
Designing a Mobile Application for the Educational Environment

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Abstract:

Purpose: *The research aims to design an innovative mobile application for students that will enhance their interaction with the university and increase their engagement in learning.*

Design/Methodology/Approach: *The study employed a comprehensive approach, including an analysis of existing solutions, identification of user needs and current technological trends. The design of the mobile application was guided by principles of an intuitive interface and cross-platform programming, followed by real-world testing of the application.*

Findings: *The developed mobile application, integrated with the university system, provides students with mobile access to educational information, push notifications, and automation of routine processes.*

Practical Implications: *The implementation of the developed system can significantly enhance students' digital interaction with the university, increase their awareness and engagement, and create new channels of communication between students and the administration.*

Originality/Value: *The study makes a significant contribution to understanding how modern mobile technologies can be effectively integrated into the educational process, enhancing the interaction between students and information systems of an educational institution.*

Keywords: *Mobile application, educational environment, digital transformation, digitalization.*

JEL Classification: *I21, I28, I31, O14.*

Paper type: *Research article.*

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1. Introduction

Digital transformation, as the driving force behind the Fourth Industrial Revolution, has brought about radical changes across all aspects of society, including the economy, politics, social relations, and culture. The rapid advancement of digital technologies has led to the deep integration of information systems into production processes, management, services, and everyday life. Despite the crucial role of digital tools in developing human capital, the education sector faces significant barriers to digital transformation, which is evident in its lag compared to other sectors of the economy. Therefore, the processes related to digital transformation in higher education warrant special attention.

The transition from a traditional university to a digital university involves a fundamental shift in its mission in the current environment to prepare personnel for the digital economy. Strategically, this shift will support the development of industries reliant on advanced technologies and foster the creation of innovative industries capable of producing high-tech, competitive digital goods and services. This approach will contribute to the national economic growth and enhance the welfare of its citizens.

However, the development of mobile applications for educational purposes requires a comprehensive approach. This includes conducting an in-depth analysis of user needs, researching current technological trends, and designing an intuitive interface. To ensure the successful implementation of such applications, it is necessary to consider the specific requirements of various educational institutions and create solutions that are scalable and adaptable to the needs of diverse user groups.

It is important to note that the design of mobile applications in the educational environment is an area of active interdisciplinary research by both domestic and international scholars. In particular, Kolodinska Y.O. and Gudakov D.O. explore the stages of user interface design, which is a crucial aspect of developing of mobile applications for students. The researchers emphasize the importance of creating user-friendly interfaces that enhance student engagement in the learning process (Kolodinska and Hudakov, 2023).

Skliarenko O.V. et al. studied the role of digital interactive learning technologies as an integral component of the contemporary educational process. Their study underscores the importance of incorporating interactive elements into mobile applications to enhance learning effectiveness (Skliarenko *et al.*, 2024).

Khomenko O.O., Paustovska M.V. and Onyshchuk I.A. in their study investigated the impact of interactive technologies on the learning process and development of higher education students. Their study highlights the importance of interactivity in educational tools, which is also a key consideration in the design of mobile applications for students (Khomenko *et al.*, 2024).

Despite extensive research and development in the field of educational technologies, the process of their implementation in educational institutions remains highly heterogeneous. This heterogeneity contributes to a widening digital divide and limits opportunities to ensure equal access to modern digital resources for all participants in the educational process.

2. Research Methodology

In researching and designing a mobile application for students in the educational environment, a comprehensive approach was employed, encompassing several key stages. First, an analysis of existing solutions and literature was conducted to identify current user needs and modern technological trends. Based on this analysis, we established requirements for the application's functionality, tailored to the specifics of the educational environment.

Next, we designed a user interface that prioritizes intuitiveness and accessibility. To ensure wide audience coverage, we used cross-platform programming to develop an application compatible with Android and iOS operating systems. The final stage involved testing the application using on real-life use cases to evaluate its effectiveness and user-friendliness in the learning process.

3. Research Results and Discussion

In the field of education, there is a growing trend towards the use of mobile technologies (Khomenko *et al.*, 2024). Android and iOS smartphones have become integral to students' daily lives, making mobile applications an powerful tool for accessing educational content and engaging with the university.

To maximize audience reach, mobile app developers often create cross-platform solutions that support both major operating systems (Bobro, 2024). Considering these trends, the design of a mobile application for students in an educational environment should incorporate the following components:

1. Mobile application: Available for download through the Apple AppStore and Google Play app stores. It implements the user interface.
2. The server part of the mobile application: It implements authorization, data access and integration with the university information system.

Students can view their class schedules, including consultations and exams, and access the following information:

- start and end time of the class;
- type of class (lecture, seminar, exercises, laboratory work, test, exam,

consultation - the full list of class types is approved at the implementation stage);

- information about the teacher;
- name of the academic discipline;
- classroom number.

Class schedules are generated based on structured data that has been entered into the educational institution's information system by the administrative staff. This system automates the creation of individual schedules for each student.

In case of any changes to the schedule, the system automatically initiates the process of informing students by sending push notifications to their mobile devices. These notifications contain a brief description of the changes made, ensuring that users are promptly updated with the current class schedule.

The system allows student to initiate an electronic request for a certificate from a specified list of types. Through an intuitive interface, users can view and confirm the information automatically pulled from their personal profiles, as well as add any missing data.

Students receive a push notification when the certificate is available in electronic form. By clicking the notification, students access the help page within the mobile application. Additionally, students can view all previously issued certificates in the mobile application and navigate to the page of any specific certificate.

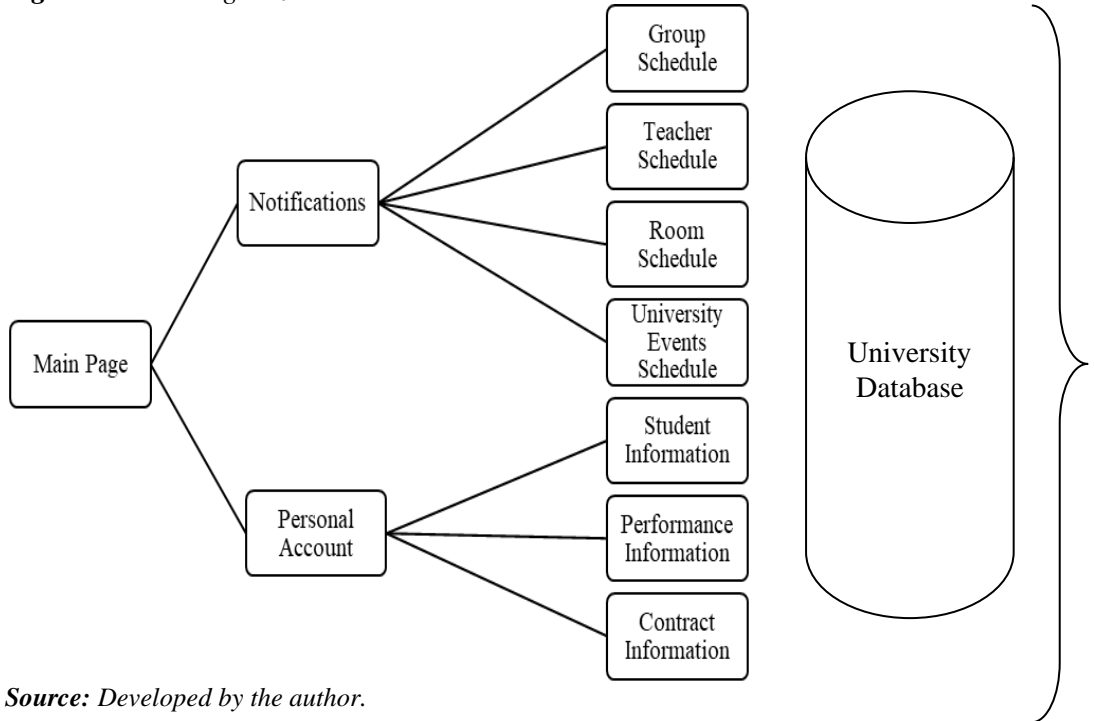
While on the help page, the student can:

- download the help file to the device;
- send the help file by email to the desired email address.

The process of sending a certificate by email involves automated generation of an email from the official university email address. For each request, an individual email is automatically generated, with the subject line including the student's surname, name, and patronymic, as well as the exact name of the certificate issued.

The body of the email follows a pre-designed template, ensuring a consistent style for all messages. The certificate file is attached to the email, and its authenticity is verified by an electronic digital signature.

The data organization scheme is shown in Figure 1.

Figure 1. Data Organization Scheme

Source: Developed by the author.

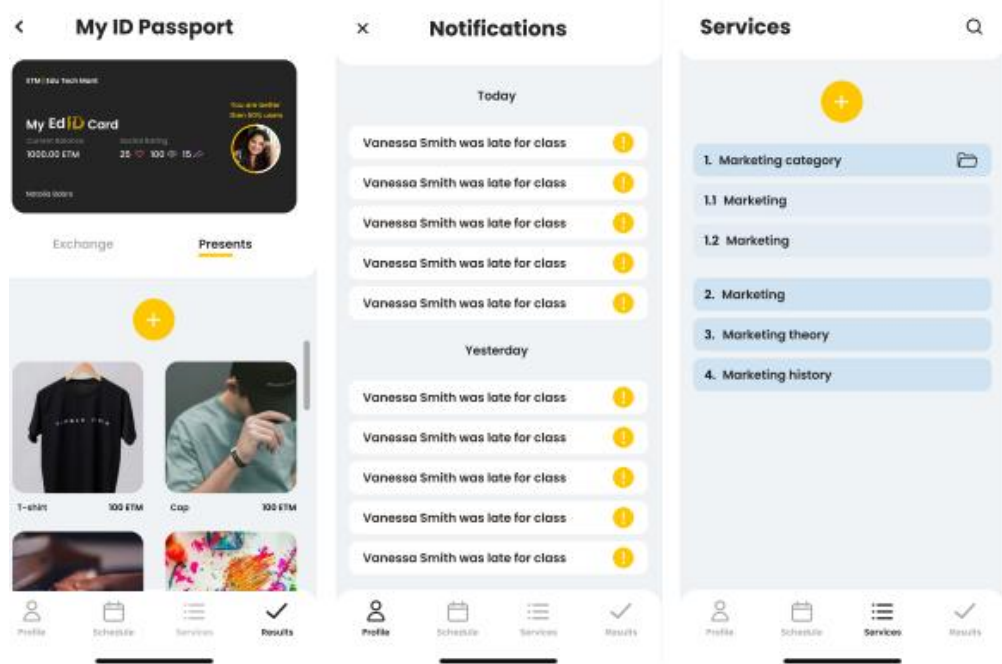
The next crucial step, after developing all necessary diagrams reflecting the logic of the information system, is to design the user interface. Various methods can be employed to define and create the ideal interface for each specific case. The interface should be simple and intuitive enough for inexperienced users while also providing sufficient functionality to ensure comfortable use of the system (Figure 3).

A mobile application is ideally implemented as a “thin client,” meaning that most tasks related to storing and processing information are handled by the existing server-based information system. The application interacts with this system via a software interface.

A thin client is an endpoint device in a client-server architecture with limited computing power, designed to enable users to interact with a remote server. Its functionality is restricted to user input and displaying results from calculations performed on the server.

Physically, a thin client can be a compact computer without local storage or a mobile device, such as a smartphone. All resource-intensive calculations, data storage, and program execution are managed by a centralized server to which the thin client connects via the network.

Figure 2. Interface Options



Source: Developed by the author.

4. Conclusion

The study demonstrates that the proposed system has the potential to significantly enhance digital interaction between students and the university. Implementation of the system is expected to improve students' awareness of academic processes, increase their engagement in university life, and establish new communication channels between students and the administration.

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Declaration of interests: The author declares that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper. Additionally, there is no funding for this work.

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