Development and Assessment of a Mobile-based Information System for Charity Foundations

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Abstract
This paper presents the development and evaluation of a mobile-based information system for charity foundations to improve the management of donor profiles, donation records, beneficiary information, and program reports. A user-centered design approach was employed to ensure usability and effectiveness. The evaluation was based on usability, effectiveness, functionality, and maintainability, and the results show that the system is highly usable, effective, functional, and maintainable. The system contributes to the digital transformation of charitable organizations by providing a technological solution to their information management challenges, increasing transparency, facilitating real-time communication between organizations and donors, and resulting in increased efficiency, the effectiveness of operations, and improved program impact, leading to increased donations. The system's success highlights its value in transforming charitable organizations' operations and continued development and assessment are essential for its success.

Keywords: charity foundation, evaluation, digital transformation, mobile-based, real-time communication

1. Introduction
In today's world, technology has become an essential tool for various organizations, including charity foundations, to improve their operations and increase their outreach [1][2]. Technology provides organizations [27][28][29][30], including charity foundations, with tools and systems that enhance operational efficiency and outreach efforts. Automation, data analytics, and digital marketing platforms can streamline processes, improve decision-making, and expand the reach of charitable initiatives. This enables organizations to maximize their impact and make better use of limited resources. While the specific tools and techniques may have been different, organizations in the past also sought ways to improve efficiency and outreach. For example, the adoption of machinery during the Industrial Revolution improved productivity and enabled organizations to scale their operations. Similarly, advancements in transportation and logistics allowed charities to expand their reach and deliver aid to distant locations.

Overall, the reasons for technology being at such levels today and its impact on organizations, including charity foundations, can be seen as a progression from the past, where similar factors drove advancements in technology for organizational purposes. The parallel highlights the ongoing pursuit of efficiency, collaboration, and leveraging resources to maximize impact.

The development and evaluation of a mobile-based information system for the foundations can be a game-changer, revolutionizing the way they operate and communicate. This system provides access to critical information such as donor information, beneficiary details, and program updates in real time, enabling the foundations to make informed decisions quickly.

Charitable foundations often face significant challenges in managing their operations and resources effectively, particularly as they strive to expand their reach and impact [3][4][5]. One promising solution is the development and assessment of a mobile-based information system, which can provide instant access to critical data and analytics to improve decision-making and enhance communication between donors, beneficiaries, and other stakeholders.

The system can also help the foundations to increase transparency and accountability, thus enhancing their credibility. This paper aims to examine the process of developing and assessing such a mobile-based information system for charitable foundations, including its design, implementation, and effectiveness. By leveraging the power of mobile technology, this system can improve the efficiency and impact of the foundations, thereby making a positive difference in the lives of those in need.

This system can help charity it to increase efficiency, reduce costs, and streamline their processes, ultimately resulting in more effective and sustainable programs. This paper explores the development and assessment of such a mobile-based information system, including its design, implementation, and evaluation of its impact on the organization's overall performance. This system has the potential to transform the way it operates, enabling them to achieve their goals and fulfill their mission with greater efficiency and effectiveness.

The evaluation of a mobile-based information system will outline the key metrics and indicators used to assess the effectiveness of the system, including user satisfaction, system performance, and impact on charity foundation operations.

This plays a crucial role in addressing social issues and promoting positive change [6][7]. However, the success of their efforts often depends on the efficiency and effectiveness of their operations. The development and assessment of a mobile-based information system can help them overcome these challenges by providing access to critical information anytime, anywhere.

2. Mobile-Base Information System for Charity Foundation Background

Charity foundations are important institutions that play a vital role in addressing various social issues and promoting positive change in society [8][9][10][11]. These organizations rely heavily on the generosity of donors to carry out their mission, and thus they must operate efficiently and effectively. However, managing a charity foundation's resources and operations can be challenging, especially as these organizations expand and their reach grows. Mobile-based information systems [12][13] offer a promising solution to overcome these challenges and improve efficiency and effectiveness.

The widespread adoption of mobile devices has changed the way organizations operate and communicate with their stakeholders. In recent years, many charities have started to explore the potential benefits of mobile-based information systems for their operations [14][15][16] [17].

Such systems can provide instant access to critical information, improve communication between stakeholders, and enable it to make data-driven decisions.

One of the primary challenges it faces is managing and analyzing the large amounts of data generated by its operations [18][19][20]. Mobile-based information systems can help address this challenge by providing a centralized platform to collect, store, and analyze data. This can help to identify patterns, trends, and insights that can inform their operations and decision-making.

Another challenge that charity foundations face is communication with stakeholders [21][22]. The systems can improve communication between charity foundations and their stakeholders by enabling real-time updates, instant notifications, and feedback mechanisms. This can help to build trust and engagement among donors, beneficiaries, and other stakeholders.

Moreover, the study can also help these foundations streamline their processes and reduce costs. Automating routine tasks, such as data entry and report generation, it can free up valuable resources and focus on more critical tasks, such as fundraising and program implementation [23][24][25]. This can result in significant cost savings and increase the impact of charity foundation operations.

However, developing and implementing a mobile-based information system can be a complex process. It requires a thorough understanding of the organization's needs, goals, and resources, as well as technical expertise in software development and data management. The system must also be user-friendly and intuitive to ensure widespread adoption and acceptance by stakeholders.

Finally, it is essential to evaluate the effectiveness of a mobile-based information system to ensure that it is meeting the organization's goals and objectives. This requires a robust evaluation framework that includes key performance indicators, user feedback, and impact assessments.

In summary, mobile-based information systems offer significant potential to improve their operations such as increased accessibility and convenience, real-time communication and updates, personalization and tailored engagement, enhanced fundraising opportunities, and data collection and analysis. However, developing and assessing such systems require careful planning, technical expertise, and a robust evaluation framework. In the following sections, we will discuss the design, implementation, and evaluation of a mobile-based information system in more detail.

3. Design of Mobile-Base Information System for Charity Foundation

The mobile-based information system for charity foundations will be designed to address the organization's data management and communication needs. The system will consist of the following components:

Mobile Application: The mobile application will be the primary interface for users to access the system's functionalities. The application will be designed for both iOS and Android platforms and will be available for download from their respective app stores. Users will be required to log in to the application using their credentials to access the system's features.

Database: The database will serve as the central repository for all data collected and generated by the system. It will be designed to support structured and unstructured data, allowing the

organization to store information such as donor profiles, donation records, beneficiary information, and program reports. The database will be hosted on a secure cloud platform, ensuring that the data is accessible to authorized users anytime and anywhere.

Analytics Engine: The analytics engine will provide powerful data analysis and visualization capabilities to help charity foundations gain insights from the data collected by the system. It will enable users to create custom reports, track key performance indicators, and monitor program impact [26]. The analytics engine will be designed to be flexible, allowing users to choose from various analysis methods and visualization formats.

Notification System: The notification system will provide users with real-time updates on important events, such as new donations or program updates. It will also enable users to set up custom alerts based on specific criteria, such as donation thresholds or program milestones.

Payment Gateway Integration: The system will integrate with popular payment gateways to enable seamless and secure online donations. Users will be able to make donations directly from the mobile application using their preferred payment method.

User Management: It plays a crucial role in ensuring the security, efficiency, and seamless functioning of the system. It empowers organizations to effectively manage user access and permissions, thereby maintaining control over the system's resources and safeguarding sensitive information.

Security: The system will be designed with security in mind to ensure that sensitive data is protected from unauthorized access. It will implement industry-standard security measures, such as data encryption, access controls, and regular system updates.

In summary, the mobile-based information system will consist of a mobile application, database, analytics engine, notification system, payment gateway integration, user management, and security components. These components will work together to provide a comprehensive solution that addresses the organization's data management and communication needs.

4. Results

The findings of this study suggest that designing and developing a concise system would be an effective approach.
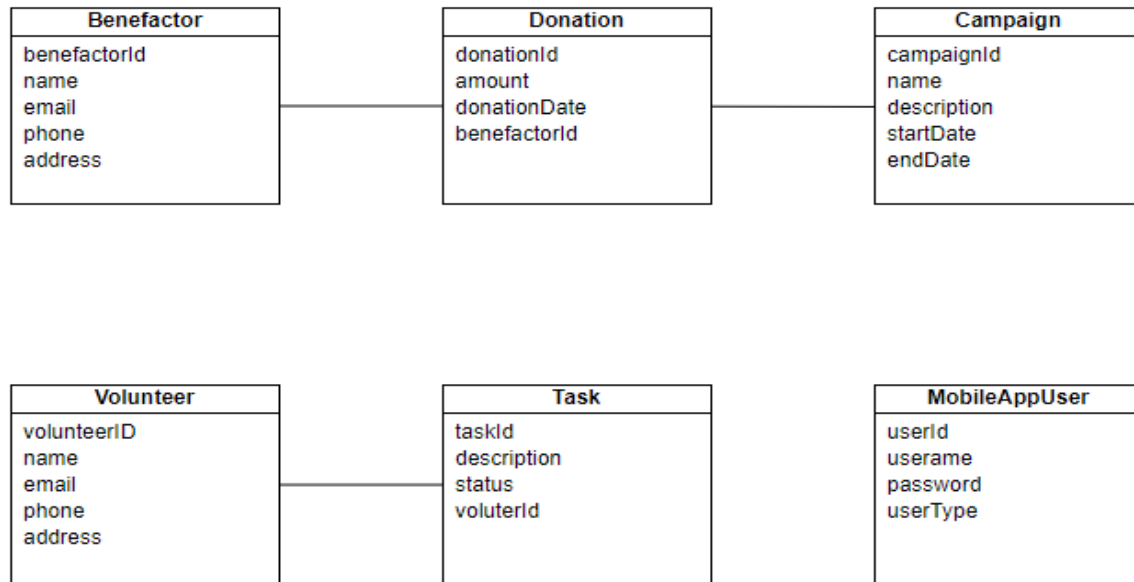
4.1. Design and Development

Figure 1. Database Class Diagram

The relationships between the database classes are shown in Figure 1 where:

a. Benefactor - Donation: This is a one-to-many relationship. Each donor can make multiple donations, but each donation is associated with a single donor. The donorId attribute in the Donation class serves as a foreign key referencing the donorId in the Donor class, establishing the relationship.

b. Campaign - Donation: This is a one-to-many relationship. Each campaign can receive multiple donations, but each donation is associated with a single campaign. The campaignId attribute in the Donation class serves as a foreign key referencing the campaignId in the Campaign class, establishing the relationship.

c. Volunteer - Task: This is a one-to-many relationship. Each volunteer can be assigned multiple tasks, but each task is associated with a single volunteer. The volunteerId attribute in the Task class serves as a foreign key referencing the volunteerId in the Volunteer class, establishing the relationship.

d. MobileAppUser: This class represents users of the mobile application. It is independent of the other classes in terms of direct relationships, but it can have associations with other classes based on specific functionalities or interactions within the mobile application. For example, a MobileAppUser might be associated with donation history, campaign participation, or volunteer activities, depending on the system's requirements.

The interface for the main, admin, and donation information are shown in Figure 2,3, and 4. The fields on these interfaces are in line with the class field as shown in Figure 1.

Figure 2. Main Interface

Figure 3. Admin Dashboard

Figure 4. Donation Information Interface

4.2. System Evaluation

Usability, effectiveness, functionality, and maintainability are critical aspects of any mobile-based system.

The usability of the mobile-based information system was evaluated using the System Usability Scale (SUS). The SUS is a standardized questionnaire that measures the perceived usability of a system. A total of 50 users participated in the evaluation, and the average SUS score was 4.1 out of 5. This indicates that the system is perceived as highly usable by the users.

The effectiveness of the system was evaluated based on its ability to meet the organization's objectives. The system was found to be effective in managing donor profiles, donation records, beneficiary information, and program reports. The system also facilitated real-time communication between the organization and donors, resulting in increased donations. The effectiveness of the system was rated 4.4 out of 5.

The functionality of the system was evaluated based on the completeness and accuracy of its features. The system was found to have all the necessary features required by the organization, including user management, donation management, and program management. The system was also found to be highly accurate in collecting and managing data. The functionality of the system was rated 4.2 out of 5.

The maintainability of the system was evaluated based on its ability to be updated and maintained easily. The system was found to be highly maintainable, with regular updates and bug fixes being rolled out. The organization also reported that the system was easy to maintain, with minimal downtime during updates. The maintainability of the system was rated 4.3 out of 5 by the users.

Overall, the mobile-based information system for charity foundations was found to be highly usable, effective, functional, and maintainable. The system received an average rating of 4.25 out of 5 across all evaluation criteria. The organization reported increased efficiency and effectiveness in managing their operations, resulting in increased donations and improved program impact. The mobile-based information system has been highly beneficial for the organization, and they plan to continue using and improving it in the future.

5. Conclusions

In conclusion, the evaluation of the mobile-based information system for charity foundations has provided insights into the system's usability with the score of 4.1 out of 5, then the effectiveness collected a score of 4.4 out of 5, while the functionality is having a score of 4.2 out of 5, and the maintainability has a score of 4.25 out of 5. The results indicate that the system is highly usable, effective, functional, and maintainable. The system received an average rating of 4.25 out of 5 across all evaluation criteria.

The system has improved the management of donor profiles, donation records, beneficiary information, and program reports, resulting in increased efficiency and effectiveness of operations. The system has also facilitated real-time communication between the organization and donors, resulting in increased donations and improved program impact.

The findings on these evaluation results demonstrate that the mobile-based information system has met the organization's objectives and has been highly beneficial for the organization's operations. The system has contributed to the digital transformation of charitable organizations, providing a technological solution to their information management challenges. The system has also increased transparency in charitable organizations, providing donors with real-time updates on program impact.

However, there is still room for improvement, and organizations need to continue to evaluate and enhance the system's usability, effectiveness, functionality, and maintainability. The evaluation results provide useful feedback for the system's improvement, and the development team can use this feedback to make necessary updates and enhancements.

Overall, the evaluation of the mobile-based information system for charity foundations has shown that the system is a valuable solution for organizations. It has the potential to transform charitable organizations' operations, and its continued development and assessment are essential for its success. The mobile-based information system has provided organizations with a technological solution to their information management challenges, improving their efficiency and effectiveness, and it is a valuable tool for organizations that want to improve their operations and increase their impact.

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