

**Student Financial Management System: Expense Tracking,
Analysis, and Optimization**

An Undergraduate Thesis

Presented to the Faculty of the
Department of Information Technology
College of Computer Studies
MSU-Iligan Institute of Technology

In Fulfillment of the Requirements in the Degree of
Bachelor of Science in Information Technology

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November 2024

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CHAPTER 1

INTRODUCTION

Financial attitude plays a crucial role in shaping the financial behaviors of millennial students [1]. A positive attitude towards money can encourage students to adopt responsible financial management habits, while a negative or indifferent attitude may lead to unstable or impulsive financial behaviors. Financial literacy plays a key role in shaping wise financial behavior [2]. Students often struggle to make ends meet and afford their education, and many of them suffer from low income, low financial literacy, compulsive spending tendencies, and high debt levels. These can be attributed to items such as demographic factors, social factors, family socio-economic backgrounds, academic influences, psychological factors, personality, and many more [3]. It is important to understand that financial behavior helps investors in navigating market volatility and achieving financial goals effectively [4]. In addition, it results in efficient financial management skills when the financial capabilities of an individual are developed, because it also enhances one's financial behaviour [5].

Research indicates that improvements in financial capabilities due to some financial factors can lead to more effective financial behaviours. Some of these factors are financial literacy, attitude, education, and decision-making are important to enhance the financial capabilities of an individual [6], [7]. Financial education can equip individuals with knowledge essential for effective financial management and decision-making [8]. Financial literacy can improve the ability to understand financial information and future plans, which develops one's financial capabilities [9]. Positive financial attitudes can also contribute to better financial capabilities such as proactive financial planning [8]. These factors are important in developing a strong financial capability that allows individuals to have financial security and well-being [5]. However, the state of financial education is still in its early stages in many countries, showing limited efficacy in improving young people's practical financial skills [10]. It is important to remember that financial literacy and financial education are complex and complicated topics that vary depending on regional and demographic factors [11]. Moreover, there have been research studies that were largely conducted in Western countries and

emerging markets about financial education, literacy, attitudes, and decisions [6], [12], [13], [14], [15].

Students can encounter various pressures from their lifestyle, campus, and their own social circles, and at the same time, issues about financial literacy need to be taken care of because students must have sufficient knowledge on how to manage their finances efficiently [16]. These aspects continue to impact how the student spends his/her finances, and when faced with necessities, a student often encounters different challenges, including on how to meet these needs [17]. Having good financial management skills can greatly help not just the students but to everyone, because the financial life of a person has a profound impact on the overall quality of life. Developing this kind of skill is a must for the students so that they can establish good financial habits early before going on to their careers, and it will be so useful in the future, in which it secures stability, independence, and navigates challenges with confidence and control.

This study proposes the development of A Student Financial Management System with Features that would enable them to develop good financial management skills. This way, we can ensure that the students will not only track their expenses but they can learn to save and thus develop a habit of self-control that will be so useful in life.

1.1 Background of the Study

Iligan City offers various scholarships and financial support services for the students that can assist them with their educational expenses. In addition, there were also organizations in the campuses that provide allowances to the students. However, despite these resources, only a number of students have been selected to be part of these organizations and financial supports, hence, it is often observed that there were still a number of students who struggle to manage their finances effectively due to different factors such as the living expenses, personal desires and cravings, and lack of tools to track down their finances, so these challenges highlight for the need of better financial management tools and also to emphasize the importance of discipline and financial literacy. In accordance to that, this project has been made due to the issues and interviews that were conducted to the students about their financial life or aspect. As a

result, the majority of them have been having difficulty on how to manage their expenses and allowances due to some factors, such as costly living expenses, satisfying their cravings, uncontrollable desires to spend, cannot track where their money went, etc.. Moreover, this proposal aims to address several of the financial struggles of the students in by providing a platform for real time tracking daily expenses, managing allowances, and can improve the students financial management skills and financial literacy, because, without proper budget management tools, tracking down expenses and managing finances can be stressful and depressing to the students that can affect their academic performances and well-being, so it really is difficult for them to manage their finances effectively without proper tools and knowledge. With that, Cross-Platform Student Budget Management System with Real-Time Expense Tracking and Analysis has been made to help the students in the university develop a habit of tracking and managing their expenses and allowances, in which it would be a great help when they graduate and have their career or adulting life, because having a good financial management skills is a must nowadays. This system helps students develop effective budgeting habits by having real time expense and allowance tracking, notification alerts system, budget and financial goals, savings, and financial recommendations to save. This will serve as a long-term financial planning and wiser spending choices for the students across various institutions.

1.2 Objectives of the Study

1.2.1 General Objective

The main goal of this project is to develop a prototype for a Student Budget Management System that can track and analyze expenses.

1.2.2 Specific Objective

To achieve the general objective of the following are the steps on how to develop a Student Financial Management System: Expense Tracking, Analysis, and Optimization:

1. To gather data from the target users through surveys and interviews to identify the key features and preferences to be incorporated into the system.
2. To develop a responsive design with a real time notification system, visualization tools, and user-friendly interface that works on mobile applications.

3. To develop an optimization feature that recommends budget-friendly stores and items to maximize the expenses or budget.
4. To conduct usability and performance testing of the system to ensure that its functionality is working well, and also to test if it is user-friendly, and works on web and mobile platforms.

1.3 Statement of the Problem

Through face to face and online surveys and interviews with the students in campuses, the two figures below are the results of the surveys and interviews conducted. However, the state of financial education is still in its early stages in many countries, showing limited efficacy in improving young people's practical financial skills [10]. It is important to remember that financial literacy and financial education are complex and complicated topics that vary depending on regional and demographic factors [11].

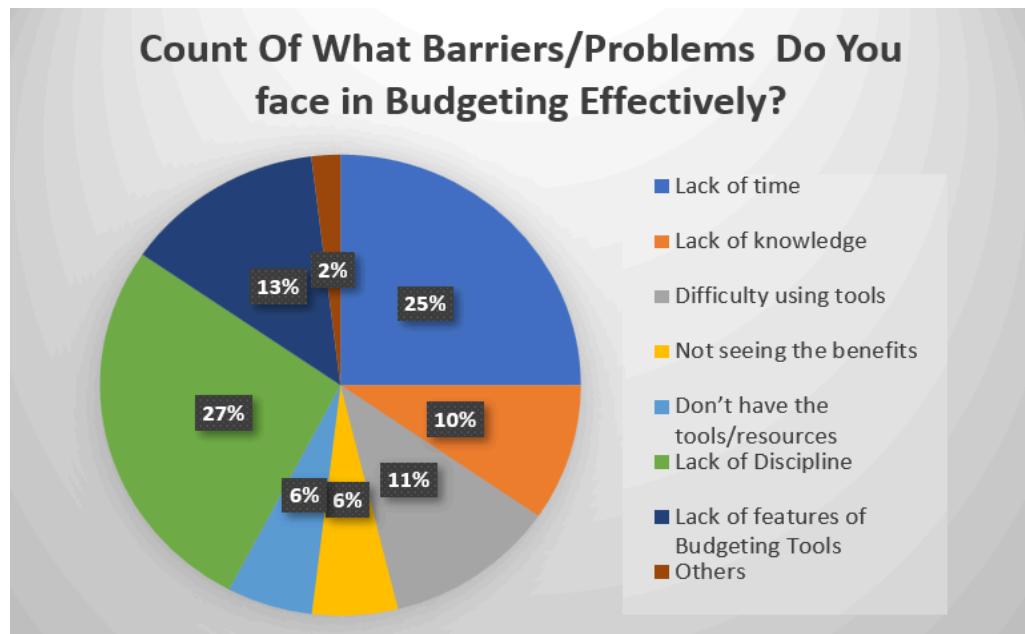


Figure 2. Count of Barriers/Problems faced in Budgeting Effectively from the Survey

Several key issues from the conducted surveys and interviews were identified:

1. **Financial Discipline Issues:** Students find it hard to manage their finances because of budgeting fatigue, lack of time and discipline, in which they find it tiring to monitor and track their expenses manually, and also some don't develop a habit of tracking down their expenses.
2. **Lack of features of Existing Budgeting Tools:** Another issue is the lack of features of existing systems that causes inefficiency of budgeting effectively.
3. **Difficulty of Using Budgeting Tools:** Students also find it difficult to use budgeting tools, and just prefer to do manual budgeting.
4. **Lack of Knowledge:** Another cause of budgeting ineffectively is the lack of knowledge, in which the students don't have prior knowledge about budgeting tools and financial management.
5. **Don't have resources or tools, No Benefits of Budgeting, and Others:** Lack of resources or budgeting tools, no good effects or benefits of using budgeting tools, and managing finances, and other causes such us manual budgeting without using technology were also another issue that causes inefficiency of budgeting effectively.

1.3.1 Research Questions

This study aims to develop a Student Budget Management System with Expense Tracking, Analysis, and Optimization that is designed to help the students in Iligan City in managing their finances effectively, and to instill in them a habit of managing their finances. Specifically, this study will answer the following research questions:

1. What are the effects of using a student budget management system such as tracking their expenses on the financial habits of the students?
2. How does the implementation of analytical tools and real-time features of the system help the students to avoid overspending and develop financial discipline?
3. How effective is the expense optimization that provides recommendations to help the students maximize their finances?

1.4 Significance of the Study

This Student Budget Management System is a proposed system to address the problem of the students about financial management. With this system, it offers a real-time tracking and analytical tools, in which the students will know their spending pattern and track their expenses, which will result in them to develop and enhance their financial capability awareness. It can also help students to improve their decisions in terms of financial responsibility, and upon consistently using the system, it will also help them to develop a habit to track their financial status, which is an essential skill to give impact to their lives in the future, especially during career or adulthood. Furthermore, with the help of the system, it will reduce the financial stress that students are facing, because of the notification system, where it would alert or notify when their budget is low or negative or when they are overspending, with that, it would help them avoid having insufficient funds for the remaining days.

In addition, the system has a feature where it would give recommendations on which stores offer lower prices, in that way they would be able to maximize their budget and they would effectively save some of their money. The system also suggests some financial educational tools and budgeting tips to really help the users enhance their financial discipline and management skills, which would help students to concentrate on their studies without the burden of financial crisis. It would also help the developers to enhance their skills in creating cross-platform applications and in implementing various features such as real-time notifications, data analytics, and the recommendation or expense optimization part, it also encourages them to dig deeper about financial tracking algorithms. On the wider aspect, this system can greatly contributes to the society by equipping young people, the adults or even everyone with financial management skills, in which the students in Iligan City which struggles to manage their finances is just a portion of the entire population or in the society, so by equipping the people with this skill, it can contribute to the economic stability and can reduce the likelihood of debt-related issues. Overall, this system adds to the advancement of financial technology (fintech) by integrating real-time notifications and tracking, cross-platform accessibility,

expense optimization, expense analysis, priority list, etc.. It encourages the adoption of technology-driven solutions for managing the finances or expenses of a user, and by using data analytics, it highlights the growing role of data in financial health. So, this system ensures users can really budget their finances and will develop a habit of good financial management skills upon using it consistently.

1.5 Scope and Limitations

Scope of the Study

The Student Financial Management System: Expense Tracking, Analysis, and Optimization is designed for students to manage their finances and expenses, however the main focus or users for this project are the students of Iligan City, although it can be helpful and beneficial to everyone, especially those having struggles in managing their finances. With that, the system offers a feature of real-time tracking which allows them to monitor their expenses, and users can list down their income sources which may be the allowance they receive or the salary from their part-time jobs or from their allowances, to keep track of their overall financial capabilities. The system also has a notification system that notify the user when their budget is low or almost negative or when they have exceeded their budget limit that they input. It also has visualization of reports of the finances and spending patterns. Users will also receive savings recommendations based on their spending behavior so that they can practice discipline and improve their decision making. This study also uses a mixed methods of quantitative and qualitative, in which survey questionnaires and interviews of the students have been conducted. Furthermore, the system has a feature where it would give recommendations on which stores offer lower prices so that students will be able to maximize their budget.

Limitations of the Study

The limitations of the system is that it relies completely on the accuracy of user input, in which incorrect data entries may lead to errors in financial assessment or data inconsistency. The current proposed system is limited in terms of integration with any financial institutions, in which it can't provide syncing with bank accounts or it does not

have a functionality where it can be connected to the users physical or digital banking. An internet connected or mobile data is also needed in accessing the application, especially on the recommendation part, in which it shows the geographical location. Also, it is important to know that while essential budgeting tools are provided, advanced financial planning features found in more comprehensive management are not included.

1.6 Conceptual Framework

The concept of this study is to make a Budget Management System suitable for the students in Iligan City that can track down the expenses, allowances, savings and financial goals. It also has other features that can surely help the users effectively and efficiently. In this part, the variables used in the study are to be discussed and presented.

The input of the user such as the income, amount, expenses, financial goals, etc. and the features of the system such as: notification system, real time tracking, spending analysis, expense optimization, etc. are the independent variables. The user behavior on how he/she manages the expenses/allowances and the achievement of savings goals is the dependent variable, in which it depends on the independent variables , like when the user is overspending his allowances and almost hits the target budget allotted, the notification system will be triggered. So, the result of the notification depends on the user behavior. The same goes for the other features of the system, in which the independent variables are the conditions set in the system. Also, to ensure a fair evaluation to the system, it needs to have controlled variables which are the factors that are kept constant and these are the population or the students of Iligan City, the accessibility of the system or platform, the environment of the system, and the features used.

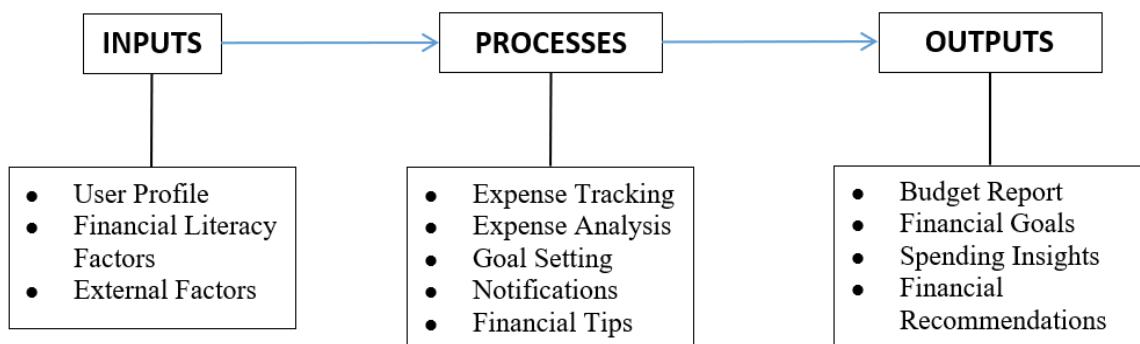


Figure 1.1 Conceptual Framework of the Study

1.7 Definition of Terms

Cross Platform - a system or software that works on various platforms such as in website application, mobile devices, etc., in which it can run on multiple operating systems.

Expense Optimization - a process to reduce and minimize the expenses of the user effectively.

Notification System - a feature in the system that notify the user and keep them updated about what they do in the application like when achieving their savings goals, almost reaching their spending/budget limit, etc.

Real-Time Expense Tracking - a feature in the system that records and updates the expenses made by the user immediately as they occur which provides an up to date financial data for accurate analysis.

Spending Analysis - a feature in the system that analyses the spending habit of the user.

User Authentication - the process of verifying the identity of the user.

CHAPTER 2

REVIEW OF RELATED LITERATURE

This part presents the review of related literature that is relevant to the development and significance of the study, which focuses on tracking of finances, budget management among students, and on financial literacy. The purpose of this review is to give insights of existing research, and identify the gaps about the study that enhances the financial literacy and habits of the students. In terms of financial management, a number of students in Iligan City are having difficulty when it comes to managing their finances, and it is tiring and inefficient when using the traditional manual budget management methods, which can affect the effectiveness of learning good financial management skills. Upon interviewing the students in the campus, several key issues have been identified such as financial discipline issues, inefficiency of tracking the expenses, lack of real-time insights and analytical tools, lack of reminders/notifications, and limited guidance on where and how to maximize the budget. With that, the main goal of this study is to develop a prototype that works on both web and mobile applications for a student budget management system that can track, and analyze the finances and expenses. So, this literature review covers the relevant studies and technologies that contribute to the objectives and goals of the proposed system.

2.1 Review of Related Literature

Mastering financial literacy skills is crucial for daily living [18]. According to Alekam[19] societies with higher levels of financial literacy are more likely to produce individuals who are capable of making better financial choices. Financial literacy is referred to as an individual's ability to gather and process financial and economic information and utilize it to make better financial decisions about financial planning, money accumulation, and debt management [20].

Financial literacy is essential when it comes to managing finances and especially a crucial aspect in the life of any adult. As indicated by [21], those who have more education have better understanding in terms of terminology and for that reason they

make better financial decisions. Moreover, financial literacy has been identified as a means to increase knowledge and guide behaviors, particularly for budgeting and saving [22]. Given its significance in daily life, economics education has traditionally included key personal finance concepts such as wealth creation, debt, and insurance and taxes.[23].

The rise of various financial instruments has become increasingly significant, these includes the alternative financial services such as payday loans, pawnshops, and rent to own stores. Concurrently, individuals now bear more responsibility in managing their financial planning, including planning, investing, and spending throughout their lives. These economic shifts have influenced both household assets and liabilities [24]. Numerous studies have stated the impact of financial literacy on the behavior of an individual's saving and investment and debt management and their practices on loaning. Research shows that individuals who are financially knowledgeable tend to gain more wealth [25].

For younger generations, financial literacy is of great importance because it enables them to effectively manage their money and achieve long-term financial goals. That is why they should acquire knowledge about financial management and incorporate it into their daily routine [26]. College students in particular are in the most critical transition of their lives where they are in a situation in which they should explore the world on their own, navigate independence, and shape their identities. It is also a period of great opportunities but also with certain risks involved. Students in particular are often uneducated and of little or no guidance in terms of financial matters [27]. College students are usually one of the groups that are in need of guidance on this type of topic as noted by Quirk [21]. It is most likely that these students will start working after graduation. For many, that will be the first time in their life that they will manage their income, and things like investments, and retirement options. That is why teaching students these skills before they enter their workplace will allow them to make better financial decisions. Debts like student debt and loans are another reason for financial education. As young adults, college students will not only encounter complexity in financial products, services and markets but also likely to face greater risk in the future. Lack of financial literacy often leads to individuals suffering from losses, either due to

decline in economic conditions and inflation or because of an economic system that tends to be wasteful driven by consumerism [28]

Majority of the people are said to be financially incapable in the countries of the United States and Canada, the reason being is that they are unable to prepare for future expenses such as education and retirement, which often lead to them struggling financially [29]. In accordance with that statement, [30] pointed out that in the country of Philippines, their financial literacy is alarming, primarily due to perennial problems of poor education in their early years which then last to their adult years. [31] supported this observation by stating that Filipinos level of saving accounts for less than 10% although it has been improving in the past years, it is still not enough as it is very far behind in the saving rates in countries of other south east asia which accounts for roughly 30% particularly in China, Singapore, Malaysia, and Thailand. Furthermore, in a survey conducted by the Central Bank of the Philippines (BSP, 2018) showed that Filipino adults in answering the questions about financial literacy scored very lowly.

Financial Education

As economies evolve mastering financial skills becomes an essential, while these advances in technology have improved the accessibility and efficiency of financial services provided globally, they are not enough. As supply-side barriers are being addressed, demand-side factors such as lack of trust or limited financial literacy are hindering the adoption of utilizing formal financial products and services [32].

Financial education helps students assess their current finances and behaviors, develop financial goals, and have financial plans. Students who undergo such education are more likely to save money, manage their resources more responsibly, and spend money carefully and likely to avoid compulsive buying. Financial education aims to improve the skills and knowledge of an individual's financial concepts and decision-making [21]. The financial decision of an individual can be improved through education, and it can also develop productivity and decision-making capabilities[5]. In addition, the risk of poor financial choices due to insufficient knowledge in financial decision making can be minimized through education [33].

According to Bajtelsmit [34], financial education can improve an individual's capacities that positively affects financial behaviour. Further research by Ghaffar et al. [35] shows the effect on financial behaviour through financial education that suggests exploring mediating and moderating effects. Investigating the relationship of financial behaviour and education is also recommended in countries where financial education is still improving.

A meta-analysis examining the connection between financial literacy, financial education, and financial behaviors across 201 prior studies reported in 168 papers were conducted [22]. In their findings, interventions aimed at improving financial literacy account for just 0.1% of the variation in financial behaviors., with weaker effects in low-income samples. Like other forms of education, the benefits of financial education diminish over time; even with larger intervention with lots of time invested in instruction have negligible effects on the behavior particularly beyond 20 months from the time of intervention. Correlational studies that assess financial literacy show stronger associations with financial behavior. However, three empirical studies that have been conducted revealed that partial effects of financial literacy diminish when controlling for overlooked psychological factors or using instruments to address omitted variables. Overall, existing studies has shown that serious limitations in financial education, which have been often obscured by apparently larger effects reported in correlational studies

This finding is not entirely unexpected, as the aim of an education course is to increase knowledge. However, it is often assumed, or even hoped, that personal financial education will change attitudes and behaviors, which improves the individuals' ability to manage their money. In fact, this is frequently the underlying, if not explicit, objective of many financial education programs. While financial education is crucial in enhancing financial knowledge and improving individual's capacity in managing their finances, it is possible that such education will eventually lead to better management of money [36].

Financial education is a controversial topic which incurs discussion on policy forums. Although, majority were excited by the thought of improving their financial skills through these programs, there was minimal solid evidence to support their

effectiveness until recently. Fortunately, the increasing rates of programs being implemented into national financial education strategies has led to more experimental studies. These strategies have placed emphasis on youth, often promoting the inclusion of financial education lessons in school curriculum [32].

Financial Management

Financial management involves regulating all aspects related to financial matters or funding. It is often defined as the process of planning, budgeting, checking, managing, controlling, acquiring, and saving funds or money for an institution or company. For personal financial management, it refers to managing income, expenses, spending on basic needs and personal savings effectively [28].

Financial management behavior is one of the most crucial aspects of personal finance. Individuals who show strong financial management behavior effectively optimize funds, allocate detailed budgets, and create plans for income, expenses and other financial activities [37], [38]. This behavior plays an important role in fulfilling the needs and achieving financial satisfaction. Moreover an individual who has an in-depth understanding of finance manages and considers financial factors in their decision making [39].

Financial attitude, financial knowledge and external locus of control factor are the factors that can influence a student's financial behavior [40]. In the research conducted by Amanah, et al (2016), financial attitude partially affects financial management behavior. Additionally, Thi et al. [40] and Herdjiono and Darmanik [41] expressed that financial attitude has a positive influence on financial management behavior. In contrast to the research conducted by Novita [42] argues that, financial attitude has no influence on the financial management behavior.

In the research conducted by Dewi [14], the spending patterns of FEB Unisbank Semarang students in a month reveal that their expenditure on entertainment is higher than on savings and educational expenses. Percentage of shopping accounts for 46% of their spending, while necessities such as food, drink and savings makes up 20%.

Transportation needs have a percentage of 20%. However, for educational expenses, it only accounts for 14%.

Good personal financial management alone is often insufficient for college students when it comes to planning, budgeting, assessing, managing, controlling their daily finances. Therefore, financial education is needed to introduce financial knowledge so that the students can get to know, understand and apply financial management practices when making their decisions. Financial knowledge at this time is needed, because people nowadays tend to make purchases on their desires or on impulse rather than needs. To have this knowledge it is necessary to develop financial skills and learn to utilize financial tools effectively [28].

Students who felt more knowledgeable and confident in their financial decision-making were most likely to engage in more healthy financial management [43]. Although, one important component of financial literacy is financial self-efficacy, when self-efficacy is not planted in the right knowledge, it can lead to overconfidence [44]. Overconfidence can result in higher risk taking and can be harmful that can result in excessive borrowing, less investment diversification, and can be a barrier to seeking professional financial advice [45].

Financial Problems of College Students

Financial problems can lead to stress, and approximately 74% of community college students have been reported to experience financial stress [46]. Financial stress can negatively affect the academic performance and the physical health of the students [27], [46]. It can also lead to stress-related health problems and unhealthy behaviors [46]. Some reports that lead to financial stress of the students include not having enough money to participate in activities, and also having large debt upon graduation [46]

The background of the students is another factor that influences the financial standings of college students, or more specifically, the financial status of their parents. The starting point of finances for any student is their family income, and this background affects the behaviors of college student perspectives and behaviors regarding money. Research has shown that the perception of money and links between family life and

money influences how the students internalize concepts about financial management and decisions. They primarily focus on the concept of scarcity, in which a person is at economic risk such as poverty. A number of students were recently experiencing scarcity in a way that they have lived independently away from their homes to attend school and are trying to support themselves financially. Other students also come from poor households, which are in a much worse period of scarcity. Those who experienced financial scarcity were often stressed and emotionally taxed, which researchers have linked to a resulting lack of financial capabilities and poor attitudes toward money [47]

The student's approach in managing their money is influenced by their respective behavior. Some students spend all their allowance immediately, frequently asking for more, while others set it aside to save and invest a portion of it. A student's behavior in spending depends on their knowledge [48]. If students lack knowledge and expertise in aspects of finance, then the possibility of making mistakes in managing their finances will be greater. This will lead to varied levels of motivation to save money, which results in having different financial decisions among individuals, and these differences can have a long term impact [49].

In a study about economic scarcity, it is found out that how long the students had to experience financial disadvantages affects how they approach money today. Cognitive and behavioral functions of individuals can be affected by the duration of scarcity. Researchers found out that students who have endured economic crises for a longer period of time struggle more with processing financial knowledge into financial behavior, possibly due to absence of positive associations with money [47].

Young people are generally vulnerable in making their financial decisions [25]. Most college students adopt a consumptive and instant lifestyle, frequently spending their money to buy things that they don't necessarily need. Moreover, with the rapid advancement of technology, especially with the existence of online shops, buying is made easier. Increased engagement with online shopping platforms will certainly increase the use of digital payment methods compared to those who shop physically. College students in particular are having it harder to manage their money especially those who are living

away from their parents as they find it hard to adjust to the sudden transition of being financially dependent to financially independent [28]. Furthermore, those individuals who have an excessive attachment to money may struggle with their social interaction or form relationships. As people with a strong love of money can have distorted views on priorities and will be less inclined to help others in need which greatly affects their interpersonal behavior [50].

First-generation college students often face greater challenges throughout their college academic journey due to financial illiteracy. Family dynamics plays a significant role in these struggles. First-generation college students, particularly those coming from Asian or Latino backgrounds, are from a close-knit family so they are more likely to face struggles [51]. The research conducted by McCallen and Johnson [52] finds that there are several demographic aspects that diminish a student's success in college. These aspects include being older than 24, working full-time, delayed undergraduate enrollment, attending part-time jobs, being financially independent, or having dependents to take care of.

Budgeting is described as the “foundation of financial health” and an essential skill for young adults. The way students handle their finances today can significantly impact their future financial conditions as habits and debts can have long-term effects. Financial challenges prevent students from securing stable employment, potentially causing additional hardships [53].

On the other hand, indicates that business students in particular, may develop a strong attachment to money, which may lead to unethical financial practices and selfishness. That is why developing financial skills are needed for all college students, particularly the first-generation students who are usually facing financial challenges. These students are among the most important to educate on finances since they are likely to enter the workforce and have new income, retirement plans and loans [50].

Young people face challenges with debt, particularly student loans. The research conducted by Lusardi et. al [54], shows that a lot of Millennials lack the understanding of their student loans and don't attempt to calculate their repayment associated with the

loans they take. When asked about how they approach their student loan decisions, about 50% of them say they would make different choices if given another chance [55].

Mobile payment users tend to engage in expensive financial behaviors, such as spending beyond what they earn, relying on alternative financial services, and occasionally overdrawing their bank accounts. They also have lower levels of financial literacy [24] With the rapid growth of fintech globally, it is important to focus on how mobile payment would affect financial behavior, and should not be seen as a replacement for financial literacy [55].

One of the problems identified is impulsive buying, which is defined as the behavior of an individual that involves purchasing items which are not planned and based on impulse [56]. The study, which were composed of 733 student respondents, reveals that there is a negative correlation between financial literacy and impulse buying, indicating that financial literacy can reduce the possibility of impulse buying, this also means that impulse buying is influenced by social factors [57]. In the research of Miller et al. [58], they proposed that interaction with other people provide buyers with a basis for comparison in regard to the theory of social comparison which argues that people's behavior including consumer behavior is influenced by their significant others. In addition to that, the study of Vijay and Kumar (2020) further explains that the presence of one's peers can increase the likelihood of an individual to engage in impulse buying.

There is a study found several positive influences. First there is a positive influence of financial attitude on financial management behavior, in addition to that, financial socialization and financial experience has an influence as well. Financial literacy was also found to positively affect financial management behavior. Furthermore, the study revealed that financial attitude, financial socialization, and financial experience positively affect financial management behavior through financial literacy [49].

2.2 Related Systems or Projects

2.2.1 Goodbudget

Goodbudget is a budgeting app that is based on the concept of envelope budgeting system which allows users to allocate their income into digital "envelopes" which presents varied spending categories in order to help users in planning their spending and to avoid overspending. The app is a cross platform which enables users to manage their budgets anywhere, along with it is the synchronization feature which can sync changes across devices. The Expense Tracking feature tracks user transactions, showing spending trends and generates a report analysis to help users understand their spending behavior. Furthermore, the app offers a feature that helps users to set saving goals incase of emergencies [59].

| Functionality | GoodBudget | Student Budget Management System |
|-----------------------|--|--|
| Budgeting Approach | Envelope-based budgeting. Uses 'envelopes' for allocating the money for specific spending aspects. | Direct inputting of expenses/finances to the system, and has real-time expense tracking and analysis. |
| Target Audience | Families and individuals | Generally students at Iligan City, but can also be used for other individuals. |
| Real-Time Features | Have real time tracking of expenses | Have real-time tracking of expenses and finances. |
| Notifications | No notification and alert system. | Have a notification system that alerts users when a budget limit is almost reached or when the user is overspending. |
| Financial Education | No educational tools or guides. | Offers educational tools and financial tips that enhance financial literacy and discipline. |
| Optimization Features | No recommendations on how to maximize the finances. | Have recommendations that suggest stores and alternatives to maximize the finances. |
| Savings Goals | Have savings goals by setting funds in specific envelopes. | Provide tools that allow saving goals and tracking its progress. |
| Reports and Analysis | Generates transactions and tracks spending | Expenses and finances will be analyzed, and offer insights about spending patterns of the |

| | | |
|-------------|--|---|
| | reports. | user. |
| Ease of Use | Simple to use but needs an understanding on how envelope budgeting works | Easy to use with user-friendly interface suitable for students and can be used without difficulties |

Table 2. GoodBudget Comparison

2.2.2 Empower

Empower is a budgeting app that has a personal dashboard that offers a free tracking tool that helps users view their overall financial context and helps them set goals in the aspect of planning for the future. The All-in-One Financial View is one of the features of the app, it allows users to link multiple bank accounts and credit cards to provide a comprehensive outlook of their finances. Additionally, it has an alert notification which notifies users when nearing spending limits. The app has an automatic saving feature that analyzes the income and expenses of the user to automatically transfer manageable amounts into savings accounts. It also provides a Visa debit card with no overdraft fees, and offers additional perks like cash back on purchases and early paycheck deposits. The app categorizes spending habits to help users identify their spending patterns. The app however, has a monthly subscription of \$8 dollars after 14 days of free trial which may be a deterrent. Furthermore, it doesn't support cash or check deposits and applies a 1% foreign transaction fee [60].

| Functionality | Empower Budget App | Student Budget Management System |
|--------------------|--|---|
| Budgeting Approach | Tracks the finances of the user automatically by linking to bank accounts. Primary focus is on income. | Direct inputting of expenses/finances to the system, and has real-time expense tracking and analysis. |
| Target Audience | General audience: working adults and families. | Generally students at Iligan City, but can also be used for other individuals. |
| Real-Time Features | Have real time tracking, categorization, and syncing of accounts. | Have real-time tracking of expenses and finances. |
| Notifications | Alerts the users about subscription, | Have a notification system that alerts users |

| | | |
|-----------------------|---|--|
| | renewals, low balances and budget limits. | when a budget limit is almost reached or when the user is overspending. |
| Financial Education | Offers spending insights. | Offers educational tools and financial tips that enhance financial literacy and discipline. |
| Optimization Features | No recommendations on how to maximize the finances. | Have recommendations that suggest stores and alternatives to maximize the finances. |
| Savings Goals | Allows users to set and track the savings of the user. | Provide tools that allow saving goals and tracking its progress. |
| Reports and Analysis | Shows reports and visualization about spending behaviour. | Expenses and finances will be analyzed, and offer insights about spending patterns of the user. |
| Ease of Use | Basic and simple features are free to use, and charge \$8 every month for premium features, but it has an intuitive interface . | Free and Easy to use with user-friendly interface suitable for students and can be used without difficulties |

Table 3. Empower Budget App Comparison

2.2.3 NerdWallet

NerdWallet is a finance app that offers a varied comprehensive personal finance tool designed for a wide range of users. Credit Score Tracking and Analysis is one of the features of the app and it provides a weekly update of the user's credit score from TransUnion along with it is the detailed breakdown factors that affects it, which is usually the payment history and credit utilization. Another feature of the app is the Personal Finance Dashboard which displays the credit scores, the cash flow, net worth, and the personalized suggestions for financial products. In the budgeting support aspect, the app incorporates the 50/30/20 rule with preassigned categories such as the needs, wants, savings/debts, and repayment. Although the customization options are limited, they are planned for future updates.

In terms of providing educational knowledge about finance, it offers an extensive library of articles, online courses, and podcasts, which covers budgeting, saving, investing, and building credit. Additionally, the Income Tax Preparation, in collaboration

with Column Tax, will soon offer built-in tax preparation tools. The mobile and web features differentiates in their task focus, the former is more on checking transactions and credit scores, while the latter includes more comprehensive financial education contents. The app is limited to tracking bills rather than paying them directly and it does not charge subscription payment making it accessible to all [61].

| Functionality | NerdWallet | Student Budget Management System |
|-----------------------|--|--|
| Budgeting Approach | Has budgeting tools with automated tracking of accounts and financial plans. | Direct inputting of expenses/finances to the system, and has real-time expense tracking and analysis. |
| Target Audience | General users: individuals, families, and professionals. | Generally students at Iligan City, but can also be used for other individuals. |
| Real-Time Features | Have real-time updates on loans, credit scores, and remaining balances. | Have real-time tracking of expenses and finances. |
| Notifications | Notification is on due dates, account and credit score updates. | Have a notification system that alerts users when a budget limit is almost reached or when the user is overspending. |
| Financial Education | Offers financial topic articles, and tools | Offers educational tools and financial tips that enhance financial literacy and discipline. |
| Optimization Features | No recommendations on how to maximize the finances. | Have recommendations that suggest stores and alternatives to maximize the finances. |
| Savings Goals | Allows users to set savings goals and give insights to finding high-yield savings. | Provide tools that allow saving goals and tracking its progress. |
| Reports and Analysis | Provides insights about spending patterns and financial health by using analytics. | Expenses and finances will be analyzed, and offer insights about spending patterns of the user. |
| Ease of Use | Has user-friendly design and is simple to use. | Free and Easy to use with user-friendly interface suitable for students and can be used without difficulties |

Table 4. NerdWallet Comparison

2.2.4 Expense Tracker And Budget Planner Project 2024

The Expense Tracker And Budget Planner Project is an online platform for tracking, analyzing, and optimizing expenses. The app is designed for users to be better in managing their money and planning in a way they can set saving goals. The user can input their spending list and can set a budget limit to monitor their spending habits and the app can alert the user by sending notification for their expenses. The app also provides visual representation of user's financial data for users to know their financial patterns. The utmost point of this app is to raise awareness in financial decisions [62].

| Functionality | Expense Tracker And Budget Planner Project | Student Budget Management System |
|-----------------------|---|--|
| Budgeting Approach | Offers Category-wise budgeting methods in allocation of funds. | Direct inputting of expenses/finances to the system, and has real-time expense tracking and analysis. |
| Target Audience | General users: individuals, families, and professionals. | Generally students at Iligan City, but can also be used for other individuals. |
| Real-Time Features | Track and monitor the expenses of the user. | Have real-time tracking of expenses and finances. |
| Notifications | Sends alerts when the budget limit for the expenses in a specific category will exceed. | Have a notification system that alerts users when a budget limit is almost reached or when the user is overspending. |
| Financial Education | No financial education tools. | Offers educational tools and financial tips that enhance financial literacy and discipline. |
| Optimization Features | No recommendations on how to maximize the finances. | Have recommendations that suggest stores and alternatives to maximize the finances. |
| Savings Goals | Have monthly and yearly savings goals options. | Provide tools that allow saving goals and tracking its progress. |
| Reports and Analysis | Provides analysis of expenses but only the basic and not much analytics. | Expenses and finances will be analyzed, and offer insights about spending patterns of the user. |
| Ease of Use | User-friendly interface for Android | Free and Easy to use with user-friendly |

| | | |
|--|---------------|--|
| | applications. | interface suitable for students and can be used without difficulties |
|--|---------------|--|

Table 5. Expense Tracker And Budget Planner Project Comparison

2.2.5 Daily Expense Tracker System

The Daily Expense Tracker System, a system that provides insights on users monthly spending patterns and has a personalized report to enhance financial transparency. The system aims to empower users to make well informed financial decisions. With the feature of financial tracking it helps users to better manage their expenses. It also provides insights about monthly spending habits and has customized reports for financial transparency [63].

| Functionality | Daily Expense Tracker System | Student Budget Management System |
|-----------------------|---|--|
| Budgeting Approach | Provides insights about monthly spending patterns and has customizable reporting. | Direct inputting of expenses/finances to the system, and has real-time expense tracking and analysis. |
| Target Audience | General users: individuals, families, and professionals. | Generally students at Iligan City, but can also be used for other individuals. |
| Real-Time Features | Have real time tracking with customizable dashboards. | Have real-time tracking of expenses and finances. |
| Notifications | No notification system | Have a notification system that alerts users when a budget limit is almost reached or when the user is overspending. |
| Financial Education | No financial education tools. | Offers educational tools and financial tips that enhance financial literacy and discipline. |
| Optimization Features | No recommendations on how to maximize the finances. | Have recommendations that suggest stores and alternatives to maximize the finances. |
| Savings Goals | No Savings goal feature. | Provide tools that allow saving goals and tracking its progress. |
| Reports and Analysis | Shows dashboards and reports about financial trends and transparency. | Expenses and finances will be analyzed, and offer insights about spending patterns of the user. |

| | | |
|-------------|--|--|
| Ease of Use | User-friendly and easy to use Easy-to-use platform. | Free and Easy to use with user-friendly interface suitable for students and can be used without difficulties |
|-------------|--|--|

Table 6. Daily Expense Tracker Comparison

2.2.6 Expenditure Tracker

The Expenditure Tracker is made for individuals who are concerned with their daily spendings. With the feature of a tracker which monitors their expenses, it allows users to have information of their spending patterns and hopefully can help users be more cautious with their spendings and save more money. This mobile app also focuses solely on tracking expenses, simplifying the process of inputting expenditures. It also displays a pie chart that generates daily expenditure [65].

| Functionality | Expenditure Tracker | Student Budget Management System |
|-----------------------|---|--|
| Budgeting Approach | Track expenses and allow users to categorize input amounts and notes. | Direct inputting of expenses/finances to the system, and has real-time expense tracking and analysis. |
| Target Audience | General users: all individuals concerned with finances | Generally students at Iligan City, but can also be used for other individuals. |
| Real-Time Features | Have real-time tracking of expenses | Have real-time tracking of expenses and finances. |
| Notifications | No notification system | Have a notification system that alerts users when a budget limit is almost reached or when the user is overspending. |
| Financial Education | No financial education tools. | Offers educational tools and financial tips that enhance financial literacy and discipline. |
| Optimization Features | No recommendations on how to maximize the finances. | Have recommendations that suggest stores and alternatives to maximize the finances. |
| Savings Goals | No Savings goal feature. | Provide tools that allow saving goals and tracking its progress. |
| Reports and Analysis | Provides insights about spending patterns and shows | Expenses and finances will be analyzed, and offer insights about spending patterns of the |

| | | |
|-------------|--|--|
| | pie charts | user. |
| Ease of Use | User-friendly, customer-centered design. | Free and Easy to use with user-friendly interface suitable for students and can be used without difficulties |

Table 8. Expenditure Tracker Comparison

| Features | Good Budget | Empower | Nerd Wallet | Expense Tracker And Budget Planner | Daily Expense Tracker | Expenditure Tracker | Proposed System |
|-------------------------------|-------------|---------|-------------|------------------------------------|-----------------------|---------------------|-----------------|
| Tracking of Expenses | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Real-Time Features | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Notifications or Alert System | No | Yes | Yes | Yes | No | No | Yes |
| Financial Education Tools | No | Yes | Yes | No | No | No | Yes |
| Optimization Features | No | No | No | No | No | No | Yes |
| Savings Goals | Yes | Yes | Yes | Yes | No | No | Yes |
| Visualization | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Analytical Tools | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Free and Easy to Use | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Table 9. Summary of Existing and Proposed System Comparison

2.3 Conclusion

The reviewed literature shows the importance of financial education, management, and literacy in our life, particularly among college students. It emphasizes that financial literacy is important in managing our finances, in which it is essential for achieving financial stability in life. Many studies show that financial literacy enhances saving, budgeting, decision making, and spending habits of an individual. Financial education is significant, however, proper application of financial knowledge and self-efficacy will determine its effectiveness. Common problems found that financial education aims to solve are mismanagement of finances, overconfidence in financial decisions, impulsive buying, poor financial management, and etc.. Hence, to promote good financial literacy and habits of individuals, it needs to introduce comprehensive financial education tools and programs, and also to reduce financial stress among the college students.

College students, the main target audience in this study, face various financial challenges that can negatively affect their academic performance, and overall well-being. These challenges are limited financial knowledge, poor financial management skills, and financial stress due to lack of resources to provide and debt. The role of family background can also affect the financial behavior and attitudes of the students. The financial perceptions, habits and decisions of the students are all affected by various variables.

A number of researchers have examined the financial consequences that the students of today are likely to face. One of the most common issues is stress-related health problems, and finances is the leading cause. Ultimately, poor financial habits can affect relationships, social well-being, and negatively impact careers, and other areas of life. Furthermore, young adults who can't learn to manage their finances at higher risk of failing to plan for retirement, and end up struggling to stay afloat to financial difficulties in their later years.

Understanding how college students approach and handle money is a significant part of setting up the next generation for success. While many factors are beyond control,

students can take charge of many areas of their lives in order to improve their circumstances, if only they are equipped with the right tools and knowledge. There are still major gaps in the literature, even though various research has been conducted in the field of financial management, education and its various influences. It's not clear how the impact of spirituality and faith backgrounds can affect perceptions and decisions of students in terms of financial perceptions. However, there are potentially hundreds more studies on this topic that could explain some of the remaining gaps.

About the systems, while most of them offers functionalities that is common to the study like the expense tracking and monitoring, analytical tools, and savings goals, they still lack comprehensive features such as optimization of expenses, financial education tools, and real-time notifications and alerts on user's behavior. Empower and NerdWallet, were close enough to the proposed system, but lack dept approach that is needed by a student-centric audience, especially about the optimization aspect of the system. The proposed system fills the gaps that the existing systems lack by implementing advanced features for an efficient financial management tool, and these improvements set the proposed system apart, making it strong and innovative solution for a student budget management.

CHAPTER 3

METHODOLOGY

In this part, the methods used to conduct this study will be discussed, detailing the research design, participants, data collection procedures, and analysis methods. This chapter also discusses the ethical considerations followed to ensure the confidentiality and voluntary participation of all participants.

System Development Life Cycle (SDLC)

The development of the Student Financial Management System: Expense Tracking, Analysis, and Optimization followed the stages of the System Development Life Cycle (SDLC).

1. Planning and Requirements Analysis

Interviews, surveys and observation are the elicitation methods used. The team conducted interviews to students to know their problems on financial management, and to know what they will expect from the system and their suggestions that can meet their needs that can help them. The team also conducted surveys by distributing questionnaires physically and online using google forms to students to collect some data on their financial budgeting practices and expenses. Lastly, by observing the students, the team observes awareness on how inefficient and problematic the students' methods they used to manage their finances.

During the requirements phase, after conducting interviews, surveys, and observations, the team collects, analyzes the data, and categorizes common problems, issues, desired features, trends, and specific requirements from the user. The team also uses a prioritization method, to align requirements based on how important it is to users and its feasibility to be implemented in the system, in which this can help in the development of the system to know what key features are needed to be focused on. With that, after identifying the key issues, problems, and preferred features from the students,

the team evaluates the feasibility of making a solution to solve the problem based on the specific requirements from the user, which will become the goal of the system.

2. Define Requirements

In this part, the requirements of the users or students in developing the system are now clear, in which several of the questions in the survey and interviews include (1) If you have used any budgeting tools/apps, what features does it have? Were the existing features helpful in budgeting efficiently? (N/A if not) and (2) What preferred features do you want in a new budget management tool or system?

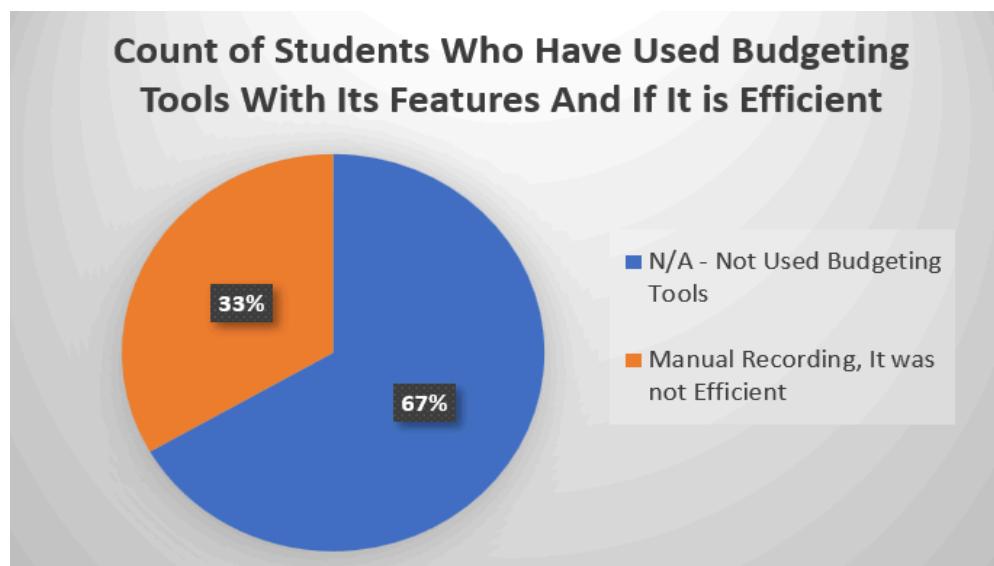


Figure 3. Count of Students Who Have Used Budgeting Tools With Its Features And If It is Efficient from the Survey

Based on figure 3. 67% of the respondents have not used existing budgeting tools, while 33% have used and identified manual recording as its common feature that was not efficient to have. Therefore, this findings shows that majority of the respondents were not familiar with using budgeting tools, while the other portion shows the identified feature is not efficient to be incorporated in a budgeting tool, so it needs to be improved.

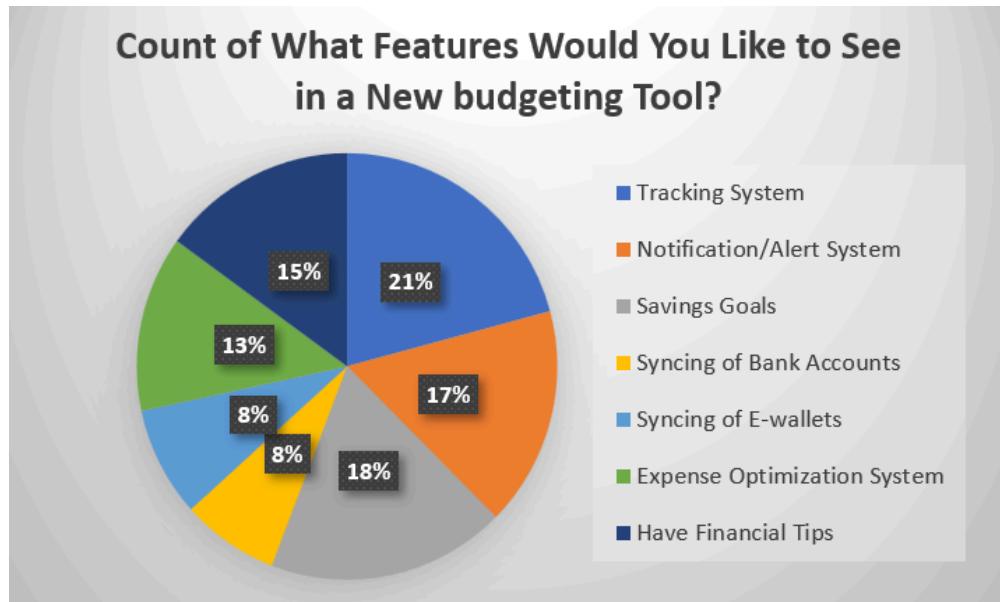


Figure 4. Count of the Preferred Features of the Students From the Survey

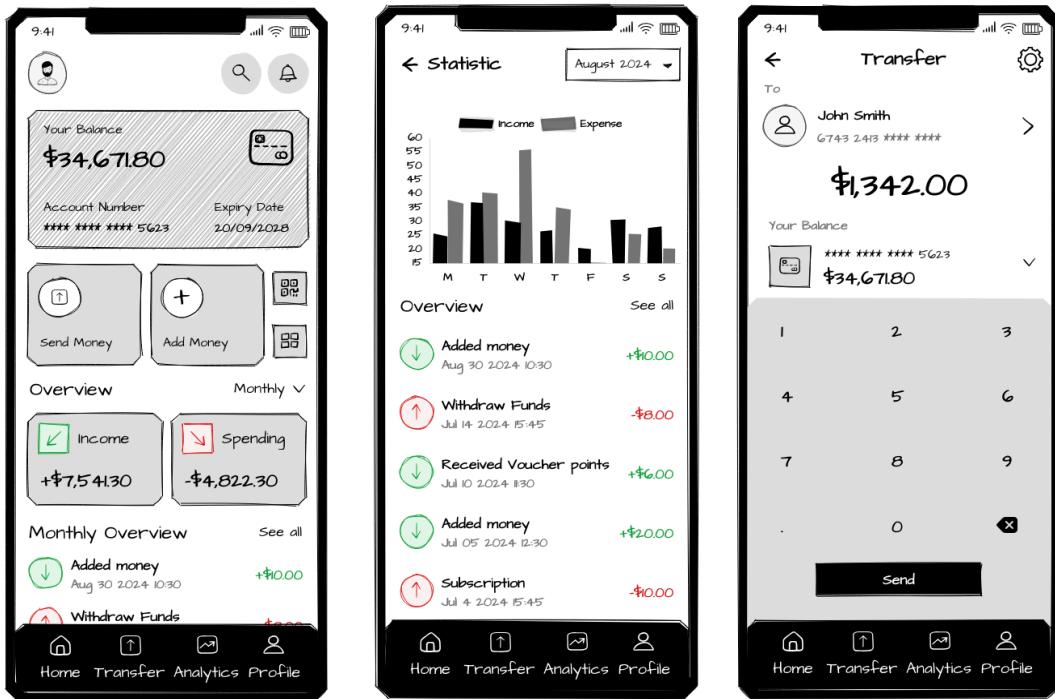
Figure 4 shows the preferred features of the students that they would like to have in a new budgeting tool. In addition to that, these identified features are the system requirements that needed to be incorporated into the system.

3. Design

- Developed the system architecture and user interface (UI) design with an emphasis on usability and accessibility across platforms.
- Created database schemas for expense tracking and budgeting analysis.

In the development of the design of the system, a certain process has been followed, beginning with the requirements gathering phase. The team conducted interviews, surveys and observations that contributed to identifying key functional requirements that will be needed to be present in the system, in which it needs to satisfy user requirements, and to the performance of the system.

In this phase, the team focused on creating wireframes for the system's user interface, which will be the blueprint for the system's layout and structure. The wireframes are created with the idea of having a user-friendly, accessible interface for easier use of the system and more at ease in managing their finances.



At this stage, the design phase has not yet progressed to the database schema as it is still a proposal, however, the wireframes will serve as the groundwork for future development. Here the features will be outlined.

Wireframes for:

expense tracking interface

Notification interface

Expense optimization interface

Saving goals interface

Analytics interface

4. Implementation\Development

- Built the system using appropriate programming languages, frameworks, and tools for web and mobile platforms.

- Integrated features such as automated alerts, analytics, and real-time tracking.

In this phase, the team implemented the system to build a prototype in accordance with the design specifications.

In developing the prototype, the team uses design-focus tools such as the Figma to make an interactive user interface efficiently. Coolors.co was also used to have a better visualization of the colors of the interface, in which it generates different color palettes to be used in designing. In building the web, the team also uses HTML, CSS, JavaScript, and other frontend Technologies. After that, the team integrated the system by combining and synchronizing user interactions and flow of the system or the data flows, in which everything was connected to make the prototype with its features and functionalities. Then, after integrating and making it function or work, the team now goes to testing, to find and fix the possible errors and problems to be encountered, so that to ensure that the prototype has met the requirement or criteria.

5. Testing

- Conducted unit testing, integration testing, and user acceptance testing to ensure the system functions correctly and meets user expectations.

6. Deployment

- Deployed the system to selected students for beta testing and gathered feedback for improvement.

7. Maintenance

- Established a plan for monitoring and updating the system to accommodate user feedback and address issues post-deployment.

3.1 Research Design

This study will be using a mixed-methods approach that combines both quantitative and qualitative research methods. This mixed-method is best to use to obtain a comprehensive understanding of the study that allows to collect numerical data through surveys, which is a quantitative method, and user evaluation, that is a qualitative method.

This method enables navigation that improves the validity of the research findings by verifying proof from both data types.

- **Quantitative Method:**

The study will be utilizing the surveys conducted on the individuals living in Iligan City, these surveys aim to collect information about their habits in managing their financial, the difficulties they experienced with the traditional budgeting methods, and their expectation on using a digital budgeting system. This kind of quantitative aspect is essential because it helps the team on identifying the patterns, trends, and the correlation between each variable, such as the frequency of how they face budgeting fatigue, or how they struggle with tracking their expenses manually.

The quantitative aspect of the study will focus on gathering numerical data through surveys. These surveys will be distributed to students and designed to collect information on their financial management habits, challenges with manual budgeting methods, and their expectations for a digital budgeting system.

Quantitative data is essential because it helps the researchers identify patterns, trends, and relationships between variables, such as how often students face budgeting fatigue or how many struggle with tracking expenses manually. This data can also be statistically analyzed to provide a clear and objective basis for the conclusions drawn in the study.

- **Qualitative Method:**

The study will focus on gathering detailed and personal insights through user evaluations and interviews, these methods allow individuals to share their experiences, opinions, and the difficulties. This information helps the team on understanding the issues they encountered. The reason for using interviews as the qualitative aspect of the study is because they provide deeper insights into each individual's thoughts and preferences, capturing the human side of the problem, making it easier to understand each individual's perspective.

The qualitative aspect will focus on gathering detailed and personal insights through user evaluations and interviews. These methods allow students to share their experiences, opinions, and challenges in their own words, providing a deeper understanding of the issues they face. For instance, interviews can explore how students feel about the manual methods of budgeting, their thoughts on the usefulness of real-time notifications, or their preferences for specific system features. Unlike surveys, which provide broad numerical data, qualitative methods help capture the human side of the problem and give voice to the students' perspectives.

The study will combine both methods to ensure having measurable insights, having rich and descriptive details, ensuring that the study will have a comprehensive outlook of the issue. This dual approach also enables the team to cross check and validate results from both methods, which makes the findings more reliable. Furthermore, by using a mixed-methods approach, it ensures that the system being developed not only meets the needs of each individual but also addresses their challenges and expectations more on a personal level.

By combining quantitative data, which offers measurable insights, and qualitative data, which provides rich and descriptive details, the mixed-methods approach ensures that the

study captures a comprehensive picture of the issue. This dual approach also enables the researchers to cross-check and validate the results from both methods, making the findings more reliable and robust. It ensures that the system being developed not only meets the measurable needs of students but also addresses their specific challenges and expectations on a personal level.

3.2 Participants and Sampling

The target population for this study were the college students in Mindanao State University-IIigan Institute of Technology who use budget management tools, have interest in financial literacy, and those who are struggling to manage their finances. The sampling technique that will be used is the purposive sampling, in which a specific group of college students whose age is within the range of 18-25 years old in the campus will be selected to be included in the sample. The sample size will be approximately 383 students, which is considered suitable for achieving reliable results in surveys. The sample size has been calculated by using the Sample Size (n) Using Slovin's Formula:

$$n = \frac{N}{1 + Ne^2}$$

where, the population size is approximate total number of students in MSU-IIT, which is 8,939.

- **Population Size (N):** 8,939
- **Margin of Error (E):** 5% → E=0.05 E = 0.05 E = 0.05

Upon substituting the values to the formula and performing the calculation, it would result in: $n = 8939/23.3475$, **n ≈ 383**.

3.3 Research Instruments

In gathering of data, the following instruments were used:

- **Survey Forms:** A structured survey questionnaire was made and conducted to collect quantitative data on the budgeting habits of the students, financial literacy,

experience and usage of financial tools. The surveys were administered face to face and online through google forms and paper forms.

- **Interview Guides:** Semi-structured interviews has also been conducted to a subset of the participants to gather insights. This guide includes open-ended questions to identify the attitude of the participants towards financial behavior, budgeting, and challenges they face in managing their finances. It also includes questions about their preferred features to be implemented in the system.

Both instruments that were used will be validated through a pilot testing, involving a small group of students to identify any issues or unclear questions, they will also answer the usability survey. Feedbacks will be collected to refine the research instruments and ensure clarity and relevance to the objectives of the study.

3.4 Data Collection Procedure

In this part, the data collection procedures will be discussed, and the process will follow these steps:

1. **Recruitment:** The target users or participants were asked and invited if they are willing to take part in the study through chats and face to face approach.
2. **Survey Distribution:** After receiving an approval, the participants were to answer the survey either online (through Google Forms) or face to face (Paper Forms) at their convenient time.
3. **Interviews:** A small portion of the participants were also selected for the interviews that were conducted face to face on the availability of the participants.
4. **Informed Consent:** Before the participation of the participants, they have been provided with a consent form stating the purpose of the study, voluntary participation, and assurances of privacy and confidentiality of their data and information.

3.5 Data Analysis Plan

Specify the methods used to analyze data. For quantitative data, mention statistical tools (e.g.,SPSS). For qualitative data, describe coding or thematic analysis techniques.

It is to be noted that the study is still in the proposal stage, because of that there is not a prototype yet, therefore, testability is not applicable. The methods mentioned below are to be carried out once the prototype is available.

In the aspect of survey instrument, the team planned to use the Post-Study System Usability Questionnaire (PSSUQ) for the usability evaluation. The PSSUQ is a standardized questionnaire that has a tool which measures user's perceived satisfaction with the system's usefulness, reliability, and quality. Therefore, it is suitable in capturing and identifying which aspect of the system where users may express dislike.

For the Quantitative Data Analysis of the study, the responses of the individual acquired through the surveys and PSSUQ, will be analyzed by the team by using descriptive statistics such as the mean, median, and frequency distribution. To examine potential relationships between financial literacy, budgeting behaviors, and system usability, the team planned to use inferential statistics. For the data, statistical software such as SPSS or Excel will be utilized.

For the Qualitative Data Analysis of the study, the result of the interview that will be conducted during post-prototype development will be analyzed by using thematic analysis. In the context of interviewing, the team planned to record the entire conversation and transcribe them for analysis to identify their patterns involving their behavior towards financial, and their attitude about the system. The team plans to record the interviews and transcribe them for analysis.

3.6 Ethical Considerations

Briefly describe how you will ensure participants' confidentiality, voluntary participation, and ethical research practices.

Confidentiality: Participants will be assured that all personal information and responses will be kept confidential. Data will be anonymized, and no identifying details will be included in any reports or publications. The research team will securely store all data to prevent unauthorized access.

Voluntary Participation: Participants will be informed that their involvement in the study is completely voluntary. They will have the right to withdraw from the study at any time without any consequences or loss of benefits.

Informed Consent: Before participating, each participant will be given a consent form detailing the study's purpose, procedures, potential risks, and benefits. Participants will be asked to provide their consent freely and without pressure.

Ethical Research Practices:

- **Respect for Participants:** Participants will be treated with respect and dignity, and their rights will be upheld throughout the research process.
- **Non-Exploitation:** The study will avoid any exploitation or harm to participants, ensuring that their well-being is prioritized.
- **Honesty and Integrity:** Researchers will present accurate and truthful information, ensuring transparency in all stages of the research.

To ensure the confidentiality of the participants, the researchers will provide a consent form before proceeding with the proper interviews and answering the survey forms online and paper-based.

The research will adhere to ethical principles throughout the study. To ensure confidentiality, participants' identities will be anonymized, and no personal identifying information will be collected in the survey or interview data. Participation will be voluntary, and participants will have the option to withdraw from the study at any time without penalty. A consent form will be provided, ensuring that participants are fully informed about the study's aims and their rights as participants. Ethical approval will be sought from the relevant institutional review board before the study commences.

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APPENDICES

Include any additional materials such as: Research instruments (e.g., surveys, interview guides). Supplementary tables and charts. Permissions or consent forms

