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Development of UTHM Pagoh Residential College Asset Declaration System 2.0

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Abstract

The return and acceptance form of the residential college assets at UTHM still uses the traditional method of using paper for each student for every new semester. This method is seen as time-consuming, financially inefficient, and not user-friendly. This study was a continuation of the project that was done by a previous final year student where feedback and comments from the previous system has been taken into consideration. This project focuses on the Pagoh Residential College and the students who live in the area. The qualitative method has been used to gain insight into the previous system developed. This system was developed based on the Agile model which involves six phases: planning, requirement analysis, design, implementation, testing, review, and feedback using an Apache server, MySQL database, Visual Studio Code as the IDE, and HTML and PHP as programming languages. In the future, residential colleges and students will use this asset declaration system to reduce all problems for them from wasting time, money, and energy. Improvements and additions to this project will be made if there are any necessary functionalities required.

1. Introduction

The Pagoh Residential College has used a physical form approach to track the state of assets in students' houses. For the students' comfort, this procedure ensures that lost, damaged, or incomplete assets can be reported and replaced. The current physical form has two sections, one for the beginning of the semester and one for the end of the semester. It is organized into five sections: office usage, student information, reminder or action information, asset information, and asset received/returned declaration. In addition to their name, matric number, semester, session, phone number, and key number, students also needed to provide these details.

Next, the students describe the current state of items in their room like study tables, beds, mattresses, wardrobes, and shelves. Students get the form from the college office at the beginning of the semester, complete the asset received declaration part, and return the form. The form is verified and signed by the staff. The asset return declaration part is also completed by students at the end of the semester and is then examined and verified by staff. The procedure permits the replacement of any damaged or missing assets and assures accountability.

There are many issues with the existing asset flow of the process. Lack of time for students to visit the Pagoh Residential College office to pick up or return the asset declaration form is one of the issues that arise. Students

waste their time and effort filling out the physical declaration form and sending it to the office to submit a piece of paper [1]. The second issue is the need to print thousands of copies of the paper to be given to students, which wastes paper, ink, electricity, and staff manpower. Staff have a hard time finding and sorting out asset declaration forms, which can be tedious and time-consuming.

The name of the project is Universiti Tun Hussein Onn Malaysia (UTHM) Pagoh Residential College Asset Declaration System 2.0 is the new version of the asset declaration system which is a continuation of the project that was done by a previous final year student where feedback and comments from the previous system has been taken into consideration.

The goal of this project is to develop an effective and user-friendly UTHM Pagoh Residential College Asset Declaration System 2.0 web application. Apache server, MySQL database, Visual Studio Code, HTML, PHP, and JavaScript will all be used in the system's development. The system will have a streamlined user interface and process to improve usability. MySQL database will be used to store and manage the data. To make sure the system meets user needs and offers a seamless experience, usability testing will be carried out. Functionality, effectiveness, and user happiness will be evaluated during the testing phase. The system has four target users: UTHM Pagoh students as declarers, college supervisors as validators, Assistants to the College Manager or better known as PPAS (Penolong Pengurus Asrama) as verifiers, and the system administrator. It was developed specifically for the residential college at UTHM Pagoh. The system is compatible with all browsers operating on Windows-based machines especially once the websites can appear the interface (UI) by browsing some platform like Microsoft Edge or Chrome when the system is running.

2. Literature Review

The creation of a website for an asset management system to improve user experience and reduce reliance on conventional means. Website design is important because it needs to strike a balance between several factors, including colour, flow, and purpose, to effectively engage the target audience [2]. The asset declaration system, which focuses on residential colleges and students, is an illustration of the trend towards digitization and the importance of contemporary technology. To avoid user boredom and ensure market competitiveness, the website for asset system design should be modern, user-friendly and be like a formal system because it involves well-known organizations like Pagoh Residential College. It should include components of web design, colours or themes, User Interface (UI) and User Experience (UX) for developing the website [3]. Several systems have been developed that have functions and purposes that are almost the same as the system that is being done referring to Table 1 which is a review of a similar system.

Table 1 *Differences between the existing projects*

System	Purpose	Advantages	Disadvantages
UTHM Student's Event Management System [4]	Controls and manages the data associated with the many university events in a proper manner.	• Well-organized content for each page. • Simple and easy to understand. • Big impact system for the university.	• Report or summary page not stated in page. • Interface is not interacted with the user for using it. • Do not have a dashboard page
Decision Support System: UTHM Pagoh Residential College Online Registration and Complaint [5]	Enable students to register their rooms, lodge problems, and get information about residential college events online.	• Content for each page is well-organized. • Have a forgot password for login. • Interface is nice and minimalised colour used.	• Using a common methodology • The colour of the font is not suitable
Designing & Developing e-College (e-CRS) as a Web Based Application Tool) [6]	Calculate the number of students to make it easier for them to apply online. Administrative workers can effectively trace student records, making them easier to use in the future.	• Easy to understand the content. • Have complete functionality for this system	• Interface is not suitable for the educational system. • Too simple for each button

The developer upgraded the existing system to establish a new system that is more user-friendly and efficient. User research is a vital element in this process since it assists designers in understanding consumers' needs, goals,

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and preferences [7]. The previous system used a simple colour scheme, but it was unappealing due to poor colour selection, particularly in the navbar [8]. In order to capture the attention of users and build an appealing user interface, developers must exercise caution during the design phase.

The system's design should not only be functional but also suit the needs and expectations of the users. To further enhance the interface and functionalities of the previous system, particularly in the implementation of interfaces for reports and overall data, modification has been made to the new system to fulfil user expectations [9]. Functionality is critical in system development, and interfaces should be straightforward, intuitive, and give users clear direction and feedback [10]. The previous approach was inefficient in terms of button functionality, such as not categorizing instructions with a dropdown button.

3. Methodology

Agile methodology was chosen as the methodology as it focuses on iterative development and appropriate planning to develop the best system through collaborative customer feedback, which is very suitable and appropriate for this project development as shown in Fig. 1.

3.1 Project Limitations

This project aimed to enhance the existing system at Pagoh Residential College by implementing a digital filing system for managing asset declaration forms. The transition from physical to online forms eliminated risks and challenges faced by students, such as loss, damage, and limited submission time. The administrative department benefited from easy access to student information through computer-based systems, reducing the need for manual searches through paper records [11]. The streamlined system simplified the process by requiring only the student's name and matriculation number for information retrieval. Overall, the project successfully improved the efficiency and effectiveness of the filing system at Pagoh Residential College.

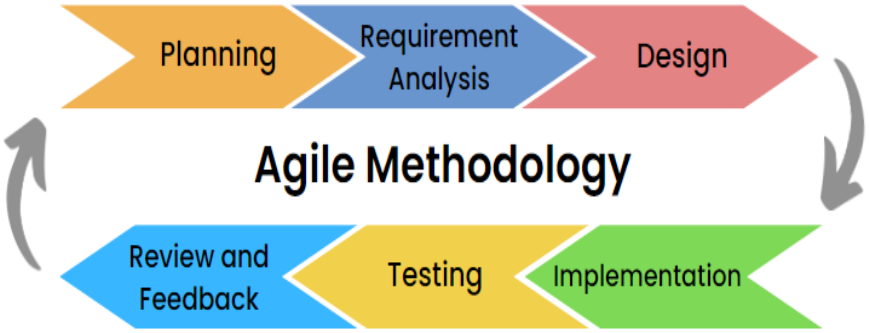

Fig. 1 *Agile methodology*

3.2 Planning

In this phase, a timeframe of 14 weeks was allocated to complete the project. The initial system was enhanced and upgraded to a more efficient version, now referred to as Pagoh Residential College's Asset Declaration system version 2.0. To increase system efficiency, it is intended to include features and improvements that users have requested. To define the needed system additions, feedback from users and discussions with the Pagoh residential college was continuously sought. The goal is to deliver an enhanced system that addresses prior issues and meets user expectations by gathering their data.

3.3 Requirement Analysis

During the requirements analysis phase, the author works closely with users to collect and record project requirements. We leverage insights from previous projects to enhance the system's efficiency and appeal, incorporating various features based on user feedback. We conducted interviews with the staff at Pagoh Residential College (KKP) to identify missing elements and gather ideas through surveys on the website. Additionally, we refer to research conducted by past students to develop a more practical system and incorporate user-friendly features. This phase allows us to evaluate and prioritize all necessary features and functions, ensuring ease of use for the end users.

3.4 Design

The production of a detailed blueprint plan for the product or solution involved utilising Canva and Figma to sketch the UI/UX and design. The design was to convert the requirements into a system architecture and develop the user interface, drawing inspiration from past projects and incorporating user feedback to add new features. The system uses Entity Relationship Design (ERD) as a design for a system to manage the data stored for use on the system by users in real life, as shown in Fig. 2.

3.5 Implementation

To ensure the success of this project, a combination of five programming languages has been used: HTML, CSS, PHP, SQL, and JavaScript. HTML was used for website structure, CSS for styling, PHP for dynamic web development, SQL for database interaction, and JavaScript for interactivity [12]. Visual Studio Code served as our Integrated Development Environment (IDE), providing comprehensive coding features and plugins. The code is utilized by Wamp as a local web server for testing and debugging, and MySQL as the database management system for efficient data storage and retrieval.

3.6 Testing

The testing phase is the most important phase of the development process, as it determines what needs to be added, deleted, and what does not need to be in the system. Agile is a methodology that performs activities repeatedly to enable continuous improvement and adaptation [13]. The product was tested with important people such as Pagoh Residential College, a supervisor, and a resident college to ask for opinions and improvements. All the feedback has been recorded and corrected in the system. By combining tests throughout the development process, early issues can be identified, feedback can be collected, and continuous improvement of the product can be achieved.

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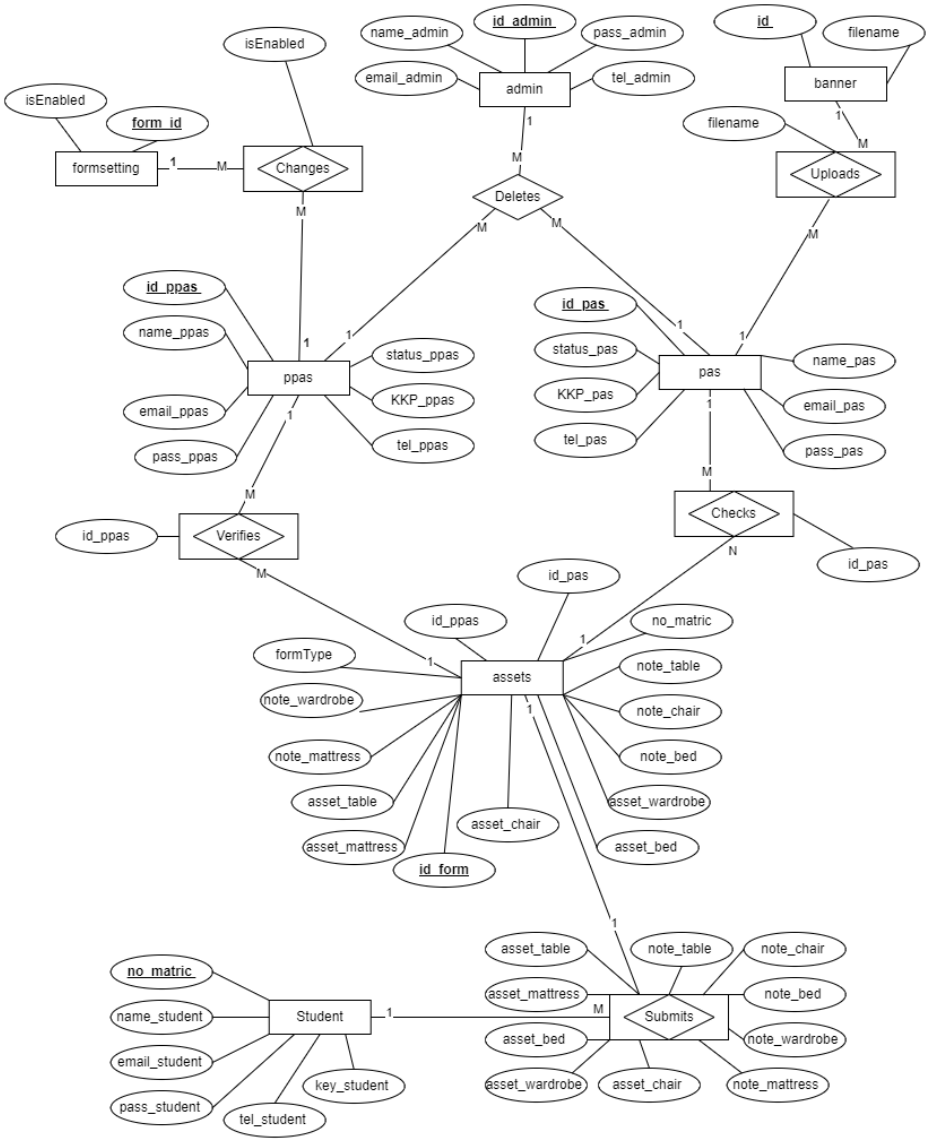

Fig. 2 *Part of entity relationship diagram (ERD)*

4. Result and Discussion

Tests conducted with feedback from residential colleges show that the system effectively supports the desired objectives. Key functions have been evaluated, such as the navigation bar on the student page to complete the form. The receive and return page allows students to select the state of the asset using a radio button, ensuring correct data is being provided as shown in Fig. 3. Students can also add notes, especially for severe damage. This system ensures effectiveness by requiring students to click the save button before submitting the form. Additionally, user manuals are available on each student and administrator page, offering instructions on how to use the system.

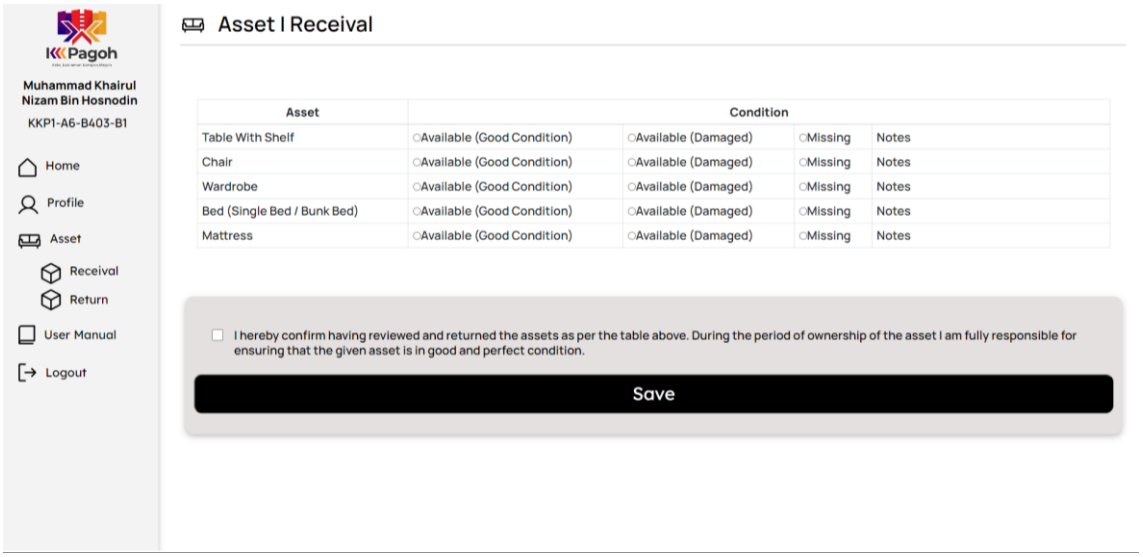

Fig. 3 *Receival asset from student page*

The test continues with the admin page, which includes the hostel supervisor and College Manager Assistant (PPAS). After submission of the declaration form, the student form data was sent to the dormitory supervisor in the administrator system, accessible through the receipt declaration section and the navigation bar summary. This page mainly checks the asset form submitted by the student, as verified by the supervisor. Once the assistant dorm supervisor validates the student's form, the supervisor can view all assets associated with the student. On the summary page, data has been organized by asset name, enabling PPAS to identify assets that have suffered significant damage and take necessary action. Additionally, for the PPAS home page, there was an information section regarding the update of asset data that had been sent by students and reviewed by PPAS, as shown in Fig. 4. It could be said that this page served as a reference for PPAS to track the status of the data in the system.

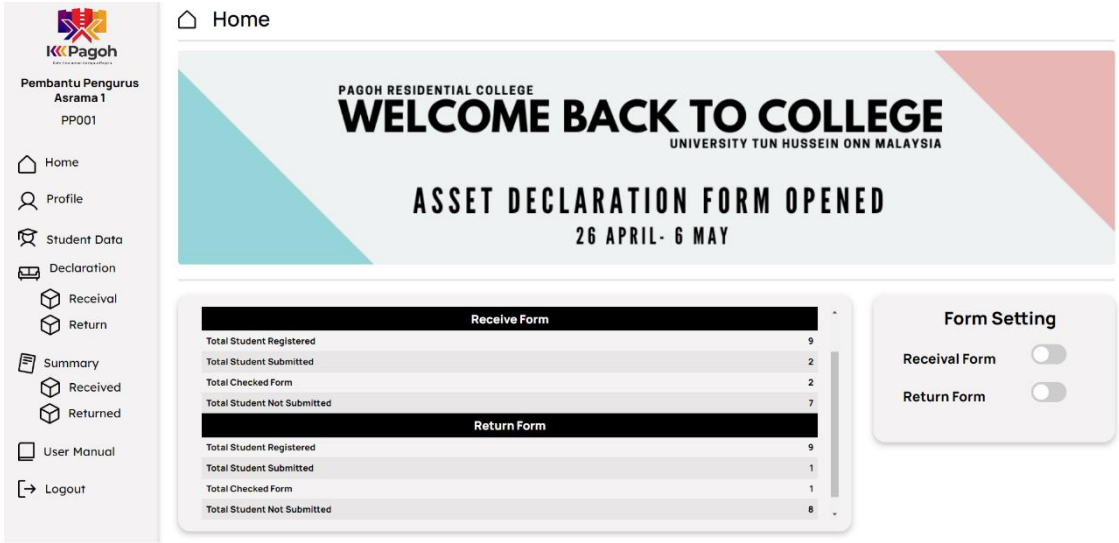

Fig. 4 *College Manager Assistant (PPAS) page*

The implemented features, including reminders for receival and return forms, proved highly beneficial in managing student data and streamlining administrative tasks. To improve the system further, the KKP planned to separate asset damage types on the student and admin pages, simplifying the reporting process. However, there were areas for improvement. The system needed modifications to allow PPAS/PAS to access data for all students, regardless of their assigned blocks. Ensuring responsiveness across various devices would have enhanced user experience and implementing data storage for past semesters would have enabled trend analysis and informed decision-making. These enhancements would have strengthened asset management and administrative efficiency within the residential college.

To further strengthen the effectiveness of this system, a survey was conducted through a Google Form, focusing on the views of UTHM students who were residents of Pagoh Residential College regarding the system. As shown in Table 2, the 30 respondents who answered the questions provided in the Google Form mostly agreed

with all the questions. This was because students believed that the system had a significant impact on addressing the development of this system. For example, it made it easier for students to fill in and submit the asset status located in their rooms to Pagoh Residential College. The system also made it easier for students to complete the asset declaration form as the student profile page eliminated the need to fill in the student's information again in the system. All resident information registered under Universiti Tun Hussein Onn Malaysia was stored in this system.

Table 2 *Number of respondent scale question*

No	Question	5*	4*	3*	2*	1*
1	I find it easy to navigate and understand the process of filling out the asset declaration form digitally.	0	0	7	11	12
2	The asset declaration system makes it easier to locate and access individual forms compared to the paper-based method.	0	0	5	11	14
3	Using the digital asset declaration system is more confusing and complicated than filling out a paper form.	2	3	6	13	6
4	The main factor is that the declaration form is not sent because the student's room is far from the residence office.	1	2	6	13	6
5	The asset declaration system has made it easier for students who live far away from the official college to submit their asset declarations.	0	1	6	12	11
6	The asset declaration system has significantly reduced the time required to complete the declaration process compared to the paper-based method.	0	1	3	17	9
7	The asset declaration system provides a faster response time regarding asset-related matters, allowing for quicker resolution of any issues.	0	0	6	16	8
8	The asset declaration system for residential colleges offers greater accessibility for students with physical disabilities or mobility challenges.	0	1	5	14	10
9	The asset declaration system user manual will help the student to use the system correctly.	0	1	4	17	8
10	Will this system help students to encourage them to submit the declaration form within the specified time and make it easier for students to fill out the asset declaration form?	0	0	3	14	13

* 5 – Strongly Disagree, 4 – Disagree, 3 – Neutral, 2 – Agree, 1 – Strongly Agree

5. Conclusion

In conclusion, the study on the development of a website for the UTHM Pagoh Residential College Asset Declaration System 2.0 is based on improvements for the previous asset system. The revision improves the weaknesses of the current system and focuses on creating an attractive User Interface (UI), functional navigation bars and efficient buttons. Similar systems are also examined to gain insight into user-friendly and efficient website design. As a suggestion for the future, during the testing of KKP, one of the recommendations that can be improved is to add notes for the KKP to use to record various things, save the data of students who occupied the Pagoh residence for the past few semesters, add the name of the asset damaged when printing.

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Conflict of Interest

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

Author Contribution

The authors confirm contribution to the paper as follows: ***study conception and design, data collection, draft manuscript:*** *Muhammad Khairul Nizam Hosnodin, Muhammad Danial Fakhri Fakhruddin;* ***draft manuscript preparation:*** *Muhammad Khairul Nizam Hosnodin, Muhammad Danial Fakhri Fakhruddin, Muhammad Ezzat Hariz Norhisam, Noordiana Kassim @ Kasim. All authors reviewed the results and approved the final version of the manuscript.*

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