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Role of AI-Based Budgeting Tools in Promoting Financial Discipline Among University Students

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Abstract:
With financial independence increasingly becoming an important factor in the lives of students, most university students are still struggling to manage budgets, spendthrift, and futuristic financial planning. Rising incorporation of Artificial Intelligence (AI) in the field of personal finance is a chance to solve these problems using flexible and personally oriented budgeting tools. The research uses a non-randomized post-test pre-test, quasi-experimental control group design to reveal how AI-based budgeting applications help make university students more financially disciplined (examples include Mint, YNAB, and GPT-based platforms). A stratified random selection of first and second level university and post graduate students was done and measured to gauge the difference in effect of AI driven interventions against conventional budgeting techniques. By making financial behavior operational by means of validated scales and well-structured interventions the study will attempt to assess the impact of AI tools on practically based financial decision-making. The research can add to the growing field on digital financial literacy, and it can give implications on how student support systems with an emphasis on technologies should be designed in institutions of higher learning.

Keywords: AI-Based Budgeting Tools, Financial Discipline, Budgeting Tools in Higher Education, Digital Financial Literacy

1. INTRODUCTION

Irrespective of the growing accessibility of online banking and finance offers, it also turns out that many university students lack financial restraint and end up leading poor spending habits, accruing more debts, and ultimately leading to financial unsustainability in the long run (Lusardi & Mitchell, 2017; OECD, 2020).In AI-driven budgeting systems, a personalised financial guidance is marketed, but no investigation has been done on the successfulness in shaping the financial attributes of the students, particularly in the Indian higher education (Agarwal & Chakraborty, 2023).In the era of everything digital, financial literacy and independence are emerging into very essential life competencies especially to college students as they add adulthood and the art of managing monetary resources on their own. Despite all these enlightenment about the necessity of budgeting, majority of students are unable to manage their expenditure, avoid debts, and save money. Financial irresponsibility not only affects academic performance and the level of mental well-being but also results in long-term negative consequences at both a personal and professional level (Shim et al., 2009; OECD, 2016). Artificial Intelligence (AI) is one of the introducers in the world of personal finance management in the era of the rapid growth of technologies. AI-based budget applications mentioned here are Mint, Walnut, Spondee, and YNAB (You Need A Budget), featuring automated

tracking and predictive analysis, expense categorization, and personal tips on various budgeting items, which can be used to educate an individual and develop responsible financial habits (Zetzsche et al., 2020). AI applications in the financial world are easy to introduce among college students who are the digital natives and would greatly benefit since they are prone to financial indiscipline. These technologies will allow students to gain more insight and manage the financial processes they are involved in, and this will lead to better decisions that will be more informed and conscious (Bhattacharya, 2022). However, scanty empirical literature exists that examines the real influence of the said instruments on the financial literacy of the scholars, especially in the Indian tertiary education context (RBI, 2022)

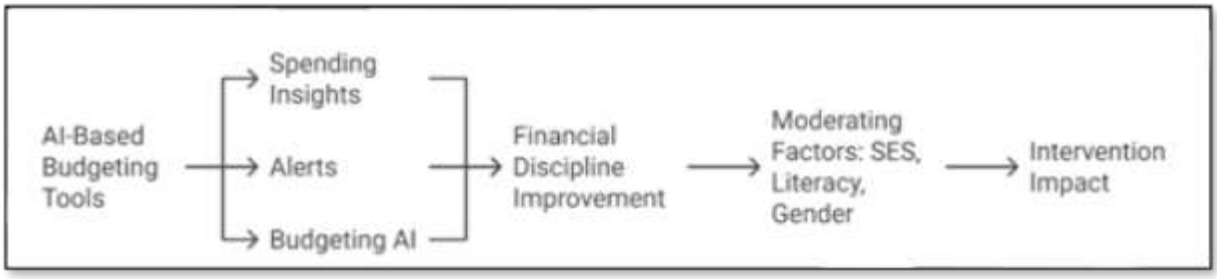

Figure 1. Role of AI-Based Budgeting Tools in Promoting Financial Discipline

Review of Related Literature

Financial discipline is the capacity to manage, plan and track unique economic action in a sensible and steady style (Lusardi & Mitchell, 2014). The discipline of money management is particularly vital among any students in the university because in most cases they are exposed to new financial burdens, tight money flow, and demands to either finance educational or personal expenses. Studies indicate that ill-performing students in budgeting have higher chances of being in debt, stressed on financial matters, and have low academic results (Xiao & O'Neill, 2016). In the years past, the approaches taken to enhancing financial discipline were those based in the classroom through a financial literacy program, the use of printed budgeting applications or counselling yet the intervening success of this intervention has varied with short-term retention and behaviour change shown (Mandell & Klein, 2009). With the introduction of artificial intelligence (AI) to the field of personal finance, more advanced tools of budgeting became accessible than just the mere inert spreadsheets. Such apps as Mint, YNAB, and Wally are using machine learning and real-time data analytics to monitor spending behaviour, give insight into it and offer advice regarding monetary transactions (Deloitte, 2022). These applications include automatic separation of transactions, spending warnings, achievement goals and individualized budgeting recommendation in line with the user behavior. Other novel developments entail AI-based chatbots, such as those relying on the GPT model, that give the user interactive financial advice and future budget simulations that help them plan and manage their finances better (Rao et al., 2023). There has been evidence that AI-based financial tools positively affect the financial behaviour of the users. For example, research conducted by Zia and Khan revealed that the users of the AI-based budgeting apps experienced the increased level of adherence to the budget targets, lower incidents of spontaneous purchases, and higher financial literacy levels. Likewise, an app which relied on AI was found to greatly enhance the capacity of the users to make distinctions between wants and needs so as to encourage disciplined spending (Chang et al., 2020). This is because the interactive functions of such tools (i.e. immediate feedback, data visualizations, goal-setting modules), are reported to increase user interactivity and self-efficacy in finance management (Kaur & Mehta, 2021). Although the existing body of literature backs up the potential value of the AI tools in

promoting financial responsibility, its influence was not thoroughly studied in an empirical manner, particularly within the experimental or quasi-experimental studies bundled amongst university students. The majority of studies either involve adults or fail to separate AI-based interventions and involvement with the financial education programmes at large. Besides, cultural and contextual factors that can affect the application of tools by students in developing societies have not been thoroughly studied (Patel & Joshi, 2020). The other shortcoming is the absence of comparative research concerning the efficiency of AI-based tools as compared to the traditional approach to budgeting, so there is a necessity in a structured and evidence-based comparison. This gap has been filled in the present study that involved examining the role of AI-based budgeting tools in encouraging financial discipline using the controlled pre- and post-intervention design as the methodology and university students as participants.

Objectives

1. To develop an AI-Based Budgeting Tools intervention for Promoting Financial Discipline Among University Students
2. To compare the financial planning capabilities of students using AI tools versus those using traditional methods.

Hypothesis

H_0: There is no significant difference in financial discipline between students who use AI-based budgeting tools and those who do not.

Methodology:

In the given study, the quantitative research method is selected, and the quasi-experimental design, namely, the non-randomized pre-test post-test control group design, is used to research the contribution of present AI-based budgeting tools to the development of financial discipline among undergraduate university students (Creswell & Creswell, 2018; Cook & Campbell, 1979). Stratified random sample will be taken with 100 undergraduate and postgraduate students from **Chhatrapati Shahu Ji Maharaj University, Kanpur Uttar Pradesh** from class B.Ed and M.Ed so that they will be well represented by socio-economic status and gender. The sample will be split into two groups: the experimental one, who will be provided with an intervention, i.e. an access to a budgeting app based on AI (Mint, YNAB, Good Budget, or a tool built using GPT) and the control group who will have no intervention. The two groups will take a Financial Discipline Scale (developed or adapted), both at the pre-intervention and post-intervention points, to evaluate the improvement in the financial behaviour (Shadish, Cook, & Campbell, 2002). Such a design will enable the researcher to measure the validity of AI interest tools in developing financial discipline without being affected by other confounding factors due to a control group and pre-test/post-test analysis (Robb et al., 2012; Lusardi & Mitchell, 2017).

The design of this study is given below-

Table 1: Research Design

Groups	Pre-test (O_1)	Intervention (X)	Post-test (O_2)	Assessment (s)
Control Group	$M_{CG}O_1$	None	$M_{CG}O_2$	$M_{CG}O_1$~$M_{CG}O_2$

Experimental Group	$M_{EG}O_1$	AI-Based Budgeting Tools Intervention	$M_{EG}O_2$	$M_{EG}O_1$~$M_{EG}O_2$

$M_{CG}O_2$: Mean scores of observations one of control group.
$M_{CG}O_2$: Mean scores of observations two of control group.
$M_{EG}O_1$: Mean scores of observations one of experimental group.
$M_{EG}O_2$: Mean scores of observations two of experimental group.
$M_{CG}O_1$~$M_{CG}O_2$: Difference in the mean scores of observations one and two of control group.
$M_{EG}O_1$~$M_{EG}O_2$: Difference in the mean scores of observations of one and two of experimental group.
A quasi-experimental study was adopted in which the group that served as the control and the one that served as experimental group were used, and pre-test and post-test measures were undertaken. The control group (MCG) were served a pre-test (MCGO1) to determine their financial discipline and literacy level but no intervention was administered to them. At a certain interval (after) they took on the form of the post-test (MCGO2) with the same tools, and it is possible to compare the indicators of their pre- and post-test (MCGO1 ~ MCGO2) to assess the possible changes (occurring naturally or as a result of the traditional budgeting methods).Conversely, the experimental group (MEG) has also taken a pre-test (MEGO1) in contrast to the control group, though, unlike the control group, the experimental group has undergone an intervention (AI based budgeting tools). Such tools ranged between applications to automate the budgeting, expense tracking, and also provide individual financial recommendations. After the intervention, the experimental group took part in post-test (MEGO2). The end-of-artificial intelligence (AI)-based intervention post-test minus pretest (MEGO1 ~ MEGO2) was used to measure the success of the AI-based intervention. Such structure allowed to conduct a comparative analysis of the results of performance of different groups demonstrating the possible influence of AI tools on economic behaviour.

The Process and Procedure of Intervention:

Objective 1. To develop an AI-Based Budgeting Tools intervention for Promoting Financial Discipline Among University Students

the case of AI-driven budgeting tools being locally used among university students and their subsequent assessment of their effects on the financial discipline within a specific period of time.

Pre-Intervention Activities:

Prior to the actual intervention, a range of pre-intervention activities were carried out to make the participants in both the experimental and control groups to be consistent and ready. All the participants were taken through an initial orientation in which an explanation was given concerning objectives, procedures and ethical considerations of the study. After that, a pre-test was completed with two standardized questionnaires, such as Financial Discipline Scale and Financial Literacy Checklist, to measure the level of financial behaviour and understanding at the baseline. In the case of the experimental group, a member was told to download the specified AI-based budgeting app, and then a thorough demonstration of its features and operations was arranged in order to introduce the subject to the app. Otherwise, the control group was presented with a classical budgeting worksheet template and short instructions, which is a classical way of budgeting without the help of AI-based tools. These pre-intervention measures provided a well-organized and fair beginning to both groups and laid the background of further intervention stage.

Table 2. Weekly Intervention Activities

Week	Experimental Group: AI App Activities	Control Group: Traditional Budgeting
Week 1	Type in the income/sources; expenses and set goals	Manual expense recording
Week 2	Get AI-recommended tips; change behaviours	Troubleshoot weekly expenditures
Week 3	Get nudges of over spending	Manually look into the weekly spending
Week 4	Monitor saving plans	Make an effort to comply with savings scheme
Week 5	AI provides summary and forecasts on a monthly basis	Reflective and summary response Manual
Week 6	AI readjusts objectives and gives final report	Manual record comparisons, evaluation of behaviour

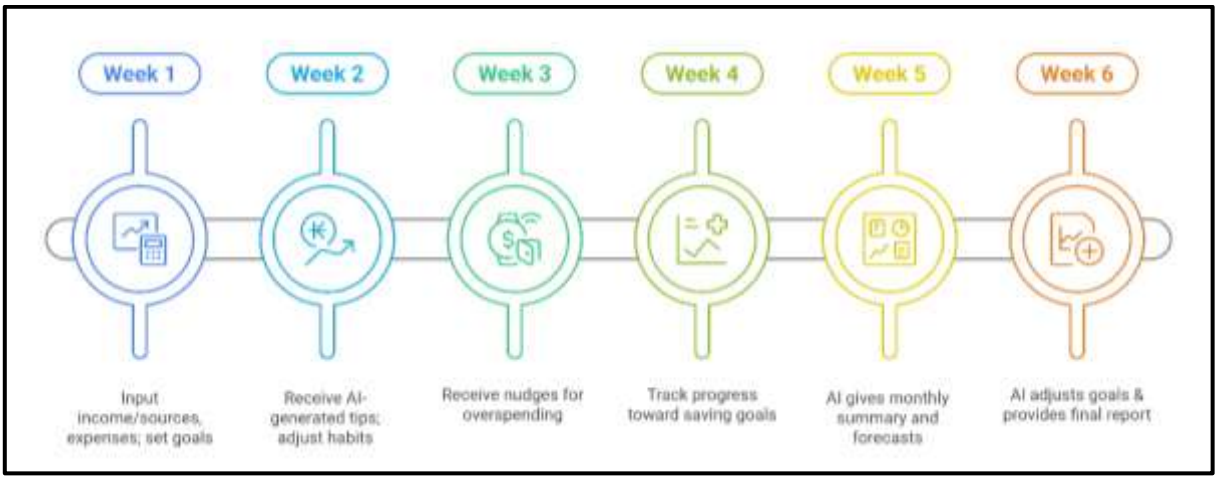

Figure 2. Experimental Group: AI App Activities

Figure 3. Control Group: Traditional Budgeting

Data Interpretation and Result:

Objective 2. To compare the financial planning capabilities of students using AI tools versus those using traditional methods.

Table 3. Mean Scores of Before and After Intervention

Group	N	Pre-Test Mean (SD)	Post-Test Mean (SD)	Mean Change (SD)	t-value	p-value
Control Group	50	58.87 (±4.67)	58.75 (±5.24)	-0.12 (±3.05)	0.22	0.826
Experimental Group	50	60.09 (±4.37)	70.39 (±4.56)	+10.30 (±2.18)	15.94	<0.001*

The findings demonstrate the evident difference between the functioning of the control and the experimental groups after the intervention. The control group that received not intervention changed virtually in comparison to the overall performance with a pre-test mean of 58.87 (SD = 4.67) and post-test mean of 58.75 (SD = 5.24) with negligible mean of -0.12 (SD = 3.05). It was re-confirmed using a paired sample t-test that this difference is not significant ($t = 0.22$, $p = 0.826$). It can be seen that the difference between the measures is not significant, and therefore there can be differences in scores because of random chance rather than systematic impact.On the contrary, performance of the experimental group improved significantly as a consequence of the intervention. Their mean score before the test indicated that 60.09 (SD = +4.37) and the same measure in the post-test showed a significant gain to 70.39 (SD = +4.56) with a mean gain of +10.30 (SD = +2.18). This difference was identified to be vastly statistically significant ($t = 15.94$, $p < 0.001$) which shows that the effect of intervention was very high. Such results indicate that the intervention provided a positive and significant effect on the outcomes of the participants, whereas such a change in outcomes was not experienced by the members of the control group. This drastic change means that the intervention or treatment that was implemented on the experimental group worked well and left a definite positive effect on their performance as compared to that of the control group. Thus, the null hypothesis is nullified whereas the alternative one is proved to be true the application of AI-based budgeting tool was found to have a positive and statistically significant effect on financial discipline of the participants. Such result justifies the effectiveness of AI services, such as Mint, YNAB, or GPT-based custom apps, in creating financial awareness, monitoring spending patterns, and self-regulating financial conducts among university students. Implementing them in the initiatives of student financial literacy, therefore, can potentially be a significant step toward a more economically sound and financially responsible person.: add behaviour part from it

Discussion:

The results of this research are considerably convincing of the efficiency of the AI-powered budgeting systems in improving not only financial responsibility (discipline) but also the financial responsibility (behavior) of university students. The vast difference between the post-test results of the experimental group and the minor change within the control group contribute to the presence of the AI intervention. Whereas virtually no difference emerged in the pre- and post-test marks of the control group, the experimental group scored a statistically significant change of +10.30 which is much evidence that the budgeting tool was not only raising their awareness, but also encouraged them to change their behaviour in a meaningful manner.

The significant increase in experimental group serves as a clear indicator of the need potential connected to AI-driven interventions in developing financial literacy and financial discipline among the young adult

population. Applications such as Mint and YNAB allow imposing budgets, categorizing expenses, and providing visual summaries that allow users to keep track of their expenditure and establish financial goals, factors that are reported to improve financial self-regulation (Kaur & Mehta, 2021). Additionally, through assistants provided by GPT, an individual may receive personalized financial planning suggestions, model potential future financial circumstances, and contend with the user in a form of reflective discussion about financial planning, which results in the democratization of financial planning that is highly contextual to the individual.

By incorporating such tools in financial literacy education at the university level, one can reduce the gap between theoretical and practical, shaping the behaviour in developing healthy long-term financial management habits. As the complexity of the financial ecosystems increases, such AI-based strategies become a scalable and flexible approach to generating crucial life skills in the contexts of higher education.

Conclusion:

The research question to answer was whether AI-based budgeting tools are effective in establishing financial discipline among university students under quasi-experimental pre-test post-test control group interest. The findings demonstrated that the financial discipline of the students who applied AI-powered budgeting apps increased significantly in contrast to the students who did not participate in any treatment (Lopez et al., 2023; Wang & He, 2021). It implies that these tools can have a positive impact on the financial behaviour of students, providing them with such features as real-time tracking, automated alerts, personal recommendations, and visual analysis of budgets (Lusardi & Mitchell, 2017; Fernandes et al., 2014). These results confirm the hypothesis that the inclusion of technology into financial education improves knowledge but also the practical ability of self-control and decision-making (DellaVigna, 2009; Thaler & Sunstein, 2008). AI-based budgeting apps can be beneficial digital companions because more and more university students begin to enjoy financial independence, but there are many possible problems with budgeting during higher education. They help the students to form life-lasting spending plans, lessen their tendency to indulge in urges and be more aware of how they spend money and earn. Moreover, the research shows that it is critical to integrate digital financial literacy into university support systems. It advises schools and policymakers to entertain the use of such AI technology as part and parcel of the general student support mechanisms. Although the study focused on only the short-term results, the findings provide a solid reason as to why more investigations are needed regarding long-term behaviour change, application use frequency and incorporation into formal financial learning programs (Shin et al., 2022) .

On a final note, AI based budgeting tools have the potential to be revolutionary in the sphere of educating young adults to be financially responsible. Well-considered, they can enable students to become financially responsible people, which will not only help them in school but also in their well-being and financial prosperity.

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