

Large Language Models and Mental Accounting: AI-Enhanced Bookkeeping for College Students’ Financial Behavior

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College students often struggle with financial challenges such as impulsive spending, inadequate savings, and ineffective budgeting. Existing bookkeeping tools fail to address these issues due to fragmented data integration, rigid budgeting models, and limited personalization. This study explores the integration of Large Language Models (LLMs) with mental accounting theory to enhance financial decision-making. By using AI-driven real-time budgeting, improved data handling, and explainable AI for transparency, this approach aims to provide more adaptive and personalized financial support. Future research should focus on evaluating these solutions in real-world settings, developing standardized assessment metrics, and expanding applicability to diverse student populations.

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1 INTRODUCTION

Strong financial management is essential for personal independence and well-being, yet many college students struggle with fundamental financial concepts. Research indicates that a lack of financial literacy leads to poor budgeting, excessive debt accumulation, and even suboptimal career decisions due to misunderstandings about salaries and benefits[1][2]. These challenges not only hinder students’ ability to become financially independent but also contribute to stress and reduced academic performance.

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Understanding how students make financial decisions is crucial for improving financial guidance. Mental accounting, a concept introduced by Richard Thaler, provides insights into how individuals mentally categorize income and expenses[3][4]. This framework explains why people often deviate from rational financial decision-making, leading to behaviors such as the sunk cost effect[5] and the tendency to allocate money into distinct spending categories (e.g., necessities vs. entertainment) rather than optimizing their overall financial health[6]. Such categorization often leads individuals to deviate from the “rational agent” assumption in traditional economics when making consumption and savings decisions[7]. For college students, mental accounting influences spending and saving habits, shaping their financial well-being. These behaviors are often shaped by family background, education, and social expectations[8].

Despite the growing availability of bookkeeping tools aimed at improving financial management, existing solutions have notable limitations. Many tools lack seamless integration across platforms, leading to fragmented financial data. Their budgeting mechanisms are often rigid, failing to adapt to users’ dynamic financial situations. Moreover, these tools rarely incorporate behavioral insights, making them less effective in encouraging long-term financial responsibility.

In exploring ways to improve financial guidance for students, I am currently conducting research on how behavioral insights and AI can enhance financial decision-making support. As part of this ongoing work, I have conducted a survey with 305 college students and in-depth interviews with 13 participants to examine their financial habits, challenges, and the role of existing financial tools. One promising direction involves integrating LLMs with behavioral finance principles to offer more adaptive and personalized financial support. The proposed system could be a mobile application that proactively provides financial advice and recommendations. To enable mental accounting-aware personalization, the system would need to collect user data such as user spending information, account allocation preferences, and financial goals, either through manual input or automatic tracking, to integrate user preferences and spending habits effectively. While this study does not propose a definitive solution, it aims to explore the feasibility of using LLMs to enhance financial guidance, particularly for low-income students who may require more flexible and tailored budgeting strategies.

Instead of focusing solely on personal financial management, AI tools can also play a significant role in group budgeting and shared financial decision-making in the future. AI tools can enhance group budgeting by integrating individual and cooperative financial approaches, optimizing income allocation, and automating expense tracking[9]. Additionally, AI supports shared financial decision-making by providing data-driven insights, predictive analytics, and strategic recommendations, improving decision accuracy and efficiency[10].

2 EXISTING LIMITATIONS AND POTENTIAL IMPROVEMENTS

2.1 Insufficient Data Integration, Integrity, and Privacy Concerns

Bookkeeping tools often struggle with integrating financial data across multiple platforms. Users frequently encounter fragmented financial records due to inconsistent data formats and security concerns, making it challenging to obtain a comprehensive view of their finances[11]. Moreover, technical limitations and poor cross-platform compatibility further hinder users' ability to consolidate information from various banks, credit cards, and financial services[12]. Additionally, privacy concerns and regulatory compliance issues pose significant barriers to user trust. Users often hesitate to share financial data due to potential security vulnerabilities[13].

One approach to overcoming these challenges is to use AI and LLMs to automate data processing and ensure consistency across financial records. Advanced machine learning algorithms can help categorize financial data more effectively, reducing fragmentation and improving user accessibility. According to my survey, a major reason many college students resist using bookkeeping tools is the requirement to pay for unlocking additional features. However, essential functions such as bill import and data integration typically require a subscription to access. Since the primary goal of bookkeeping software is to help users save money, requiring them to spend money before they can even start saving seems inherently contradictory. In my future design, I will make these features completely free to access. Blockchain-based security mechanisms[14] may also enhance data integrity and protection. Furthermore, integrating explainable AI can increase transparency in data handling, building greater user trust[15]. Incorporating federated learning with differential privacy ensures that financial data remains decentralized while maintaining the accuracy of AI-driven financial insights, reducing exposure to cyber threats[16]. Furthermore, adopting explainable AI methods tailored for financial decision-making can enhance user trust by offering clear justifications for personalized recommendations and mitigating concerns regarding algorithmic bias[17]. Addressing these privacy and security concerns will strengthen trust and encourage the widespread adoption of AI-enhanced financial management solutions among students.

2.2 Rigid Budgeting Models and the Role of Mental Accounting

Many bookkeeping tools rely on static budgeting frameworks based on predefined rules. These models often fail to adjust dynamically to fluctuations in users' income and expenses, making them less effective in addressing financial uncertainties. Traditional budgeting algorithms, which assume predictable financial patterns, quickly become obsolete, limiting their ability to provide meaningful financial insights[18]. Additionally, most tools lack mechanisms to incorporate real-time financial behavior adjustments, reducing their adaptability to users' needs. Mental accounting plays a crucial role in budgeting decisions, as users

often categorize their money into separate accounts, influencing how they allocate funds[19]. Current bookkeeping tools do not adequately integrate behavioral finance insights, leading to misaligned financial planning strategies. For example, users may be reluctant to shift money between mental accounts even when necessary, leading to suboptimal budgeting outcomes.

To address these shortcomings, AI-powered bookkeeping tools can incorporate dynamic budget allocation strategies, adjusting in real-time to users' income and spending fluctuations[20]. Furthermore, LLMs can help users reframe financial decisions based on behavioral insights, providing context-aware recommendations that align with their existing mental accounts[21]. Behaviorally informed interventions, such as nudges encouraging users to save more[22], can help optimize financial habits.

2.3 Limited Personalization and User Support

Bookkeeping applications often fall short in offering personalized recommendations tailored to different financial situations. For instance, low-income students who require more flexible budgeting strategies may find existing tools inadequate in addressing their specific needs[23]. AI-driven tools often employ standardized suggestions that fail to account for individual spending habits and long-term financial goals.

LLMs can provide personalized financial advice tailored to individual financial behaviors and goals, offering targeted recommendations for different user groups. By integrating mental accounting principles, AI can better understand how users perceive different sources of income and expenses, customizing budgeting strategies accordingly. Additionally, improving transparency in AI models and compliance with financial data regulations[24] can strengthen user confidence in these tools[25].

3 CONCLUSION

This paper examines the potential of integrating LLMs with mental accounting theory to improve financial decision-making among college students. Traditional bookkeeping tools often lack real-time adaptability and behavioral insights, limiting their effectiveness in addressing issues like debt accumulation, impulsive spending, and inadequate savings. LLMs offer a potential solution by providing personalized, context-aware budgeting recommendations aligned with users' financial behaviors.

A key finding highlights the need for adaptive budgeting models and greater transparency. AI-driven bookkeeping tools that adjust dynamically to income fluctuations and incorporate explainable AI features could enhance trust and usability. Strengthening data security and privacy measures would further encourage adoption.

Future research should focus on testing AI-enhanced bookkeeping solutions in real-world settings, particularly for low-income students. Evaluating their effectiveness through longitudinal studies and interdisciplinary approaches will be crucial. Ultimately, using AI in bookkeeping has the potential to foster greater financial independence and long-term financial stability.

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