

FINTRACK: A Comprehensive System for Personal Financial Monitoring and Management

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Abstract: This study examines and forecasts the spending behaviours of college students to assist them in recognising opportunities for financial enhancement and cultivating improved saving practices. The survey data categorizes expenditures into necessary and non-essential categories and assesses financial literacy through savings rates. The analysis computes monthly income, total spending, and savings to offer insights into financial well-being. The study used visualizations such as pie charts and bar graphs to elucidate the distribution of spending across several categories. It provides tailored advice based on savings rates, including budgeting strategies, spending reduction methods, and prospective investment opportunities.

The study analyses the impact of spending behaviours on long-term financial stability, highlighting the necessity of reducing superfluous expenditures by comparing essential and non-essential spending. Predictive models forecast future financial results, assisting students in preparing for possible obstacles. "FinTrack" enhances its offerings by providing pragmatic guidance on establishing financial objectives and identifying cost-effective substitutes for typical expenditures. This project utilises Python for data analysis and visualisation to elucidate spending trends, offer actionable advice, and enable students to manage their funds, so fostering financial literacy and independence.

Keywords: Financial Literacy, Savings Rate, Spending Habit, Personalized Recommendations, Investment Opportunities.

1. INTRODUCTION

Proficient financial management is an essential life skill, especially in the current economy, where economic security relies on judicious decision-making. Students sometimes find it tough to budget and save due to the need to balance essential expenses such as personal fees, housing, and food with discretionary expenditures on entertainment. A significant number of students find it challenging to monitor expenditure and pinpoint opportunities for

savings, thus jeopardizing their financial well-being in the long term. The FinTrack tackles these issues by examining and forecasting student expenditure patterns. The primary objective is to assist pupils in comprehending their financial habits, optimizing money management, and enhancing savings. By classifying expenditures into necessary (needs) and non-essential (wants), the initiative offers a transparent perspective on spending behaviours and promotes the contemplation of financial decisions. The research utilizes survey data from students, concentrating on their income, expenditures, and savings. It uses Python for sophisticated data analysis and visualisation to discern trends and computes essential metrics such as average monthly expenditures, savings rates, and expense allocation across categories. Furthermore, it assesses financial literacy through savings rates, providing tailored suggestions for enhancing saves, optimizing budgets, and improving financial decision-making. FinTrack aspires to transcend mere identification of spending patterns; it endeavours to promote prudent financial practices through actionable guidance and tailored methods. The project equips students with the information and resources to cultivate sound financial habits, fostering enduring financial stability and well-being.

2. LITERATURE REVIEW

2.1 Financial Literacy and Its Critical Role

The information and abilities required to manage budgets, loans, savings, and investments are collectively referred to as financial literacy. It is impossible to overestimate the significance of financial literacy in the modern world, when economic stability and financial security are largely dependent on individual financial management. According to a 2011 study by Lusardi and Mitchell, those who lack financial literacy are more likely to

face long-term financial instability, neglect retirement planning, and struggle with debt. On the other side, people who are financially literate are better able to plan for their financial future and can steer clear of typical dangers like high-interest loans.

Young people's purchasing and saving habits may suffer as a result of their frequent lack of fundamental financial education, especially among high school and college students. Students' financial literacy was shockingly low, according to research by Chen and Volpe (1998). According to their research, students who did not receive formal financial education were more likely to make bad financial decisions that resulted in debt and insufficient savings. This demonstrates the essential role that financial education plays in forming lifelong financial habits, underscoring the urgent necessity for it throughout formative years.

2.2 Student Spending Habits: Trends and Insights

It is very important to understand how students spend their money because it often shows what their financial goals are and how disciplined they are. Xiao et al. (2011) found that students spend a lot of money on things that aren't necessary. The most common areas of spending are entertainment, eating out, and electronics. Spending this way often creates an imbalance that makes it hard for students to pay for things like school, energy, and transportation.

Tisdell (2014) examined the psychological and social influences that shape students' expenditure patterns. The study revealed that peer influence and social conformity were substantial factors contributing to students' discretionary expenditures, particularly in areas like social activities and luxury purchases. The survey indicated that numerous students possessed inadequate budgeting skills, frequently depending on parental assistance or loans without comprehending the long-term implications. This pattern was particularly pronounced among students with limited financial education or those who lacked exposure to personal finance discussions at home.

2.3. Influence of Financial Education on Behaviour

Research has shown that learning about money makes people better at managing their money. A meta-analysis by Fernandes, Lynch, and Netemeyer (2014) found that people who learn about money are

more likely to behave responsibly with their money by doing things like planning, saving, and staying out of debt. Targeted financial education programs, especially those that focused on useful topics like making budgets, setting savings goals, and knowing interest rates, were found to greatly improve people's money habits.

Additionally, learning about money in high school has long-lasting advantages. Mandell's research from 2008 showed that high school students who took personal finance classes were more likely to keep good money habits after college. However, Mandell's study also showed that teaching people about money is not enough; the quality and usefulness of the teaching are very important for changing people's behaviour. Traditional lecture-based methods have been shown to have less of an effect on students' behaviour than programs that use interactive tools, real-life case studies, and personal cash management software.

A lot of research has been done on the link between learning about money and better buying habits, but there are still big holes in the research. For example, most of the research that has been done so far has been on college students. Not many studies have looked at how high school students handle their money. High school is a key time for financial growth because that's when kids start handling their own money, whether they get help from their parents, get allowances, or work part-time. This study tries to fill that gap by looking at how students spend their money, especially in a developing area like Sarangani Province where learning about money isn't always easy.

Another gap in the literature pertains to personalized financial recommendations. While numerous studies explore general financial behaviour and the impact of education, few studies offer personalized strategies based on individual spending patterns. This research seeks to contribute by analyzing survey data and providing tailored recommendations to students for improving their financial habits. By focusing on categorizing expenses into essential and non-essential, this study will highlight areas where students can make immediate changes to their spending habits, thereby fostering a culture of savings and financial responsibility.

3. EXSISTING SYSTEM

The existing systems for managing student spending are often basic, relying on traditional methods like

handwritten ledgers, spreadsheets, or simple mobile apps. These tools typically focus on recording transactions without providing deeper insights or personalized recommendations. Most platforms lack features tailored to individual financial needs, and they often don't include financial education, leaving students unable to effectively interpret their financial data. A major limitation is the failure to distinguish between essential and non-essential spending. Expenses like rent and groceries are grouped with discretionary purchases, preventing students from identifying areas to cut back or manage finances better. This lack of categorization leads to poor financial decision-making and hampers goal setting.

In conclusion, existing systems lack essential features such as expense categorization, predictive analysis, personalized recommendations, real-time updates, and data visualization, all of which are crucial for effective financial management. This highlights the need for more advanced, data-driven solutions to better serve students' financial needs.

4. PROPOSED SYSTEM

The Fintrack system is designed to help students manage their finances more effectively. It categorizes expenses into essential and non-essential spending, making it easier for students to focus on necessary costs and identify areas to reduce discretionary expenses. The system also offers real-time tracking and feedback, allowing students to monitor their spending habits and avoid overspending. With predictive analysis, Fintrack helps students plan for upcoming expenses by forecasting future costs and savings based on past spending patterns. This feature also assists in setting achievable savings goals and preparing for unexpected expenses. Another important aspect of the system is its financial literacy education. It provides personalized tips and recommendations to guide students in budgeting, cutting unnecessary costs, and improving their saving habits. The system is built with a simple and easy-to-use web interface powered by Streamlit, making it accessible from any device. Students can quickly view and manage their financial data without needing a background in finance. By using tools like Pandas, NumPy, and Scikit-learn, Fintrack performs detailed data analysis and offers tailored recommendations to suit individual financial needs. In summary, Fintrack is a practical solution for managing student finances. It offers features like real-time tracking, expense

forecasting, personalized advice, and financial education, all within an intuitive web platform.

5. METHODOLOGY

5.1 Research Design and Approach

This study uses a quantitative research approach with survey data to analyze student spending habits and financial literacy. The survey-based design enables efficient data collection and identification of trends and patterns. Statistical methods are used to explore relationships, such as the influence of financial literacy on spending behavior. The research aims to answer:

- What are the common categories of student spending (essential vs. non-essential)?
- How does financial literacy impact spending habits?
- What improvements can enhance students' financial habits?

5.2 Data Collection

Data was gathered via an online survey distributed through Google Forms targeting college students. The survey covered:

- Personal Expenses: Clothing, gadgets, entertainment, self-care.
- Educational Expenses: Books, tuition fees, school supplies, activities.
- Social Expenses: Dining out, movies, gatherings.

It comprised three sections: demographics, spending behavior, and a financial literacy assessment with scenario-based questions on budgeting.

5.3 Data Cleaning

Survey responses were cleaned for accuracy:

- Missing Data: Imputed with median values or excluded if incomplete.
- Outlier Detection: Unrealistic values (e.g., \$0 expenses) were removed.
- Categorization: Expenses were divided into essential (e.g., food, utilities) and non-essential (e.g., entertainment, gadgets).

The cleaned data was stored in CSV format for analysis in Python.

5.4 Data Analysis

Analysis was conducted using Python libraries like pandas, seaborn, matplotlib, and scikit-learn.

- **Descriptive Statistics:** Metrics such as mean, median, mode, and standard deviation summarized spending trends.
- **Visualizations:** Bar charts compared essential vs. non-essential spending, pie charts showed spending breakdowns, and scatter plots analyzed relationships (e.g., income vs. savings).
- **Savings Potential:** Identified overspending on non-essentials and calculated potential savings by reallocating or reducing discretionary spending.

This streamlined methodology enabled insights into student spending patterns and strategies for financial improvement.

6. RESULTS AND DISCUSSION

The analysis and inference are given below:

6.1. Income Distribution Analysis:

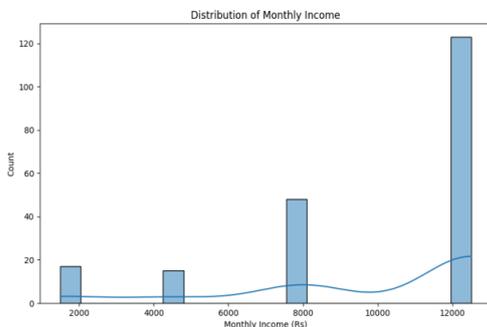


Fig 1

- Fig 1 analyzes the range and distribution of students' monthly income or pocket money.
- Collects income data from users.
- Groups income into categories: Below 3000, 3000-6000, 6000-10000, and Over 10000.
- Assigns numerical values to these ranges for analysis.
- Reveals the average income level of students.
- Enables individuals to compare their income with peers.
- Provides valuable context for analyzing expenses and savings.

6.2. Spending Pattern Analysis:

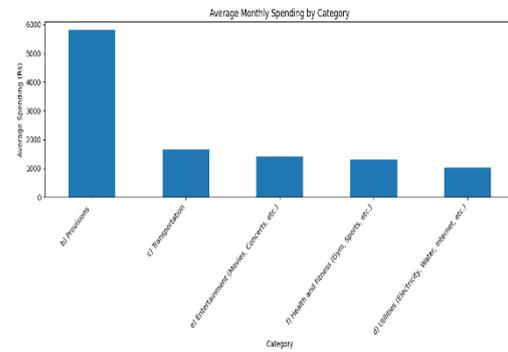


Fig 2

- Fig 2 analyzes how students allocate money across various expense categories.
- Collects spending data for categories like Rent, Food, Transportation, Utilities, Entertainment, and Health.
- Calculates total expenses and percentage share for each category.
- Visualizes spending patterns using bar charts.
- Highlights key spending areas.
- Identifies opportunities to cut costs.
- Compares spending habits with recommended budgeting guidelines.

6.3. Savings Rate Analysis:

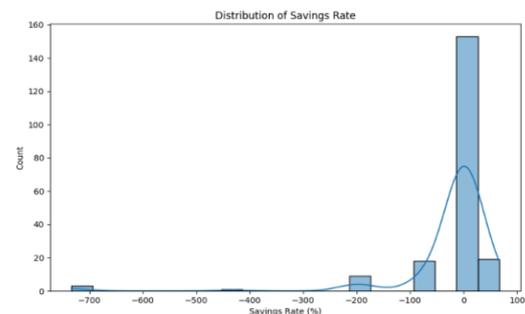


Fig 3

- Fig 3 analyzes students' savings and categorizes their saving behavior.
- Calculates savings as the difference between income and expenses.
- Determines savings rate as a percentage of income.
- Classifies savings into None, Less than 10%, 10-30%, and Over 30%.
- Provides a clear understanding of saving habits.
- Helps students evaluate if their savings are sufficient.
- Supports tailored savings recommendations.

6.4. Expense Tracking Method Analysis:

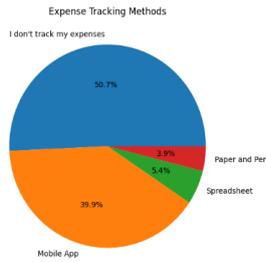


Fig 4

- Fig 4 explores how students track their expenses and its impact on financial behavior.
- Collects data on tracking methods: Mobile App, Spreadsheet, Paper and Pen, or No Tracking.
- Analyzes the relationship between tracking methods and savings rates or spending habits.
- Identifies the most popular tracking methods.
- Recommends effective tracking practices.
- Examines how expense tracking influences financial health.

6.5. Financial Challenges Analysis:

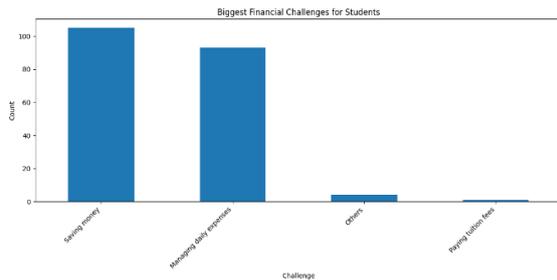


Fig 5

- Fig 5 identifies the most common financial challenges faced by students.
- Gathers data on key issues like managing daily expenses, paying tuition fees, saving money, and other concerns.
- Examines how often each challenge occurs and its connection to other financial habits.
- Highlights the biggest financial concerns students face.
- Provides targeted advice to address specific challenges.
- Informs the creation of effective financial education programs.

This application provides a complete overview of a student's financial health by analyzing income, expenses, savings, financial literacy, and more. It offers personalized recommendations, visual insights, and clear explanations to make financial concepts easy to understand.

Inferences:

- Visualizes spending habits to highlight areas for improvement.
- Shows savings rates compared to recommended benchmarks.
- Offers tailored advice based on financial data.
- Encourages better financial habits and literacy.

By using this app regularly, students can better manage their finances, achieve their goals, and build long-term financial stability.

7. CONCLUSION

The "FinTrack: Your Personal Financial Sentinel" project offered an in-depth analysis of student financial behavior, uncovering valuable insights into their spending habits, savings patterns, and financial challenges. The analysis of income distribution, spending behaviors, and savings rates highlighted areas where students could improve their financial management. It was found that students with higher financial literacy tended to have better savings rates, underscoring the importance of enhancing financial education. The study also examined various methods of expense tracking, sources of income, and investment behaviors, providing a comprehensive view of students' financial practices. Gender-based analysis revealed differences in financial behavior, suggesting the need for financial education tailored to gender-specific needs. Moreover, the project identified common financial challenges and the level of financial confidence among students, offering a clearer understanding of their financial well-being. These findings emphasize the need for targeted financial literacy programs and tools to help students better manage their finances. The recommendations aim to boost students' financial literacy, improve their confidence in managing money, and address common financial issues. Future work could expand on these insights by incorporating a broader datasets and exploring additional factors that influence financial behavior, helping students achieve greater financial stability and success.

8. SCOPE FOR FUTURE ENHANCEMENT

In the future, the project has the potential to greatly expand its impact by incorporating advanced technologies and enhancing its functionality. Introducing artificial intelligence for predictive analytic could allow the system to forecast financial

trends and offer proactive advice. The integration of block-chain technology for secure transactions and transparent financial tracking would increase user trust and ensure data integrity. Additionally, connecting the system with banking API and financial management tools could create a seamless user experience, making it easier for users to manage their finances. Adding gamification elements could further engage users, making financial planning both educational and enjoyable. Collaborating with fin-tech companies and utilizing big data analytic could provide more tailored and precise financial insights, ultimately improving the system's effectiveness. This holistic approach would not only make the system more powerful but also ensure its adaptability in an ever-changing financial environment.

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