

Family Budget Management Information System Project

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Abstract. The article considers the project of the family budget management information system, which is an innovative tool for an effective planning and controlling family finances. This system allows users to track income and expenses, form a budget for the future and analyze the financial activity during a certain period. The main capabilities of the system are accounting of income and expenses, categorization of financial transactions, budget planning and creation of reports and analysis of expenses as well. The project presents comparative characteristics of an already existing developments and practices regarding family budget management. The database was designed, the workflows and requirements for the system were modeled and the prototype of the application was developed. Various functional aspects were considered, such as tracking expenses, budget planning, setting financial goals and monitoring their achievement. Additional functions in the form of bonus points were designed to encourage users to actively use the system. The results of the work are presented and confirmed by systematized in the form of UML diagrams data. Due to a clear and simple interface and advanced capabilities, the information system will become an irreplaceable assistant for every family in matters of budget management. Implementation of this system will help families to control their finances, plan a budget and make sound financial decisions better.

Keywords: IT project, information system, family budget management, UML diagrams, mobile application.

I. INTRODUCTION

Effective management of the family budget is becoming more and more important in the modern world, where technology plays an important role in our lives. Household financial management information systems (IS) are tools that help families with better managing their finances, planning expenses and saving money. They allow you to keep records of income and expenses, prepare monthly or annual budgets and set financial goals. The system can provide useful tips and recommendations on how to save money and improve your financial situation.

Developing a family budget management information system requires a deep understanding of user needs and knowledge of technologies and methods used to create effective and user-friendly products [6]. Thanks to what the mobile application will be improving using the latest technologies to ensure its reliability, security and ease of use.

The IT project will help families with better managing their finances and improving their quality of life.

II. FORMULATION OF THE PROBLEM

Financial literacy is essential for staying afloat in the modern world, as the saying goes, “money rules the world”, yet many people lack the skills to manage it effectively. A widespread issue is low financial literacy, with many individuals lacking understanding in areas like budgeting, investing, taxation, and pensions, which can result in poor financial decisions, such as taking high-interest loans, making unprofitable investments, or failing to save adequately for retirement. This lack of knowledge often leads to an increased debt burden, as people enter into credit and loan agreements without fully grasping their terms and consequences, ultimately causing repayment difficulties and worsening economic conditions. Furthermore, inadequate investment knowledge prevents people from accumulating wealth, as many avoid investing due to a lack of understanding of risks and benefits. Insufficient financial planning, particularly for old age, is another major problem, as most individuals fail to grasp the workings of pension schemes and do not prepare for their financial future. Additionally, low financial literacy can impact economic stability, with financially uninformed individuals avoiding taxes or disregarding financial rules, contributing to broader economic uncertainty.

To solve this problem, it is necessary to focus on improving people’s financial literacy through education, providing access to qualitative information and creating tools that help to manage their finances better.

In modern digital world, mobile app developers are constantly looking for effective approaches and methods to attract and retain customers of their products.

The competition in the mobile app market is very tough, so it is important to develop a strategy that will satisfy the needs of users and allow them to stay with the product for a long time. The successful development of family budget management information systems requires not only an understanding of the basic principles of budget management, but also knowledge of how to motivate and retain mobile applications customers.

The most common approaches and methods to encourage and retain users of mobile applications for family budget management include personalization, which is a key factor in user retention achieved by collecting and analyzing user behavior, preferences, and needs. Users can also be engaged through gamification, contests, awards, or bonus accrual with options for future use. Effective interaction is important, with features like quick assistance, easy transaction entry, and access to reports and analysis. Regular updates and improvements, particularly those based on user feedback, also contribute to retention. Additionally, integrating with social networks helps expand the app's reach by fostering community interactions and information sharing.

With the help of these strategies and methods, users can be encouraged to use the application, the application can be made not only useful, but also interesting and exciting. Of course, it's also important to remember that users will use the app as long as their opinion is taken into account, so the main thing is to follow user's advice.

III. FORMULATION OF THE PURPOSE OF THE ARTICLE

The purpose of the article is to design an information system for managing the family budget, that will help to effectively distribute the funds of the application users, optimize their expenses, which will raise their standard of living.

The goal of the IT project is to develop an effective and user-friendly tool that will help family manage their finances, plan expenses and income better and achieve financial stability.

The main task of the information system is to help users create a plan and realistic financial goals according to the users' circumstances and their capabilities, to provide a qualitative overview of the expenses and personalized recommendations to improve their budget. Also, IS will provide resources and information for financial literacy of users and ensure reliable security of personal data.

IV. ANALYSIS OF SIMILAR APPLICATIONS

Today, there are many family budget management software applications, because every person faces financial expenses. After considering the analogues of the application, it can be noted that they have similar functionality, but there are also some differences present [2, 3, 7].

Money Manager is one of the best home accounting programs that is easy to use and has a Ukrainian-style interface. The application allows you to quickly add income and expenses, create a monthly budget and plan regular payments. Statistics are presented in the form of graphs, which simplifies the analysis of financial behavior [5].

AndroMoney is an application that allows you to connect multiple accounts and manage shared budgets. It supports cloud technologies (Google Docs, Dropbox), synchronization with other devices and restoration of saved data. Budgets can be set for each category or for each month [1].

Monify is a simple and convenient mobile application that helps keeping track of income and expenses and save money. It allows you to connect to different devices and enter data, which is convenient when managing a budget together with family members. The application is also

compatible with Google Drive and Dropbox, in which data is automatically synchronized [4].

The Table 1 shows a comparison of our project with analogues.

TABLE 1. COMPARISON OF THE IT PROJECT WITH ANALOGUES

Characteristics	Our project	AndroMoney	Monify	Money Manager
Statistics in the form of graphs	Yes	Yes	Yes	Yes
Monthly budgeting	Yes	Yes	Yes	Yes
Regular payments planning	Yes	Yes	Yes	Yes
Quick add expenses income	Yes	Yes	Yes	Yes
Cloud technologies support	Yes	Yes	Yes	No
Connecting multiple accounts	Yes	Yes	Yes	No
Synchronization with other devices	Yes	Yes	Yes	No
Setting a budget for each category	Yes	Yes	Yes	No
Restoring saved data	Yes	Yes	Yes	No
Use of geolocation	Yes	No	No	No
Accrual of bonuses	Yes	No	No	No

If to compare the IT project with similar products, then its advantage is that it will use geolocation data to track users' expenses in different locations. As users do their shopping, the app can automatically geolocate shopping locations and spending categories (e.g., groceries, clothing, entertainment). This is especially useful for families trying to better manage expenses and budget. In addition, this information may be used for reporting and analysis to help users make informed financial decisions. It is important that the information system respects user's privacy when using geolocation data. The app will have an option to disable this feature if they don't want their geolocation tracked.

Also, in order to interest users, the application can provide accrual of bonuses and achievements. The main principles of calculating bonuses will be carried out according to the following criteria – expenses: 1 bonus point is awarded for every UAH 100 spent in certain categories; savings: 5 bonus points are accrued for every unused UAH 1,000 at the end of the month.

The mobile application offers several ways to use bonus points, including the option to redeem them for attractive discounts from partner stores, paying for utilities or mobile phone services, and even converting points into a monetary equivalent.

The equivalent of 1 bonus point will be 1 UAH. Bonus points will be calculated according to the formula:

$$Bonus\ points = \left(\frac{amount\ of\ expenses}{100} \right) + \left(\frac{amount\ of\ savings}{1000} \right).$$

With the help of this concept, people can be motivated to optimize their spending and savings. Bonus points will interest people in receiving benefits, which will increase the number of users and business partners of the mobile application.

V. PRESENTING THE MAIN MATERIAL

Family budget management software applications help users better control their finances, plan a budget and make informed financial decisions. They are distinguished by rich functionality, convenient interface and popularity among users.

With the help of the family budget management information system, positive effects can be expected, namely improving the family's financial condition as the system helps users understand their expenses and income better, providing training and education by offering basic information about financial literacy, and reducing stress by giving users a tool to track and plan their expenses, which is especially helpful for families with limited financial means.

The main process of the information system's functioning includes registration and authorization of users, allowing existing users to authorize and new ones to register. It also facilitates budget creation and management, enabling users to set monthly or annual limits and track their expenses in real time. Users can manually enter expenses or synchronize data with their bank accounts for expense tracking. The system supports setting financial goals, such as saving a specific amount or reducing expenses in certain categories. Additionally, it offers cost analysis and generates reports to help users better understand their spending. Lastly, the system sends reminders and notifications about upcoming payments and completed goals.

These steps can be adapted and extended according to the specific requirements and user's needs. Besides, it is important to ensure ease of use, data security and high performance of the system.

Fig. 1 presents the physical model of the family budget management IS database.

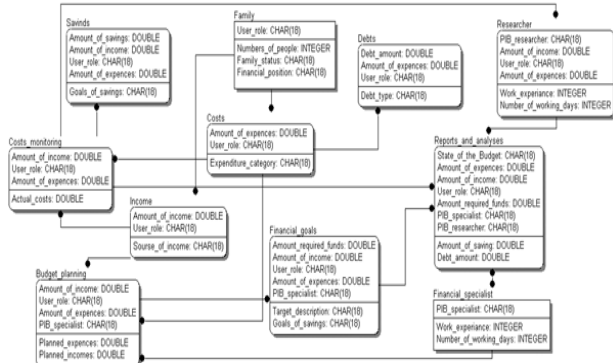


Fig. 1. Database model at the physical level.

The next stage of IS design is the construction of UML diagrams using the unified modeling language, which is an integral part for the graphical representation of information systems. Fig. 2 presents a usage diagram that allows you to picture the scenarios of using the system and its users performing certain functions.

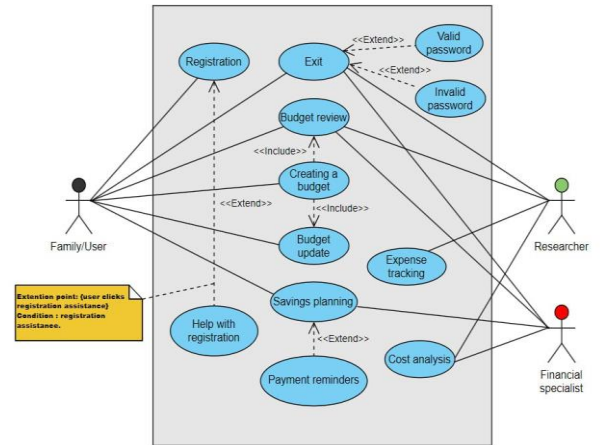


Fig. 2. UML use case diagram.

The UML diagram of classes of object that implement the main processes of system functioning, which is being developed in IT project, is shown in Fig. 3.

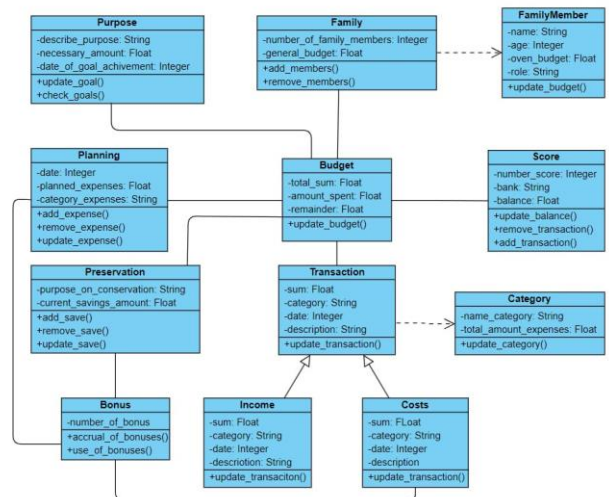


Fig. 3. UML diagram of system object classes.

Further, a diagram of states and transitions is designed, which allows you to visualize the behavior of the system or its individual parts in different states. Fig. 4 shows the UML diagram of the general functionality of the family budget management IS.

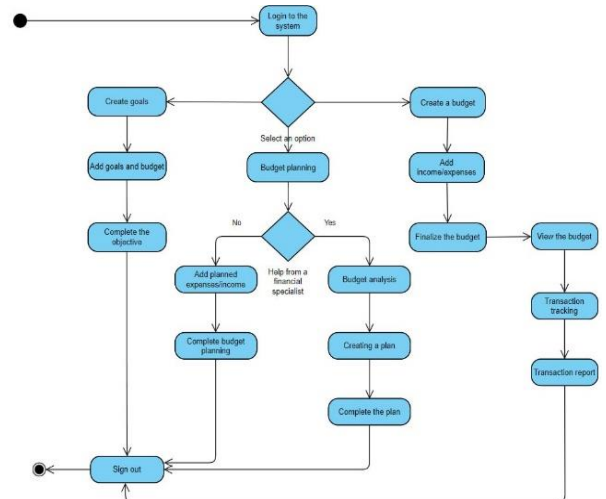


Fig. 4. UML states diagram.

CONCLUSIONS

An information system prototype is the fastest and easiest way to describe an application idea. In a prototype demonstration, the design and logic of the interface can be imagined. The prototype is not yet a complete solution, there are many models and limitations, but with its help you can get feedback from the customer with further wishes and corrections. The conceptual prototype of the image of the mobile application of the family budget management information system is presented in Fig. 5, 6.



Fig. 5. Prototype of the main screen of the mobile application.

In Fig. 5, the upper part shows a rectangle that demonstrates the user menu, on the left is a burger with the necessary sections for the menu, and on the right side there are transitions to other pages such as statistics, transactions, etc. Next, there is content with a view of profits and expenses and the possibility of adding them in a certain category.



Fig. 6. Mobile application authorization prototype.

Fig. 6 shows the screen of the application where the user's authorization is located. There is a menu at the top with the option to return to the main screen, below there are fields for entering a login and password. You can also log in using your Gmail account on the page.

The article considers the key aspects of designing an information system for managing the family budget. Developing effective family budget management systems requires a deep understanding of user needs and the use of advanced technology to create useful tools that are intuitive and easy to use. Such an IT project can greatly facilitate budget management, avoid unforeseen expenses and contribute to the achievement of economic goals. As a result, users will be able to manage their finances, plan for the future and make informed financial decisions better.

A comparative characterization of the family budget management information system with similar products was carried out. The IT project differs from analogues by using geolocation data to automatically track expenses in different places and categories, which is especially useful for families who want to better manage their budget. This app also accrues bonuses for usage, supports cloud technologies, allows connecting multiple accounts, syncs with other devices, and provides the ability to set budgets for each expense category. To ensure privacy, users can disable the geolocation function.

In the article, the design of the database was carried out, the processes and requirements of the system were modeled and the prototype of the mobile application was developed. Various functional aspects were considered, namely: tracking expenses, budget planning, setting financial goals and monitoring their achievement. Additional functions in the form of bonus points are also designed to encourage users to actively use the system.

Thus, this IT project can combine solving family budget problems with the help of innovative technologies. Automatic expense tracking, support for cloud technologies, the ability to connect multiple accounts and the use of geolocation to synchronize with other devices make the system unique and convenient. Additional features such as bonus points allow users to actively use the app. As a result, users can manage their finances more effectively, avoid unexpected expenses and achieve economic goals.

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