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MyRELASIS UTHM Digital ePortal: Development of RELASIS Student Information System

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Abstract

In the modern age of Information and Communication Technology (ICT), office management has evolved to become more efficient through technological advancements. However, the Briged RELA Siswa Siswi (RELASIS) UTHM still relies on manual methods to manage student information and office documents, leading to inefficiencies and data tracking challenges. This project aims to address these issues by developing the MyRELASIS UTHM Digital ePortal system, a web-based platform that streamlines student information management, report generation, and office operations. In addition, the system's objectives include designing and developing the system and testing it with the target users, which involves administrators, instructors, and students. The system's modules include login and registration, order, order management, activities record, user profile and report module generation. By implementing this system, the project initiatives to reduce reliance on manual methods, enhance efficiency, and provide secure data storage. Not only that, improve accessibility and facilitates rapid information retrieval for comprehensive reporting. The chosen methodology for this project is the Prototype model, which includes iterative development, user feedback and continuous improvement. The project is important because it will help offices become more efficient while cutting down on paper use and raising productivity. This project provides a revolutionary approach to update RELASIS's student information management system in line with the rapidly changing digital environment.

1. Introduction

Office administration has experienced revolutionary changes in the era of global technical breakthroughs, especially in the field of Information and Communication Technology (ICT). In both the public and private sectors, the integration of ICT has largely transformed information management techniques by streamlining procedures and greatly accelerating the flow of information at different organizational levels [1]. But even with this general trend towards digitization, many public universities including the outstanding Universiti Tun Hussein Onn Malaysia (UTHM) continue to maintain student information records and university management documentation using outdated manual systems. The use of manual processes costs a lot of money in terms of time, effort, stationery, and physical space because the huge quantity of data requires careful documentation in management and student files. These manual procedures not only increase the possibility of information loss during transfers,

but they also result in spatial inefficiencies in the workplace, which are exacerbated by the difficulties in handling large amounts of redundant, erroneous, and inaccurate data [2]. The use of database platforms for student information management appears to be a convincing solution considering the most recent technological advancements, offering improved efficiency, simpler procedures, and significant time and labor savings. To solve these issues, the current project introduces the MyRELASIS UTHM Digital ePortal system, a web-based platform specifically made to streamline report preparation, modernize student information management, and enhance overall office operations.

The aims of the system include design, development, and testing with target users, who include administrators, instructors, and students. The system's primary focus is on eliminating the inefficiencies and data tracking issues associated with the current manual techniques. The system includes all the necessary modules that deliberate break from traditional methods for login and registration, order, order management, activities record, user profile and report generating thorough student information management. In the context of the rapidly changing digital landscape, the project aims to send in a new era of computerized and streamlined operations for the office by implementing this innovative system, which will not only reduce reliance on manual methodologies but also enhance efficiency, ensure secure data storage, and strengthen accessibility. In summary, with a focus on the revolutionary effects of ICT, it offers a thorough examination of the situation of office administration today considering technological advancements. It highlights the conflict between the pervasive use of outdated manual methods in many public higher education institutions, especially Universiti Tun Hussein Onn Malaysia (UTHM), and the broad use of digitalization in information management across industries.

2. Literature Review

A literature review is a critical analysis and appraisal of previous research (found in books and academic journal articles) on a particular subject. It provides a contextual framework for research and sheds light on the status of knowledge in each topic now. A literature review should clarify important ideas, exhibit critical analysis, and point out any gaps in the body of knowledge [3]. Scholars conduct literature reviews to ascertain crucial theories, procedures, and conclusions from extant research, thus acquiring acquaintance with the present level of knowledge within a particular domain. Through critical analysis, researchers can identify knowledge gaps, which makes it easier to formulate well-informed research questions and hypotheses [4]. Literature reviews provide researchers with an essential framework for their work by situating their findings within the larger context of accepted beliefs. In addition to summarizing and analyzing the body of information, a well-done literature review lays the groundwork for next initiatives, advancing academic discourse and directing future research.

2.1 MyRELA system

The MyRELA system simplifies the management and recording of RELA member data, allowing interested parties to register and apply at state RELA offices for involvement in RELA Malaysia's operations. Users can apply for MyRELA and check their application status online. Additionally, it manages other system to enhance RELA's effectiveness in volunteer and community service, such as MyLatihan RELA, RELA Webmail, Asset Management Monitoring System, and Open Data along with a login authenticator and dashboard for operations management. The proposed system is like MyRELA that aims to streamline registration especially for new students that joining the RELASIS at early semester in first year of studies. The system suggests an improvement in information separation, filtering, retrieval, and overall system performance to ensure smooth information processing and resolve lags detected in MyRELA. The goal of the proposed system is to provide benefit comparable to MyRELA, focusing on improved data organization though system with speed to streamline management workflow and efficiency store and retrieve student data.

2.2 SisMA UTHM system

The Centre of professional Advancement and Alumni (PKKA) at UTHM created the UTHM Alumni Information System (SisMA), which is used to compile data on graduates, monitor the professional statuses of alumni, and evaluate graduates' marketability in overseas sectors. It has features like search capability, CARE verification, recording alumni information, login, and a career page for organizing student and alumni data. SisMA UTHM system interface, particularly in terms of login verification, student registration, information recording, tracking, and an application process, the proposed system and SisMA are identical. By offering a better organized student information system, tracking, and searching based on student profiles that is more efficient, and the addition of an easy-to-use feature for t-shirt purchases, the suggested system seeks to improve these features. The suggested approach offers a more seamless account access procedure by utilizing email and strong passwords for login

authentication. All things considered, the suggested system priorities improving student information management with extra capabilities for purchases and applications, whereas SisMA places more emphasis on alumni career information management.

2.3 Ziegers Printing OnPay Affiliate system

The Ziegers Printing OnPay Affiliate system is an online business and e-commerce platform that provides small and medium-sized businesses with payroll and HR software solutions. With customizable reporting and analytics for labour expenses and workforce trends, it expedites payroll operations, tax computation, direct payment, and time monitoring. The Ziegers Printing OnPay Affiliate system makes managing employee benefits easier. Besides, the suggested approach makes easy student payments by effectively gathering data for shirt purchases. While OnPay covers a wide range of e-commerce, the proposed system focuses on order status information, digital receipt printing, digital payments using QR codes, and purchase records. Without compromising other system features, this makes it simple for students to keep track of their uniform applications and t-shirt purchases within the system, improving accessibility and organization.

2.4 MyRELASIS UTHM Digital ePortal

To simplify the management of student records, the MyRELASIS UTHM Digital ePortal system offers a user-friendly interface. This integrated solution makes it easy to maintain student data. For organizations like RELASIS UTHM in particular, accurate and timely tracking of student data is important. The system consists of several modules that are specifically designed to satisfy the needs of administrators, educators, and students. Users can create new accounts and are guaranteed secure access through the "Login and Register" module. Administrators and students can examine purchase information and statuses when students order RELASIS t-shirts and apply for uniform suits through the "T-shirt Purchase Payment and Uniform Application" feature.

2.5 Comparison with the Existing Systems

There are several problems with the current manual approach for gathering and keeping student data, which uses paper and Microsoft software. These problems include finding records and getting data out for official uses and report creation. As shown in Table 1, on the other hand, the MyRELASIS UTHM Digital ePortal system offers a productive and intuitive solution. Through the addition of new capabilities to the platform, this system seeks to expedite the management of student records while guaranteeing accuracy and timeliness. Using a QR Code, the technology enables online payments. While user registration permits profile modifications, the "Record Activities" area keeps track of students' participation in RELASIS UTHM programs. To improve overall system functionality and user experience, administrators can issue certificates for programs participation through the "e-Certificate" module and generate digital reports using the "Report" features.

Table 1 *System's Comparison*

Features/System	MyRELA System	SisMA UTHM	Ziegers Printing OnPay Affiliate System	MyRELASIS UTHM Digital ePortal
Login and Register	√	√	√	√
Order	X	X	√	√
Order Management	X	X	X	√
Activities Record	√	X	X	√
User Profile	√	√	√	√
Report	√	√	√	√

3. Methodology/Framework

For the system to be created in an organised and methodical manner, the web development technique selected is essential. It helps with project efficiency, reasonable time estimation, and quality maintenance within the allotted period [6]. Early in the development process, developers can detect and handle difficulties by using a methodology such as model prototyping, which consists of six phases: requirement analysis, design, prototyping, user assessment, review and refine, implementation, and maintenance. To create a system that is both functional and effective while also meeting user requirements, the methodology chosen is determined by the applicability of the project and the demands of the users.

3.1 Prototyping Model

The prototyping approach, which involves developing a prototype of the system to define and understand user needs, has been selected as the model for system development. The choice of this process, which involves iteratively developing a prototype in line with established user demands through input from users, is contingent upon the suitability of the project [5]. Six steps make up the prototyping model Figure 1, which highlights the need to produce prototypes early on before user evaluation and review to make sure the system satisfies user needs.

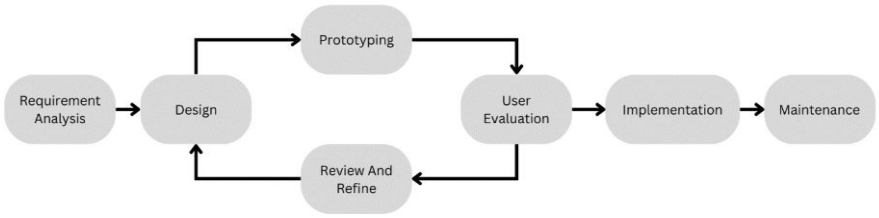

Fig 1 *Prototyping Model Phase*

The methodology for web development process is phased according to the prototype approach [6]. The project is started with the requirement analysis phase, which involves obtaining data through research, observation, interviews, and the production of a Gantt chart for project planning. Entity Relationship Diagrams (ERD) and Data Flow Diagrams (DFD) manufacturing, as well as flow chart system analysis, are given top priority. Using programs like draw.io, the database, system interface, and user interface are designed during the design phase. It generates wireframes, database schema, and system architecture. To test and confirm concepts, the prototyping phase builds a system prototype using database software and Laravel.

Table 2 *Software development activities and their task*

Phase	Task	Output
Requirement Analysis	☐ Proposed the project ☐ Determine the project schedule, activities and output ☐ Define problem of project and requirement ☐ Collect information and user requirement	☐ Project proposal ☐ Develop Gantt chart ☐ Project Documentation
Design	☐ Draw Diagram of ERD and DFD ☐ Sketch flowchart of the existing system ☐ Design and sketch user interface ☐ Design and develop database schema ☐ Determine hardware and software requirement	☐ ERD and DFD class diagram ☐ Existing system flowchart ☐ User interface design of the system ☐ Database schema ☐ Hardware and software Requirement

Prototyping	□ Develop prototype based on user interface design. □ Apply module of system in the prototype □ Detect bug, error and weakness of the system. □ Fix the error	□ Prototype
User evaluation	□ User and stakeholder test the prototype. □ Get feedback from user after testing the prototype	□ Feedback user □ Report of user testing □ Documentation of user testing
Review and Refine	□ Update and fix the prototype based on review.	□ Documentation of analysis report □ Update system prototype
Implementation	□ Develop the final system prototype.	□ Final product of prototype
Maintenance	□ Monitoring and tracking the prototype after implementation. □ Fix bug and error □ Update the prototype.	□ Maintenance of the system □ Update solution of the problem inside the system

4. Analysis and Design

In the development of the project website system, this chapter involves thorough analysis and design process to ensure it meets user needs and business objectives. This chapter also delves into the detailed analysis and design, covering the system modules, functional and non-functional requirements, user needs, hardware and software specifications, and web-based design. A structured approach is employed using context diagrams, Data Flow Diagram (DFD), and Entity Relationship Diagram (ERD) to illustrate system components and connections [7]. The analysis phase includes gathering requirements through stakeholder interviews, user stories, competitive analysis, and user research to create personas and journey maps. Technical analysis involves selecting the technology stack, planning system architecture, and conducting a feasibility study [8]. In the design phase, information architecture is established with sitemaps and content strategy, followed by wireframing and prototyping. User Interface (UI) and User Experience (UX) design focuses on visual and interaction design, ensuring responsive functionality across devices. Usability testing with real users and evaluation testing to help refine the design, while technical design encompasses database schema planning, API design, and implementing security measures

4.1 Functional and Non-Functional Requirements

The functional requirements describe the fundamental features of the system, including module operations and user interactions. Features like order management, activity recording, T-shirt buying procedures, uniform application procedures, activity recording, user profile updates, and thorough reporting for administrators. Table 3 and table 4 show all the user requirements for administrators, instructors, and students.

Table 3 *Functional requirements*.

No	Module	Description
1	Registration and Login Module	• Allow the new users to register new account before login. • Allow the existing users to login with the email and password. • Redirect the valid users to dashboard when successful login.
2	Order	• Allow student to fill the of merchandise form • Allow student to make a payment by scanning provided QR Code or make a manual transaction • Allow student to fill the uniform application form.

		• Allow administrator to manage list of order purchase and uniform application. • Allow instructor to view the list of merchandise order and uniform application
3	Order Management Module	• Allow the administrator to manage and update status order. • Allow the administrator to view order and application details. • Allow administrator to monitor payment
4	Record Activities Module	• Allow Administrator to generate or create and key in student's attendance based on student participation on program • Allow administrator to manage record activities • Allow administrator to manage digital certificate of activities • Allow instructor to generate or create and key in student's attendance based on student participation on program • Allow instructor to manage record activities • Allow instructor to manage digital certificate of activity • Allow student to fill the attendance activity form • Allow student to view list of record activities at dashboard student • Allow student to download and view e-certificate from activities transcript
5	User Profile	• Allow user to update user information by time to time
6	Report Module	• Administrator can generate report about student information and their statistic for each semester • Administrator can monitor student's information and performance from record activities more effectively

Table Error! No text of specified style in document. *Non-functional requirements.*

No	Requirement	Description
1	Performance	The system should be always usable
2	Maintainability	The system should be troubleshooting smoothly and aid in maintenance
3	Security	The system should be secure to access account to prevent unauthorized access
4	Compatibility	The system should be compatible with common web browsers

4.2 User Requirements Analysis

User requirement analysis is a cooperative approach that uses soft skills like critical thinking, judgement, and communication to identify user expectations for a new or improved product. The proposed MyRELASIS UTHM Digital ePortal system's specific functions are intended to meet the varied needs of users. Building a system that closely complies with user expectations and operational constraints is based on this analysis.

4.3 Hardware and Software Requirements

Table 5 *Hardware and Software requirement*

Aspect	Requirement
Computer	LAPTOP-4UOK5LDM Nitro AN515-45
CPU	Minimum 2GHz
Memory	12GB RAM
Storage	16.0GB SSD
GPU	NVIDIA GeForce RTX 3050 Ti and AMD Radeon (TM) Graphic
Internet connection	Wi-Fi or hotspot connection
Operating system	Window 11 Home Single Language
Cloud-based	Microsoft 365

Web browser	Google chrome, Internet explorer or Microsoft edge
Open-source code editor	Microsoft Visual Studio Code
Database	Laragon, MySQL, and phpMyAdmin
Reference Management Tools	Mendeley, Google Scholar, and Bibguru

4.4 Context Diagram

A context diagram is a graphic illustration that show how a system interacts with its surroundings. An outline of the system's boundaries is given along with an explanation of how it communicates with users, other system, and outside data sources [9]. It offers an easily read and understandable summary of the system's surroundings and the information exchanged between the system and these entities. Early in the system design process, context diagram is frequently used to document requirement and inform stakeholders of the system's scope [10].

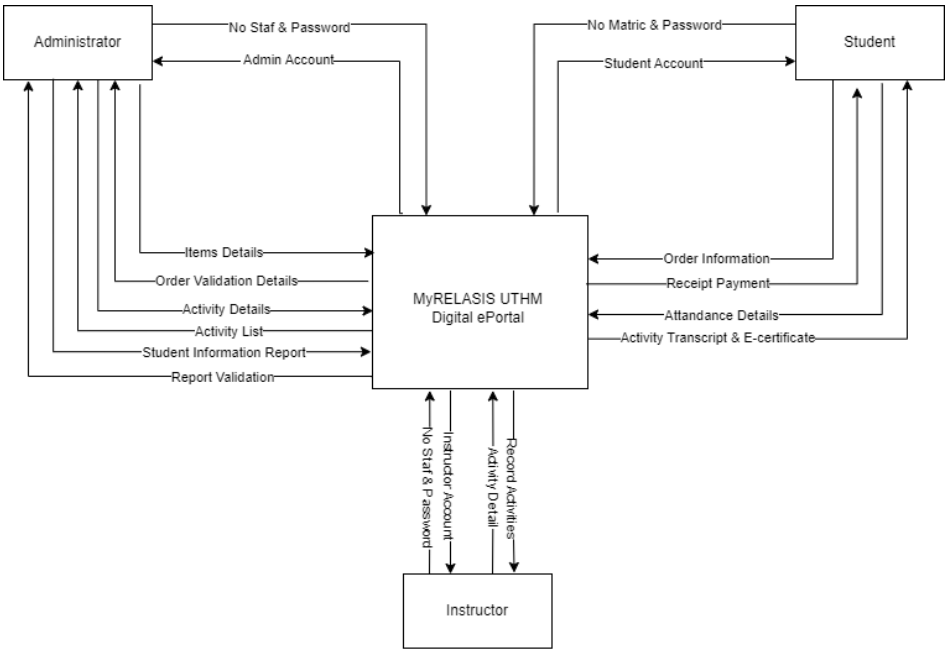

Fig 2 *Context Diagram*

The MyRELASIS UTHM Digital ePortal's context diagram is shown in Figure 2. The interaction of three primary external entities which are administrator, instructors and students that highlighted. The main users who manage and securely store student data are administrators and students. Instructor have restricted operational access, and administrator manage the system. Students provide data for administrative purpose into every module. The data flows between the system and its external entities have appeared clearly in this figure and ensure the effectiveness of data processing and administration.

4.5 Data Flow Diagram Level 0 (DFD)

A Data Flow Diagram (DFD) is a graphic that shows how data moves through a system. It displays how input from entities flows through processes to produce output that is sent to other entities or kept in data repositories. An overview of this data flow is given by the Level 0 DFD, which shows each input and output connected to the activities and entities in the created system. To comprehending and evaluating the data exchange patterns inside the system architecture, this visualisation is necessary.

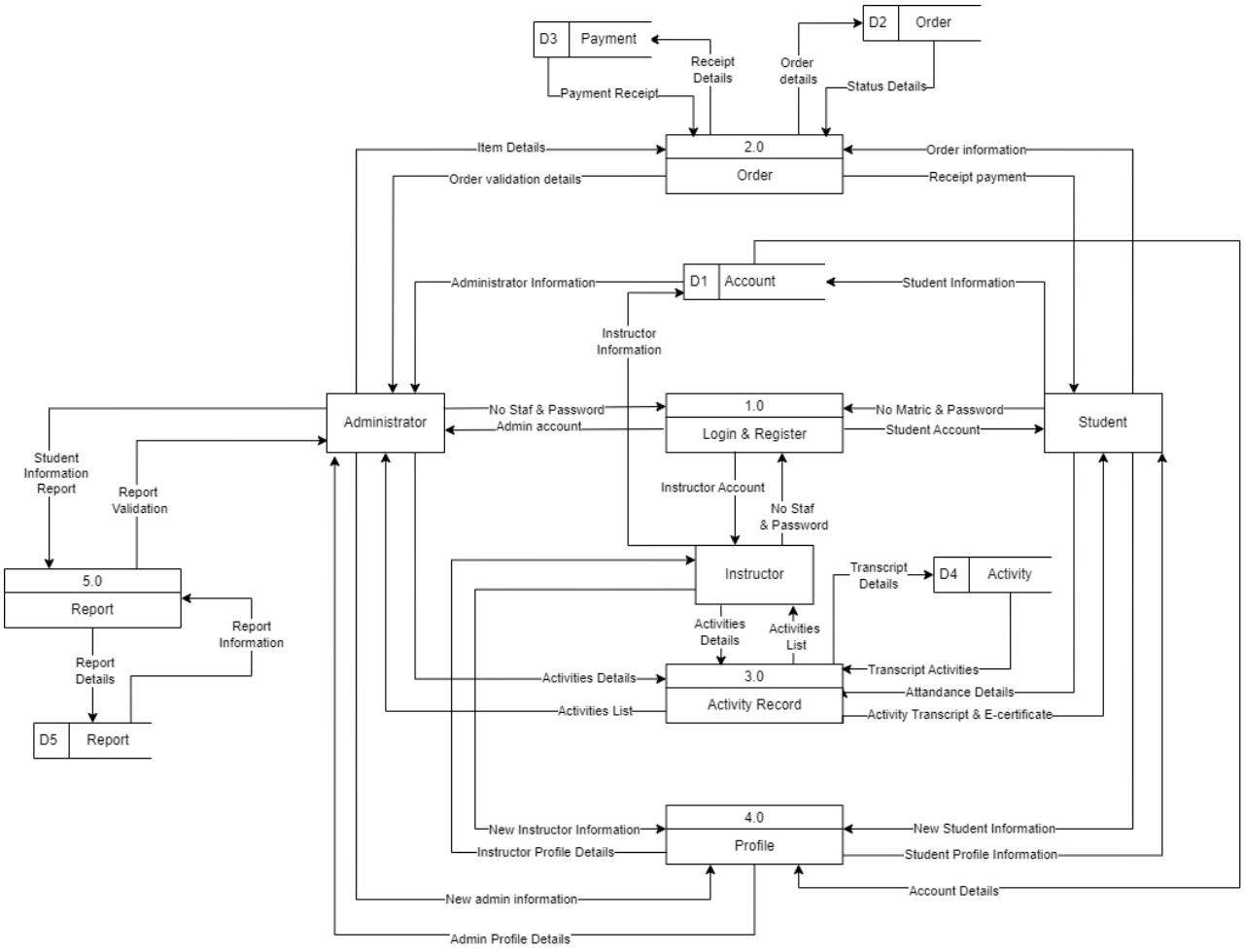

Fig 3 *Data Flow Diagram Level 0 (DFD)*

The Data Flow Diagram (DFD) Level 1 of the MyRELASIS UTHM Digital ePortal is shown in Figure 3. It shows the data interactions between administrator, instructors, and students. The “Login and Register” process is used to handle login credentials. Students use their matriculation numbers and password, while administrators and instructors use staff number and password. The order details, payment receipt processing, item and uniform application and order status updates are all handled by the “Order” and “Order Management” process. It gives students access to order and payment information and alert administrators to order validation. Using the “Activity Record” process allows administrators and instructors to create list, manage information and document activities. The active transcripts, e-certificates, and attendance records are also given to the students. Processing and storing user data in the "Profile" process oversees the creation of new information of profiles for administrator, instructors and students. By merging report details into the system, the "Report" process creates student information reports that administrators have verified. This figure provides a thorough understanding of how operations and data flow throughout the system and guaranteeing easy-to-use interactions and effective data management.

4.6 Entity Relationship Diagram

An entity-relationship diagram (ERD) uses symbols to show organisational structure while visually representing the links between entities in a database system. Within the database, these relationships establish connections between certain items or concepts. The characteristics of the entities are communicated through their attributes. The structure of a database system can be conceptualised, planned, and communicated with the use of ERDs, which are an effective tool that help database designers and other stakeholders comprehend and create links between data items. A well-organized database can be developed and maintained more successfully when this visual representation upholds the integrity and efficacy of the overall database design.

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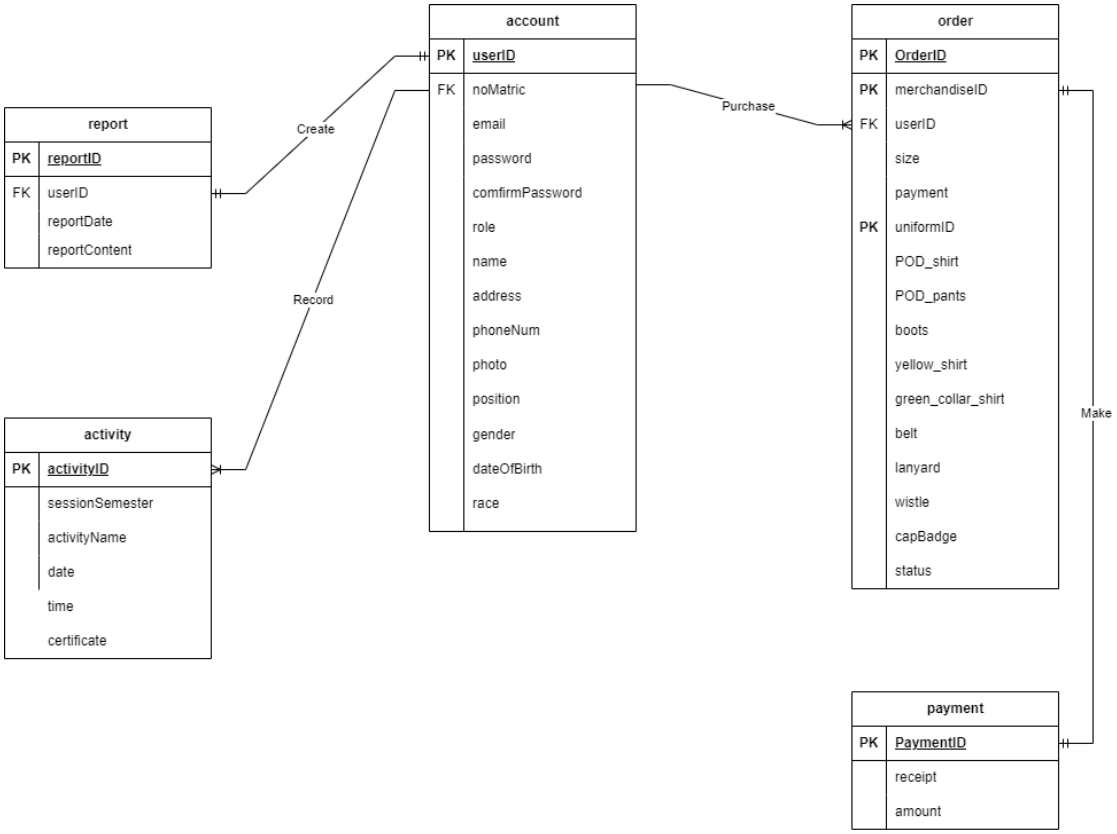


Fig 4 *Entity Relationship Diagram (ERD)*

Figure 4 shows that the Entity Relationship Diagram (ERD) for proposed system represents the structure of relationships of key entities within the system which are account, order, payment, report and activity. The account entity stores user information, including personal details for administrators, instructors, students. The order encompasses merchandise and uniforms application details while payment record transaction information and report include student information and dates linked to users. The activity track user participation in events and session details. This ERD illustrates how user accounts interact with orders, payments, reports, and activities within the system. The figure also provides a clear visualization of how the various data stores interact with the system for efficient management of student information.

4.7 Flowchart

A flowchart is a visual representation illustrating the sequential progression of steps or processes within a system, technique, or algorithm. Employing standardized symbols to denote processes, decision points, and flow direction, flowcharts provide a clear and comprehensible depiction of complex workflows [8]. Due to its effectiveness in illustrating the connections and sequential logic inherent in different parts of a process, this visual aid is extensively employed in a variety of fields, such as software development, corporate procedures, and problem-solving [8].

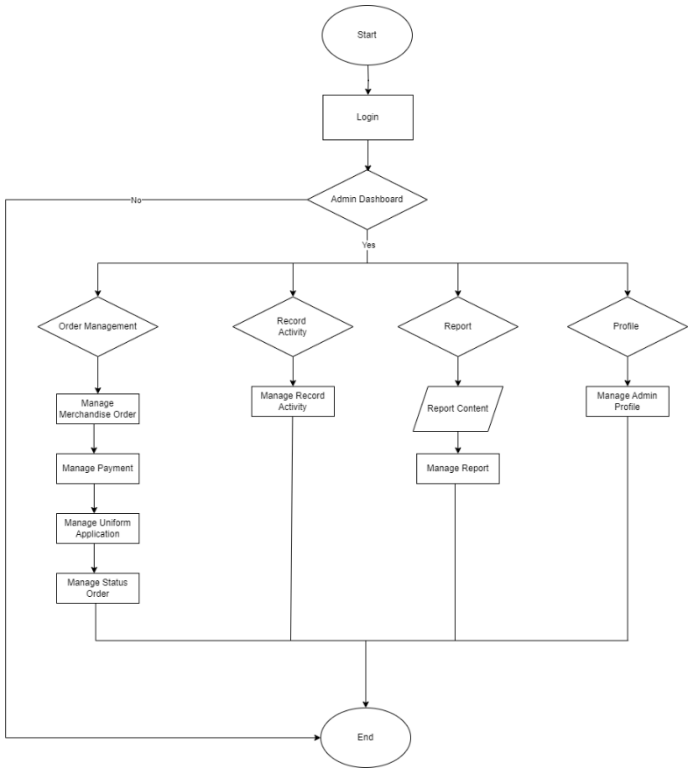
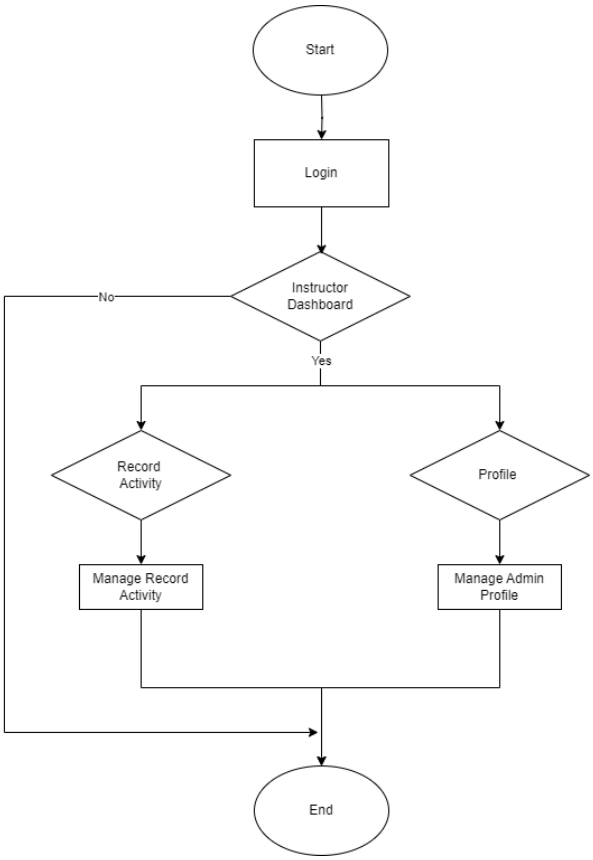


Fig 5 (a) Flowchart for Administrator



(b) Flowchart for Instructors

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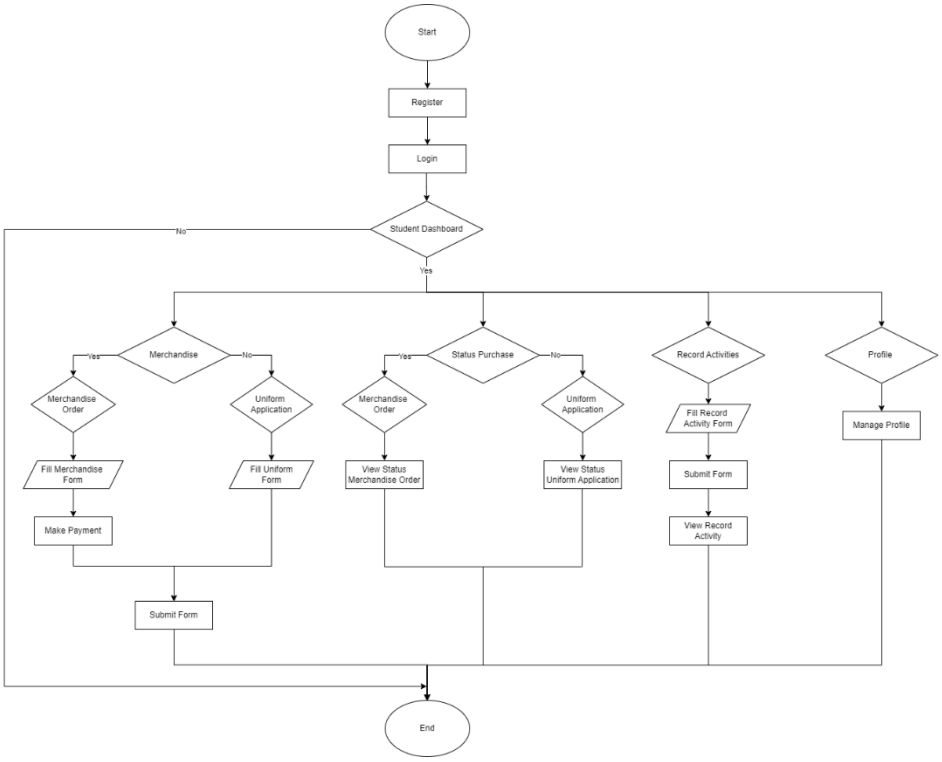

(c) Flowchart for Students

The flowchart in Figure 5 (a) outlines the administrative workflow for logging in and performing duties. After logging in, administrators access the dashboard where they choose from four main modules: "Order Management," "Record Activity," "Profile," and "Report." In Order Management, they handle purchase orders, payments, uniform applications, and order statuses, as well as monitor activities and manage student information reports. The instructor's flowchart in Figure 5 (b) shows a simpler process focused on managing Record Activity and Profile tasks from the Instructor Dashboard after logging in. Figure 5 (c) depicts the student process starting with registration and ending with login. Once logged in, students access their dashboard to manage merchandise orders, uniform applications, track order statuses, record activities, update their profiles, and view attended events for university certifications and rewards.

4.8 System Architecture

A software system's high-level structure and organisation are referred to as its system architecture in the context of analysis and design. All the essential parts, modules, data flows, and interactions that specify how the system works are included. Architects sketch the system's architecture to give the development team a guide during the analysis and design stage of software development [11]. Data storage, UI design, module integration, and general system behaviour are all included in this. To guarantee that the system is implemented according to the requirements and performs as intended, the architecture acts as a foundation for the development process. To achieve the project's goals, a scalable, well-organized system must be created.

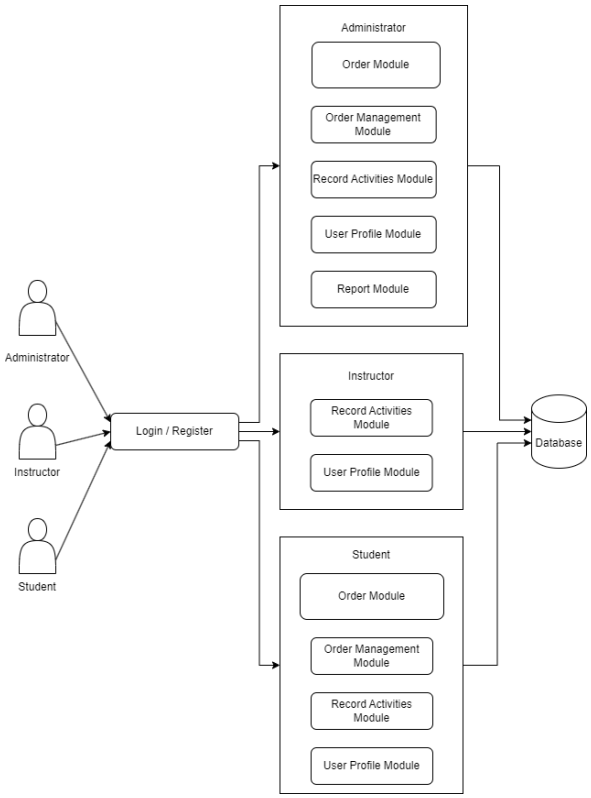

Fig 6 *System Architecture*

The logical framework for administrators, teachers, and students is illustrated in Figure 6, which shows the system architecture of the MyRELASIS UTHM Digital ePortal system. Access to all operational data, including order, order management, and activity records, user profile and report is provided to administrators. They produce a range of digital reports as well. Instructors focus on student information and activity records, supporting administrators in monitoring student performance and helping with certificate delivery. In addition to using features like activity recording and obtaining digital certificates depending on their participation, students use the system to update personal information. The architecture enables communication between the three user roles and guarantees effective data management by organising, retrieving, updating, and gathering data inside the system.

5. Implementation and Testing

To make user interactions and administrative tasks easier, the system is developed using numerous major components. The wide feature set and cross-platform interoperability of Microsoft Visual Studio Code led to its selection. PHP facilitates safe user authentication, role-based redirection, and data management in the login, registration, and profile modules. A thorough approach to report creation and administration is facilitated by the report module. All modules are effectively tested to meet user needs through extensive testing, including User Acceptance Testing (UAT) with UTHM users. Test findings confirm that users are very satisfied with the system's usability and task completion, indicating its dependability in satisfying a range of user needs.

5.1 User Interface

The process of designing aesthetically pleasing and intuitive computer interfaces is known as user interface (UI) design. It incorporates ideas like feedback, consistency, and clarity. Applications with a well-designed user interface are more intuitive and simpler to use, which improves the user experience that shown in Figure 7 and another interface will be shown in appendix A, B, C, D, E, and F.

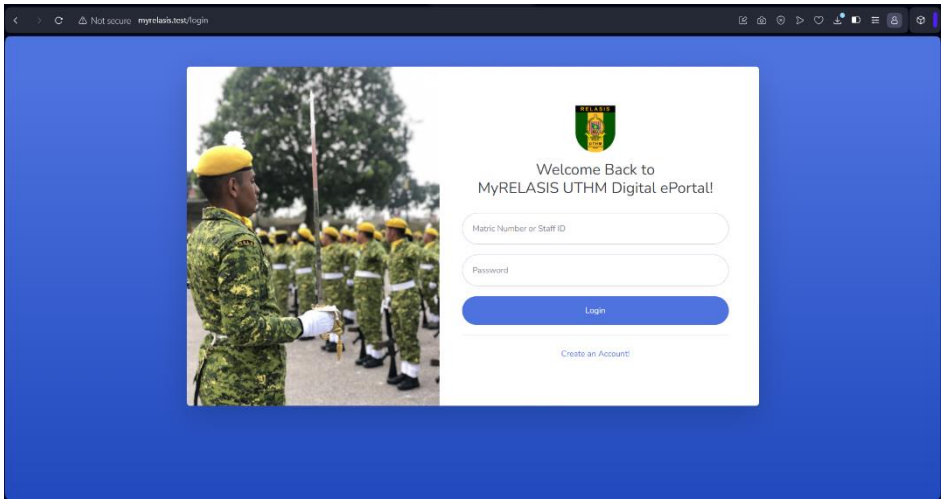

Fig 7 *Login Interface*

User can access the system by inputting their credentials on the straightforward and user-friendly login interface screen. Users fill up the appropriate boxes with their password and matrix number or staff ID. Users are redirected to their customized dashboard, which differs based on their role which is admin, instructor, or student by the interface after successful authentication. To guarantee that every user may access the system effectively and securely, there is also an option for new users to register by creating an account.

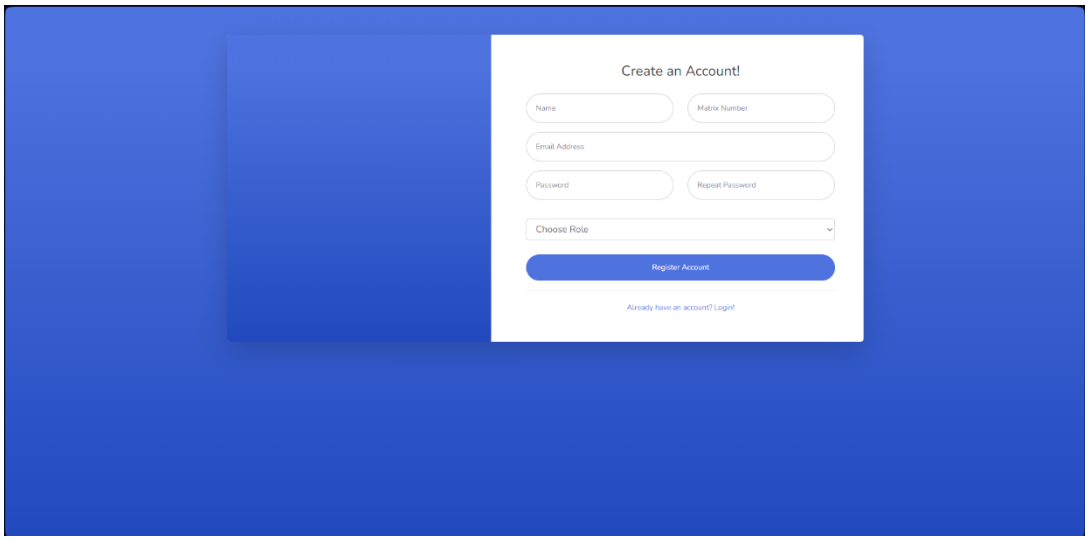

Fig 8 *Register Interface*

The registration interface shown in Figure 8 was designed to be simple to use, so even inexperienced users may easily create an account. In the corresponding boxes, users must provide their name, email address, password, matrix number or staff ID, and confirmation of the new password. Users submit their information by clicking the "Register Account" button after providing the required information. A user account is created and access to the system is granted upon successful registration. Additionally, a login link is included in the interface, making it simple for registered users to access the login page.

5.2 Functional Testing System

The functional testing of the system is conducted to evaluate the performance and reliability of each module, ensuring they meet the specific requirements and function correctly in various scenarios. Thirty respondents are involved including administrators, instructors, and students in the User Acceptance Test (UAT) method of testing. The user login and account registration, uniform application, merchandise order, order management, record activity, profile, and report modules are among the modules that were tested. The functionality testing result of every system module is displayed in Table 6 through 12.

Table 6 *Functional Testing System for Login and Registration Module*

Module	Functional Testing Details	Expected Result	Result
Login and Registration	Instructor and user can register for an account	Instructors and students should be able to create for an account	PASS
	Administrator, instructors and students can login into the system	Administrator, instructors and students should be able to login into the system	PASS
	system will restrict login whenever a wrong credential is entered	System should restrict login when an incorrect credentials has been entered	PASS

Table 7 *Functional Testing System for Order Module*

Module	Functional Testing Details	Expected Result	Result
Order	Students can add new merchandise order and add new uniform application	Students should be able to make an order for and merchandise and apply for uniform	PASS
	Administrator can update merchandise product and uniform details	Administrator should be able to update the details and new merchandise product	PASS
	System provides order details accurately	System should display accurate details for each order	PASS

Table 8 *Functional Testing System for Order Management Module*

Module	Functional Testing Details	Expected Result	Result
Order Management	Administrator can update an order's status	Administrator able to update the status of an order	PASS
	Students can view and delete status order	Students should be able to view and delete status order	PASS
	System displays the details of status order	system should show the details of order and status order	PASS

Table 9 *Functional Testing System for Record Activity Module*

Module	Functional Testing Details	Expected Result	Result
Record Activities	Administrator and instructor can manage activity details	Administrator and instructor should be able to manage activity details	PASS
	Student can record attendance of participation	Students should be able to record an attendance of activity	PASS
	System will display the list of activity and details of activities	System should display the activity details with e-certificate	PASS

Table 10 *Functional Testing System for Record Activity Module*

Module	Functional Testing Details	Expected Result	Result
Profile	Administrator and instructor can update user profile	Administrator, and instructor should be able to manage user profile	PASS
	Students can add new information into profile	Student should be able to update new information in user profile	PASS
	System displays the administrator, instructor and student user profile	System displays new information of user details	PASS

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Table 11 *Functional Testing System for Report Module*

Module	Functional Testing Details	Expected Result	Result
Report	Administrator can create report of student information	Administrator created student information report	PASS
	Administrator can manage report	Administrator can manage the student information report	PASS
	System will generate a report	System successfully created a student information report	PASS

5.3 User Testing

In system implementation, User Acceptance Testing is used to confirm that the built system satisfies end users' needs and expectations. It makes sure that users can utilize the installed software to do their activities efficiently and that the system operates as intended in practical situations. UAT facilitates the identification of any differences between the delivered product and the initial requirements, enabling the necessary corrections and enhancements prior to the final deployment. In addition to guaranteeing user happiness and usability, this testing phase seeks to gather user feedback through google form that consists of related questions that shown in Figure 9, which will improve the system's overall quality and dependability.

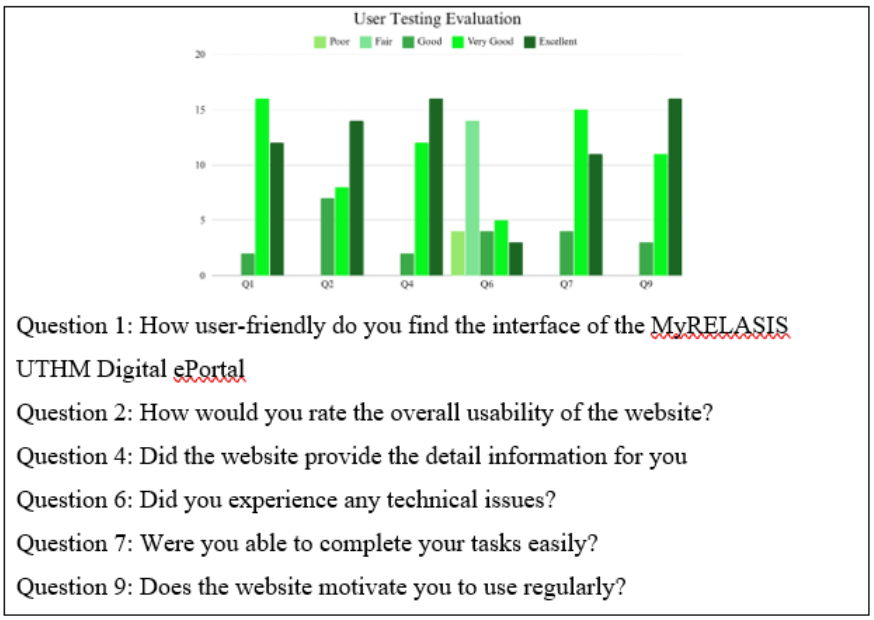

Fig 9 *Analysis of user testing evaluation through survey question*

6. Conclusion

In summary, the proposed solution aims to improve administrative procedures and student record management. Using innovative web-based technology, the system solves the manual procedures by including modules for activity recording, user profiles, order management, registration, and reporting. It guarantees usability, maintainability, security, and compatibility with popular web browsers by giving priority to user requirements across administrators, instructors, and students. The system design is expected to bring UTHM's administrative needs a streamlined and effective solution, bringing in a new era of digital efficiency and accessibility in higher education management systems with its strong approach based in prototyping and extensive need analysis. The secure architecture and user-centric interface of the proposed system are highlighted by the in-depth analysis and design. These features are intended to improve administrative efficiency and student data management. The system makes use of visual aids including flowcharts, entity-relationship diagrams (ERD), context diagrams, data flow diagrams (DFD), and system architecture diagrams to guarantee clear data processing and productive communication between instructors, administrators, and students. The system facilitates user-role-specific activities that are frictionless and optimized through modules for order administration, activity recording, user profiles, and reporting. This all-encompassing strategy improves overall system usability and data integrity while guaranteeing that the system satisfies the wide range of user needs. PHP and Microsoft Visual Studio Code were used in the implementation of the proposed system to enhance user engagement and administrative effectiveness.

Administrators, instructors and students participated in extensive testing, which demonstrated the system's dependability in satisfying user expectations and operational requirements. User Acceptance Testing (UAT) collected input to improve the overall quality and dependability of the system while also verifying its usability.

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Conflict of Interest

Authors declare that there is no conflict of interests regarding the publication of the paper.

Author Contribution

This journal requires that all authors take public responsibility for the content of the work submitted for review. The contributions of all authors must be described in the following manner:

The authors confirm contribution to the paper as follows: ***study conception and design:*** *Author X, Author Y;* ***data collection:*** *Author Y;* ***analysis and interpretation of results:*** *Author X, Author Y, Author Z;* ***draft manuscript preparation:*** *Author Y, Author Z. All authors reviewed the results and approved the final version of the manuscript.*

An author name can appear multiple times, and each author name must appear at least once. For single authors, use the following wording:

The author confirms sole responsibility for the following: study conception and design, data collection, analysis and interpretation of results, and manuscript preparation.

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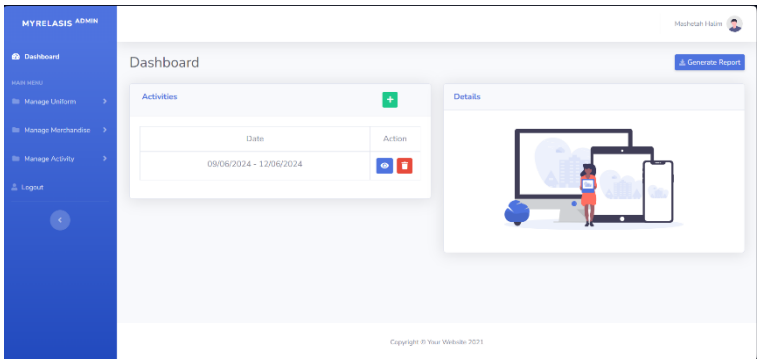
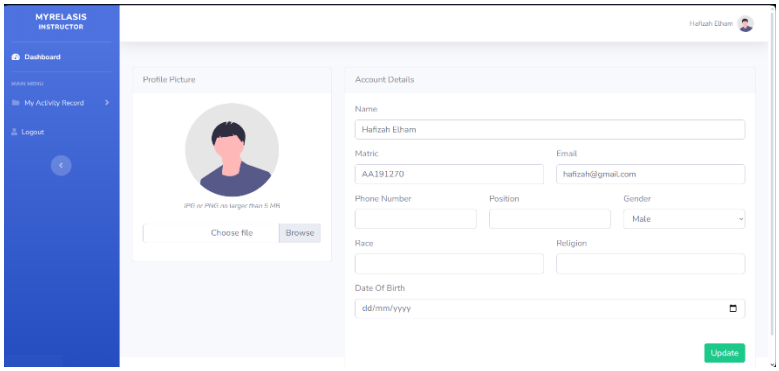
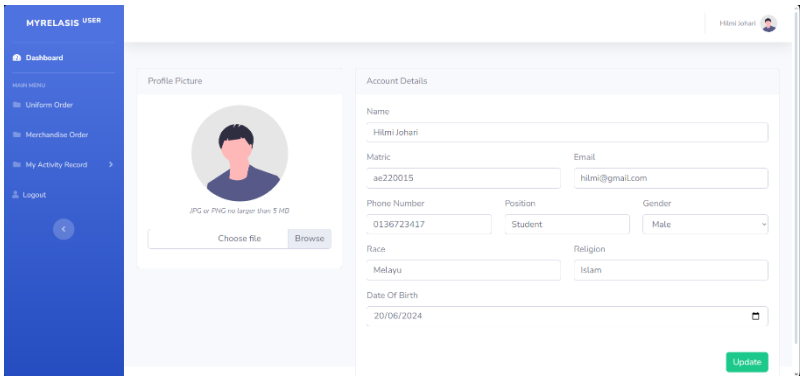
Appendix A: User Interface for Dashboard User



(a) Administrator Dashboard

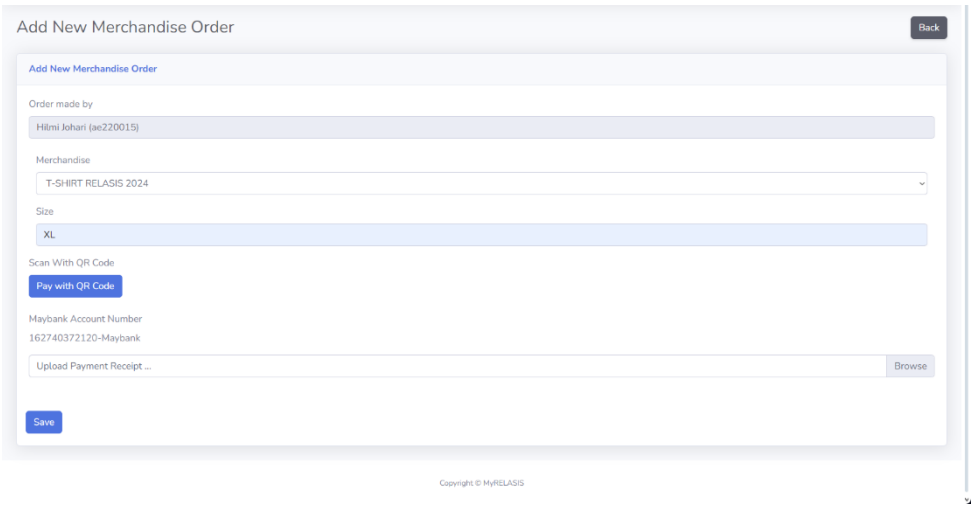


(b) Instructor Dashboard

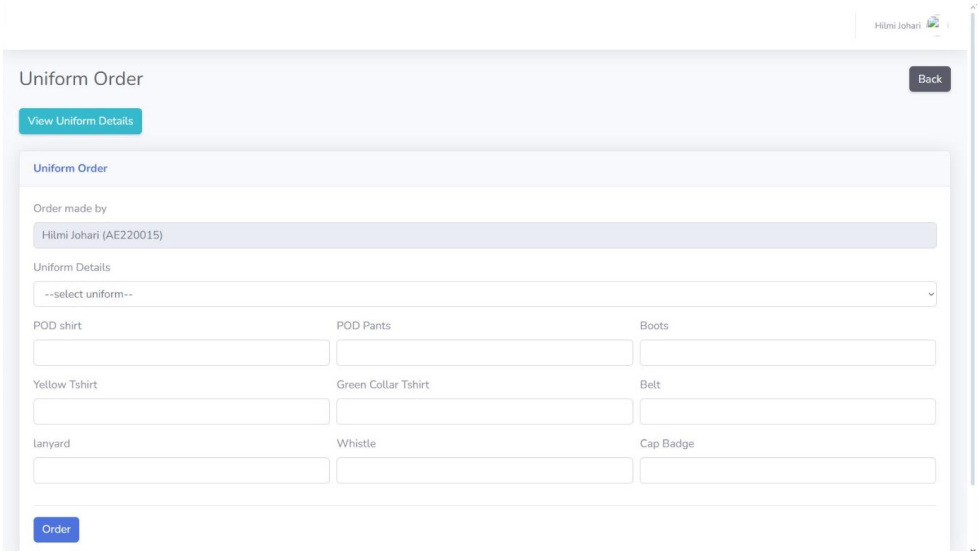


(b) Student Dashboard

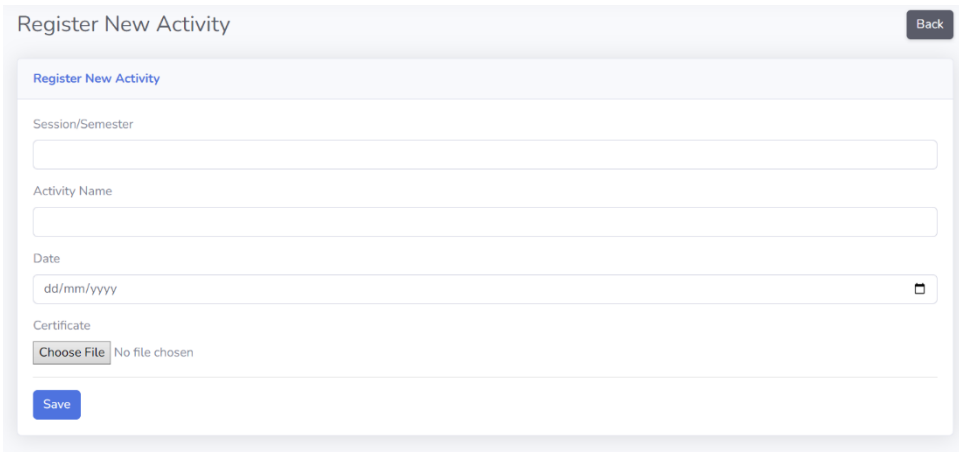
Appendix B: User Interface For Merchandise Form, Application Form, and Attendance Form



(a) Student Merchandise Order Form



(b) Student Application Form



(b) Student Record Activity Attendance Form

Appendix C: User Interface for Order Management and Status Order

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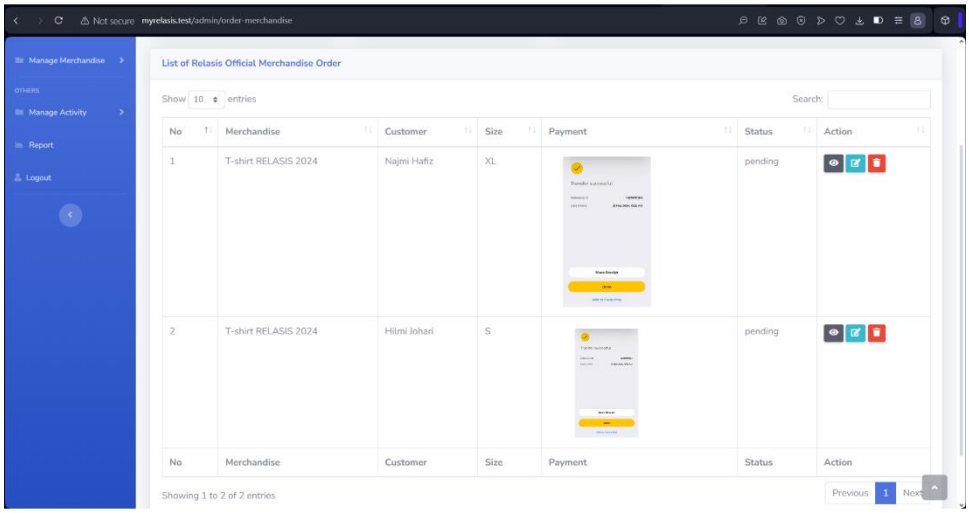
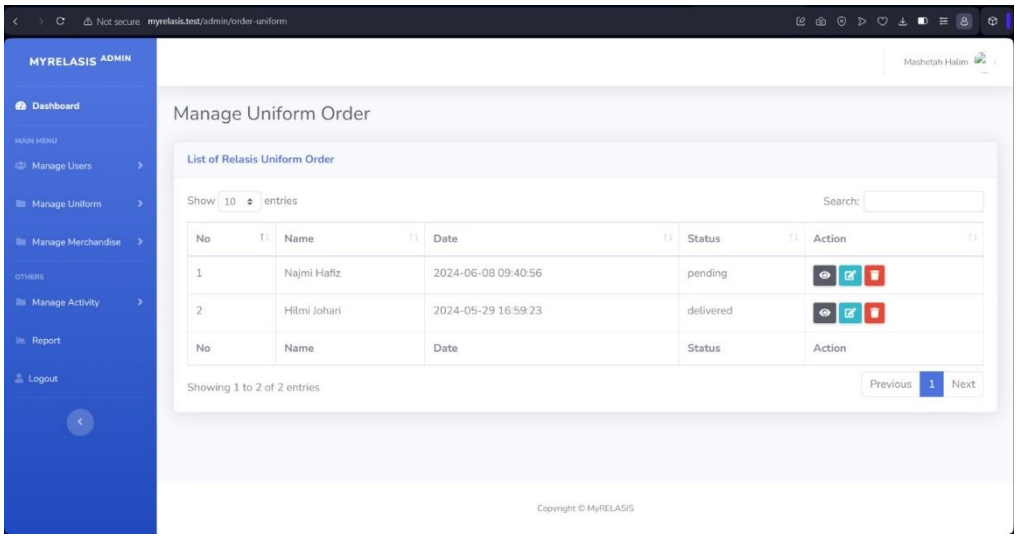
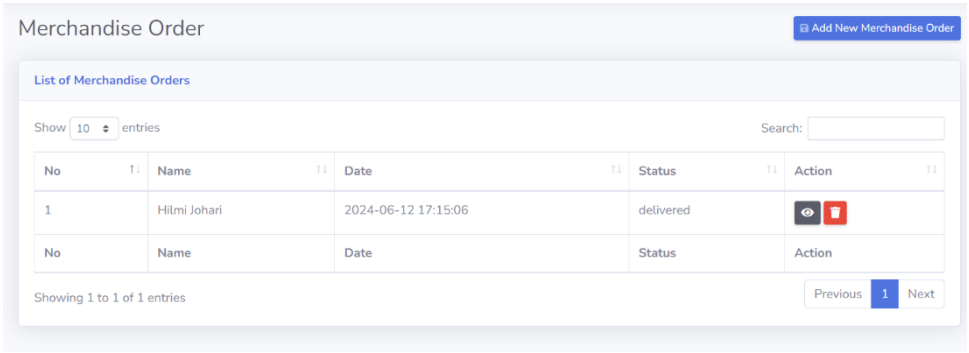


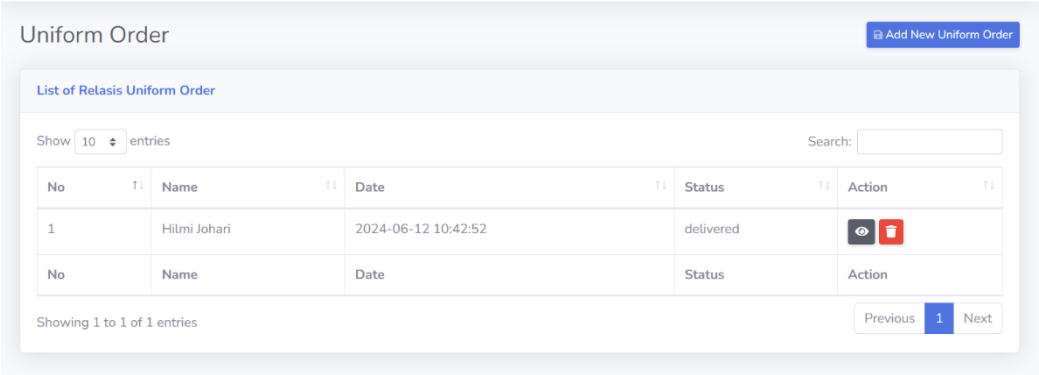
(a) Merchandise Order Management



(b) Uniform Application Order Management

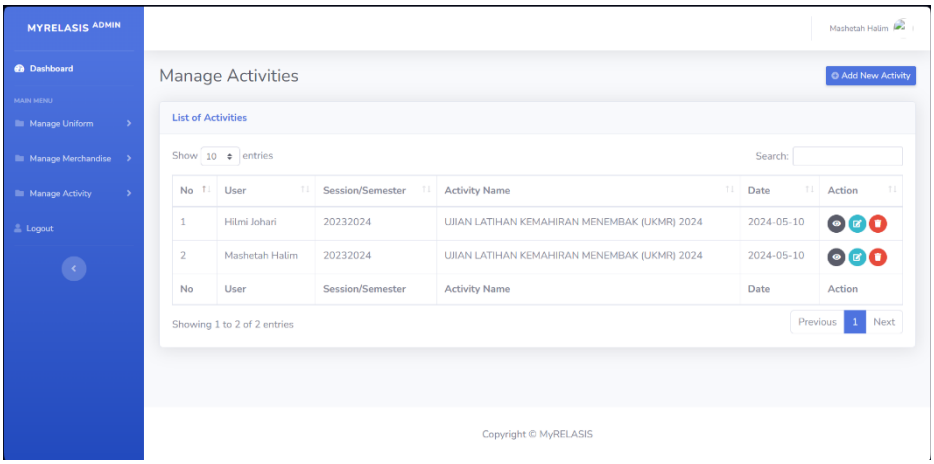


(c) Status of Merchandise Order

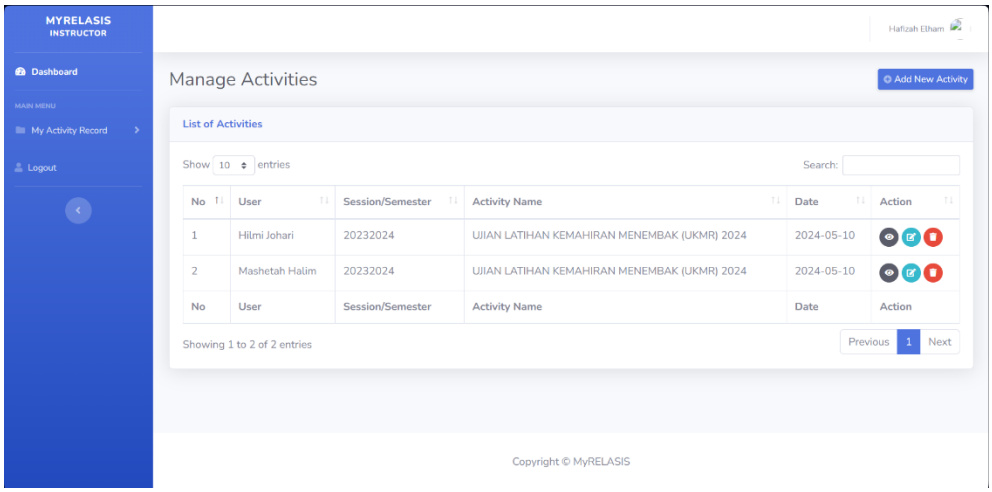


(d) Status of Uniform Application

Appendix D: User Interface for Record Activities



(a) Record Activities for Administrator and instructor



(b) Students Record Activities