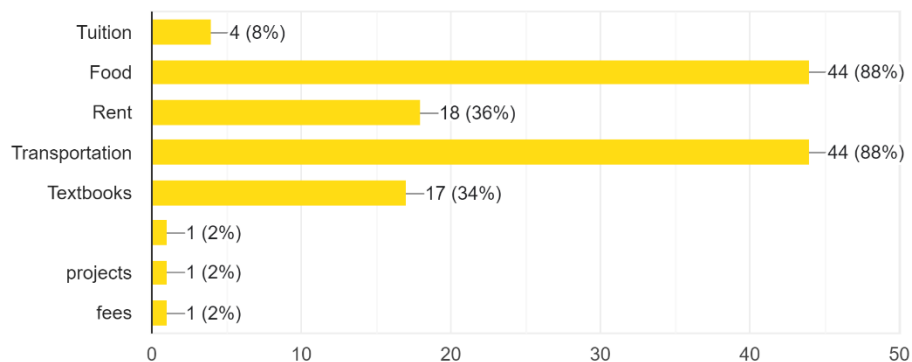
What would motivate you to use an income and expenses tracker app regularly?

50 responses



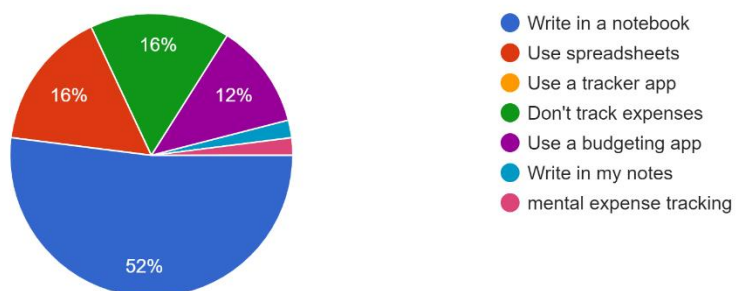
What are your most common expenses as a student? (check all that may apply)

50 responses



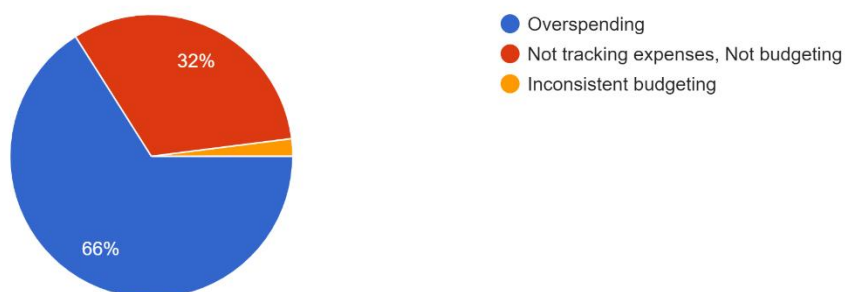
How do you typically track and categorize your expenses?

50 responses



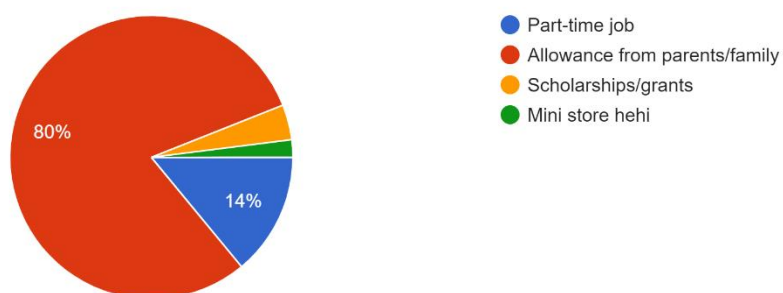
What are the biggest financial mistakes you've made as a student?

50 responses



What are your main sources of income as a student, and how do you manage this income?

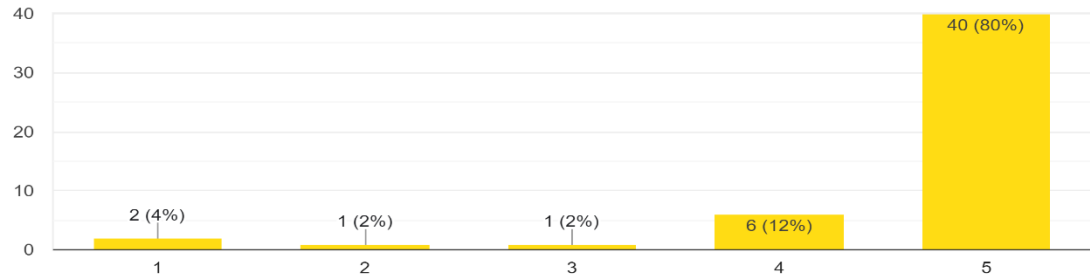
50 responses



Part II.

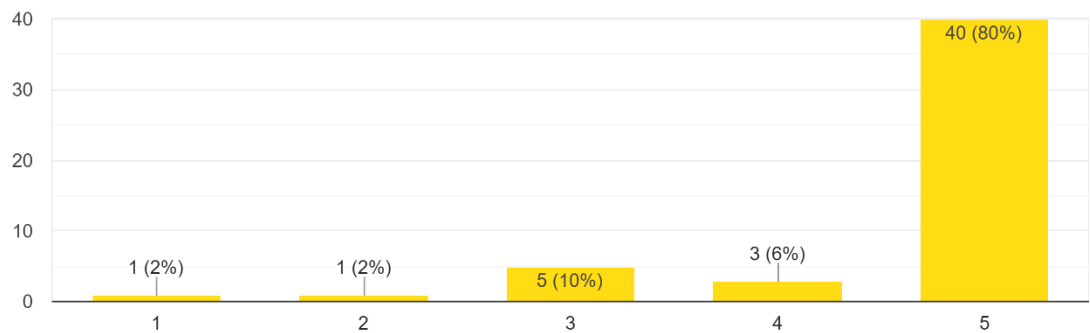
The app should have an easy-to-navigate interface for managing and tracking expenses.

50 responses



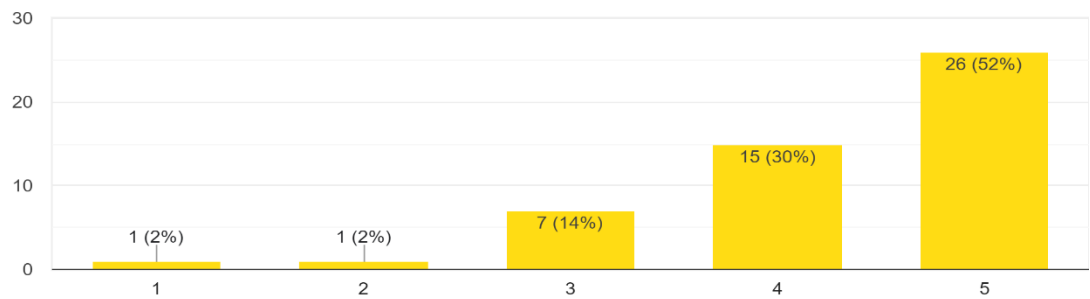
Customizable categories based on personal spending needs are essential in the app.

50 responses



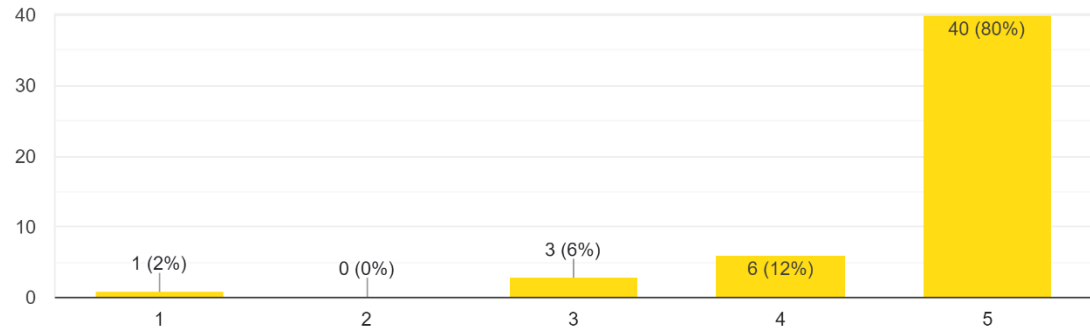
Regular reminders and notifications to update or review the income and expenses are helpful for maintaining financial discipline.

50 responses



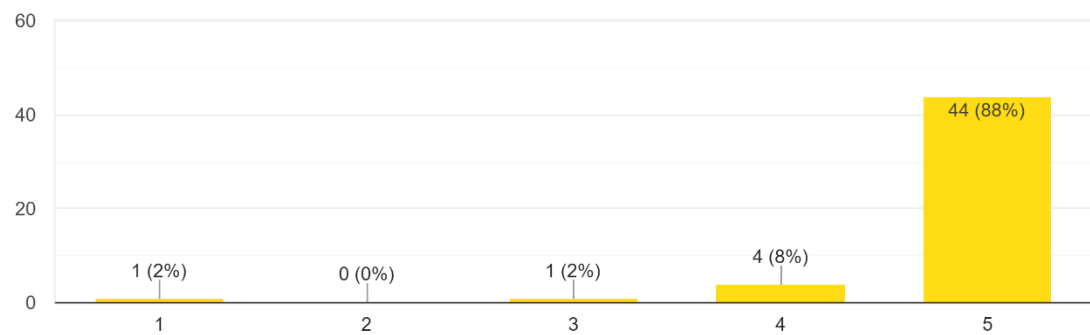
Interactive graphs or visuals illustrating spending patterns and trends would be useful for financial analysis.

50 responses



The app should have strong data security measures to protect user information and financial data.

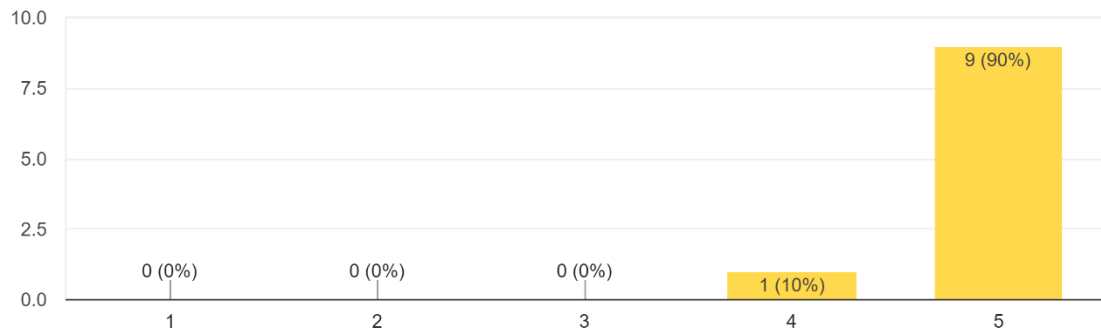
50 responses



Appendix E
Evaluation Summary

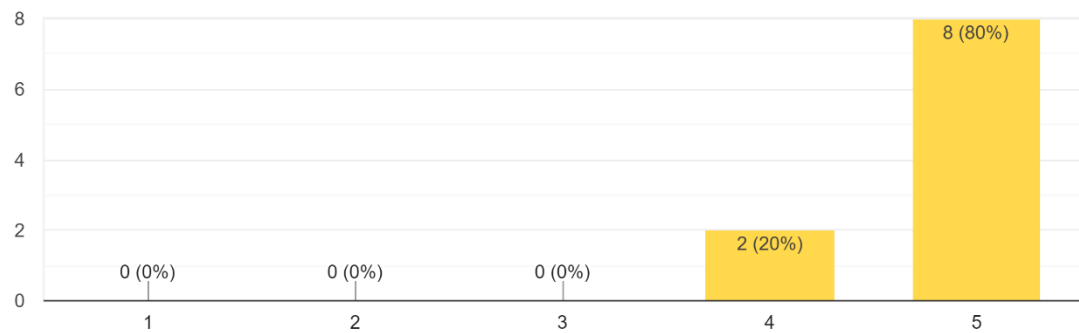
The app's user interface is easy to navigate.

10 responses



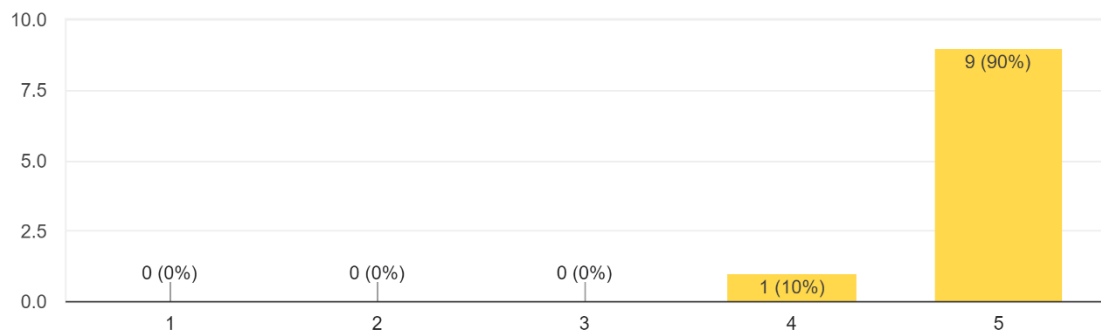
The app accurately records income.

10 responses



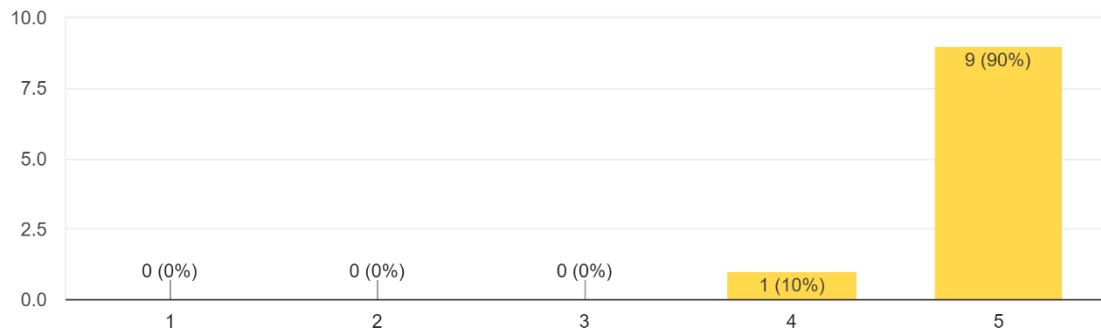
The app accurately records expenses.

10 responses



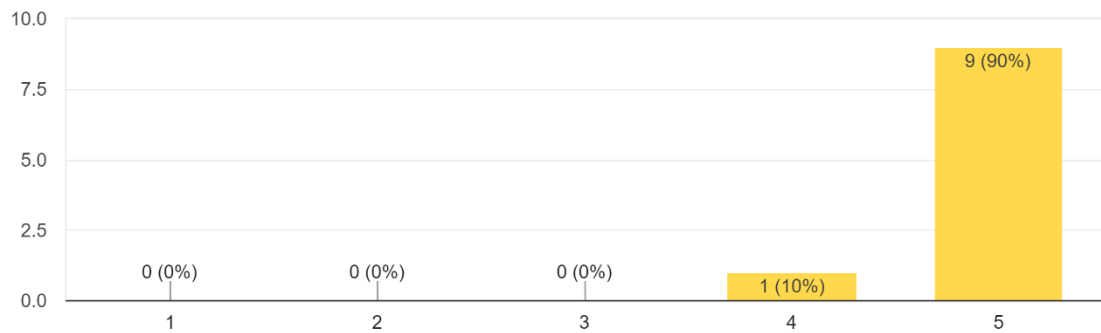
The app provides clear and informative summaries of my financial data.

10 responses



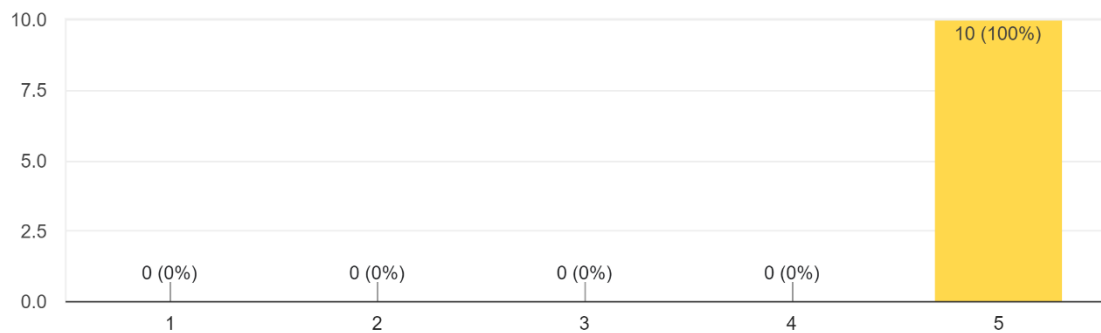
The app accurately categorizes my income and expenses.

10 responses



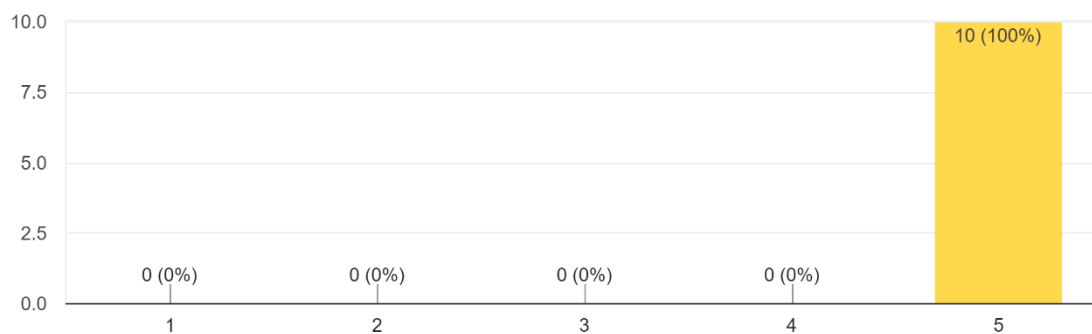
I find it easy to learn how to use the app.

10 responses



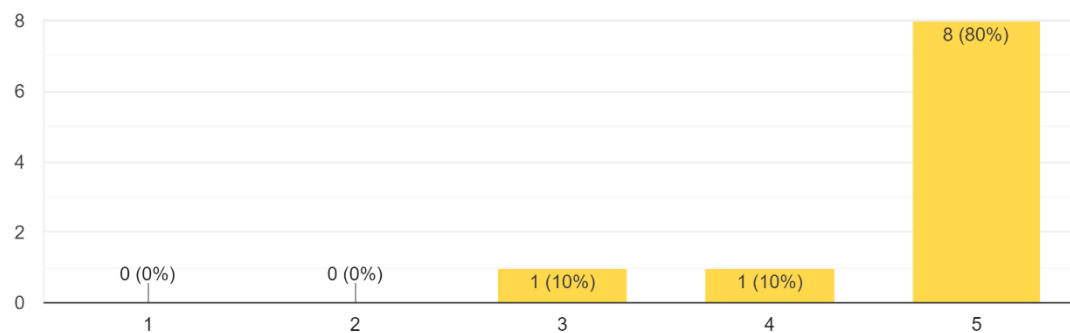
The app's design is visually appealing.

10 responses



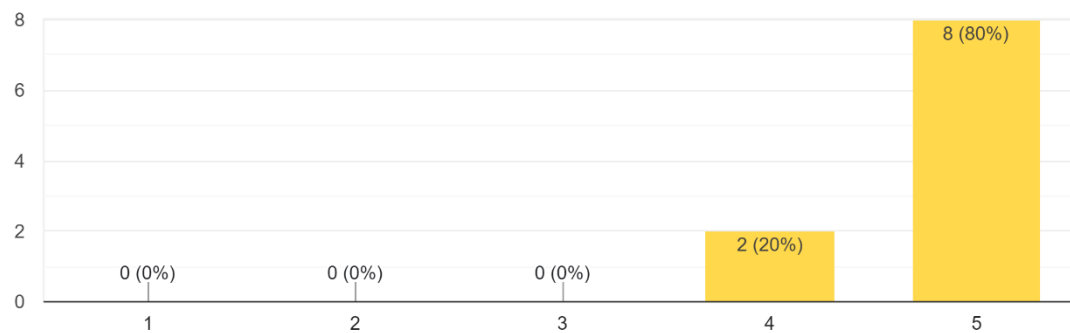
The app provides helpful alerts to notify about spending.

10 responses



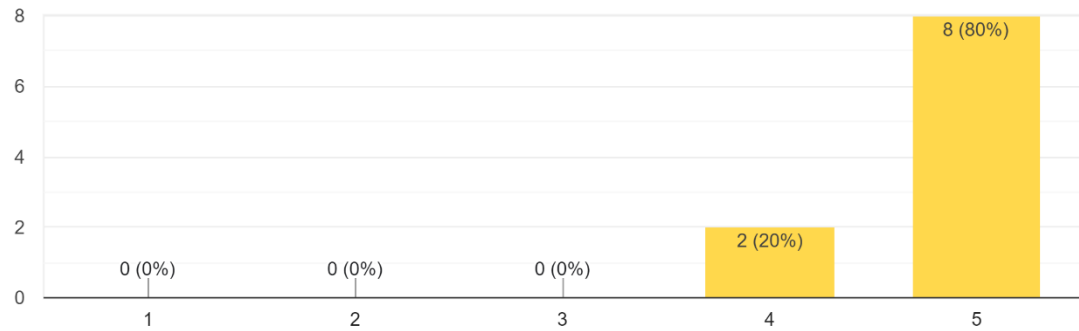
The app offers a seamless experience.

10 responses



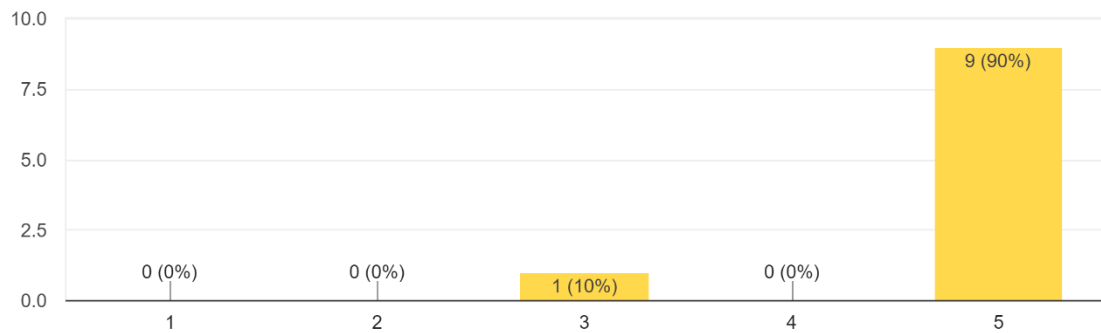
The app's loading times are reasonable.

10 responses



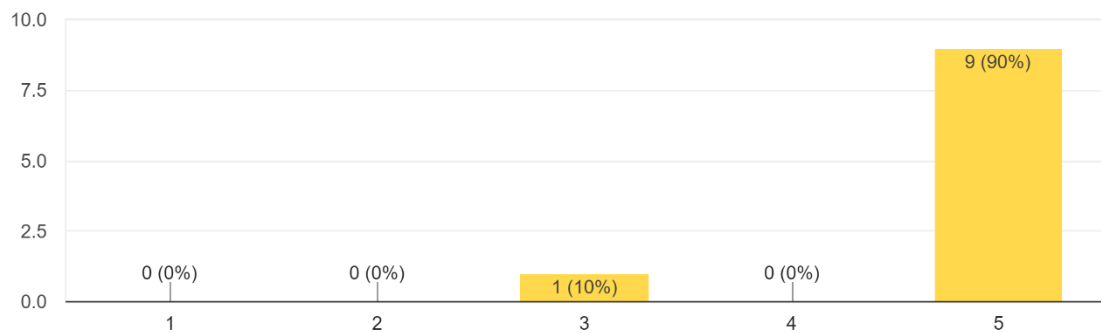
I trust that my financial data is securely stored within the app.

10 responses



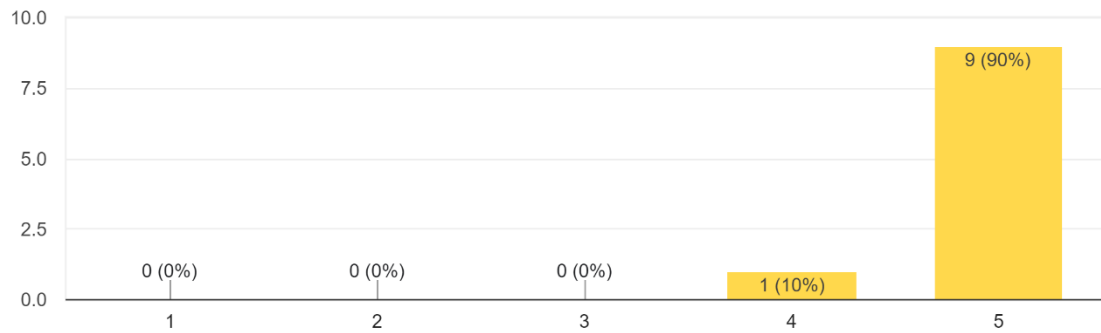
The app provides adequate options for securing my account (e.g., password protection)

10 responses



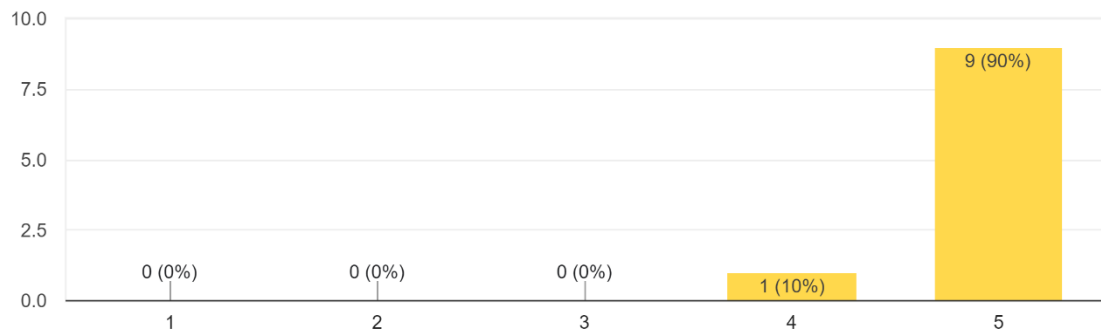
I am satisfied with the overall performance of the app.

10 responses



I would recommend this app to other students for managing their finances.

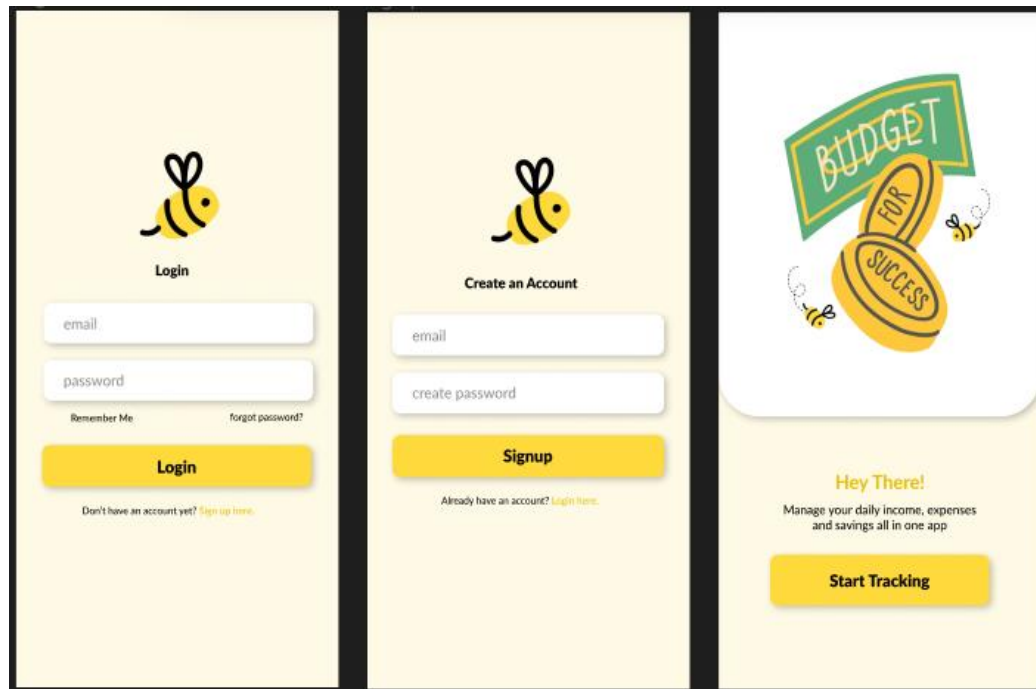
10 responses



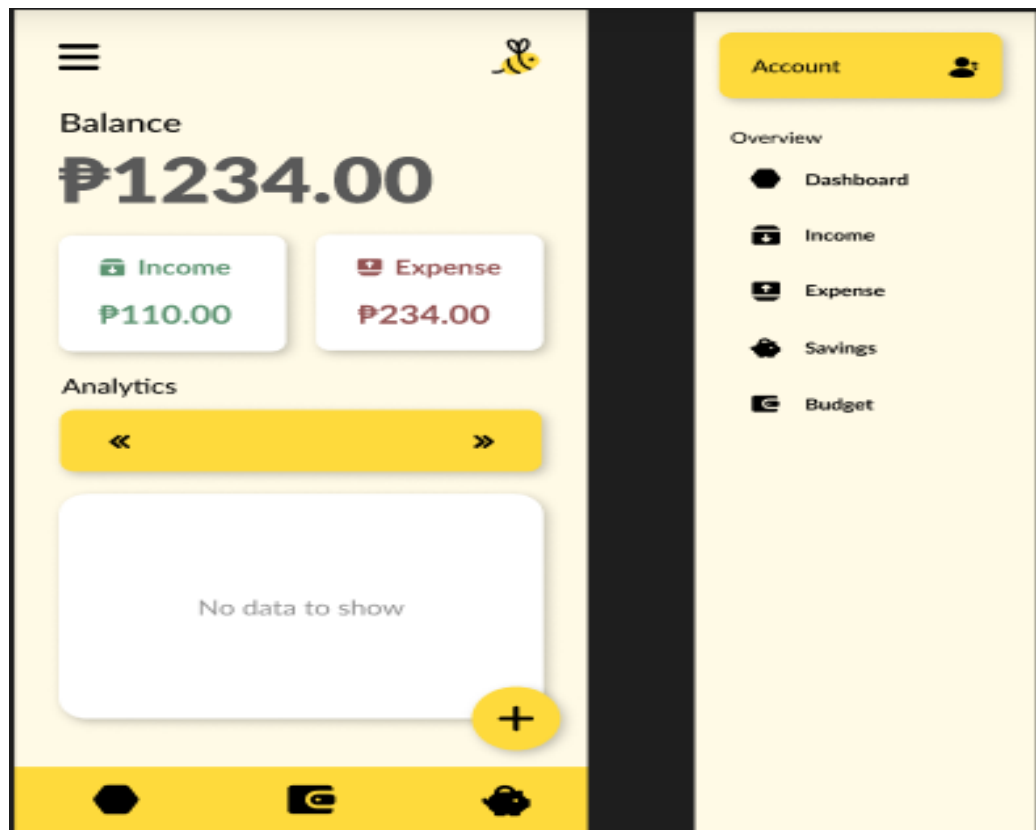
Appendix F

Screenshots

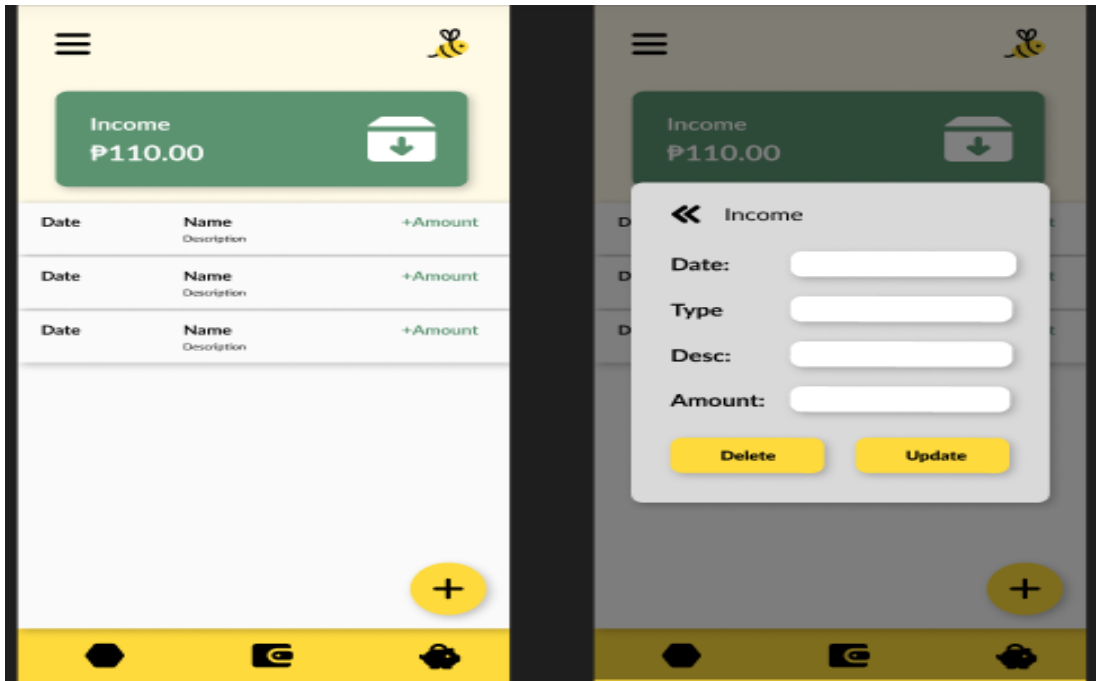
BudgetHive Screen / Sign Up and Log In



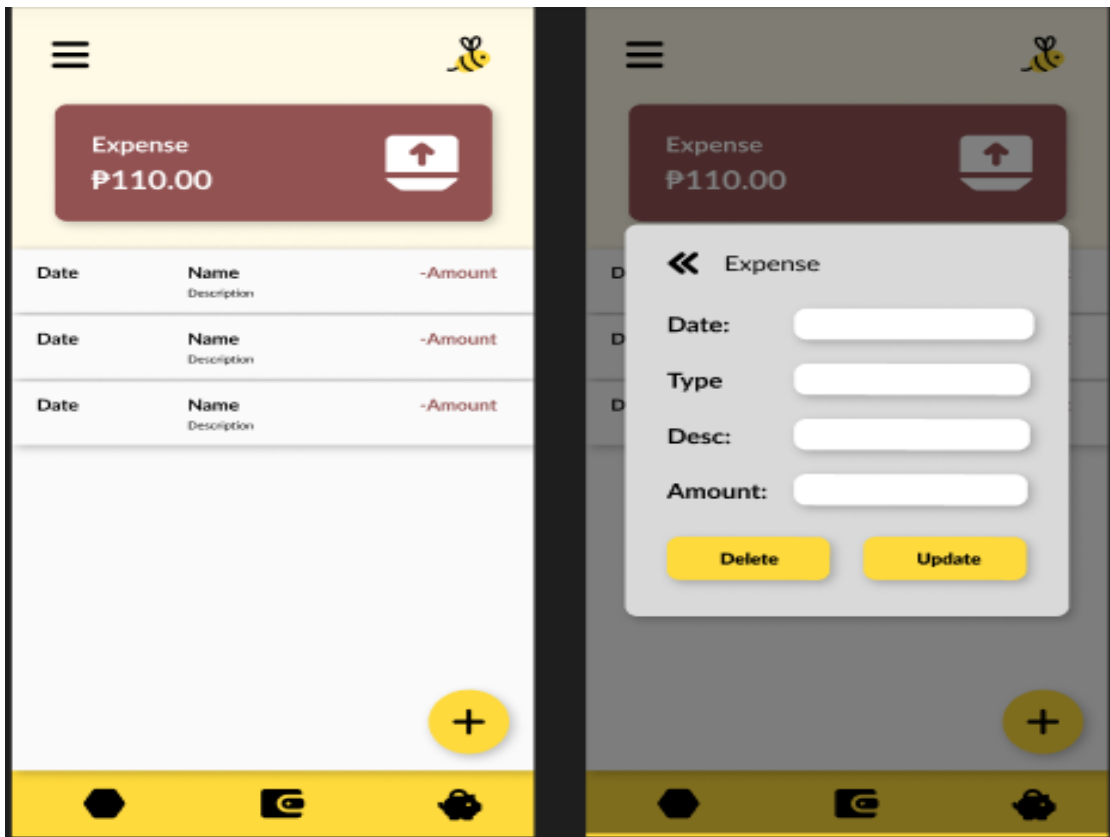
Dashboard



Income Fragment



Expense Fragment



Layout of Profile

The image displays two side-by-side mobile application screens with a light yellow background and a dark grey header bar. Both screens feature a back arrow icon and the title 'Account'.

Left Screen:

- Section: Account Email
- Input field: email@email.com
- Buttons: Change Password, Logout, Delete Account

Right Screen:

- Section: Change Password
- Input fields: current password, new password
- Button: Save