IT5/L – IT Elective 2

2798

OwlReg

SHS Registration System

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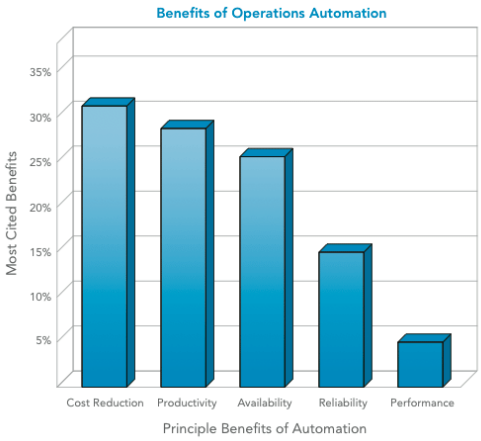
SHS Student Registration System

Many schools face challenges in managing student registration, often due to manual processes and lack of an organized system. This causes delays, errors, and difficulty in tracking student records, making enrollment more stressful for both students and administrators. Without a structured system, important data such as personal information, academic background, and requirements may be misplaced or overlooked, leading to inefficiency. Based on the importance of digital solutions in education management, an SHS Student Registration System can streamline enrollment, ensure accuracy, and provide a faster, more reliable process for both schools and students [1].

Problem 1: Limitations of Manual (Traditional) Registration Setup

Inefficient Process is the main problem in the traditional setup of the school registration process. It gives an ineffective outcome in the student registration process and also causes too much time consumption and delays. Additionally, research highlights that high volumes of manual paperwork not only introduce errors but also lead to staff burnout, further slowing down the process [2]. Moreover, many institutions still rely on complex, fragmented systems that don't communicate effectively across departments, adding layers of confusion and prolonging the enrollment timeline. In Batangas Province, Senior High Schools support the K-12 curriculum and offer three strands, but they still rely on manual enrollment systems. This results in time-consuming processes, manual listing before encoding, difficulties in handling large numbers of enrollees, and challenges in ensuring quality education [3].



Figures 2: Effectiveness of Automation in School Registration Systems

Solution 1: Implementation of a Centralized Digital System

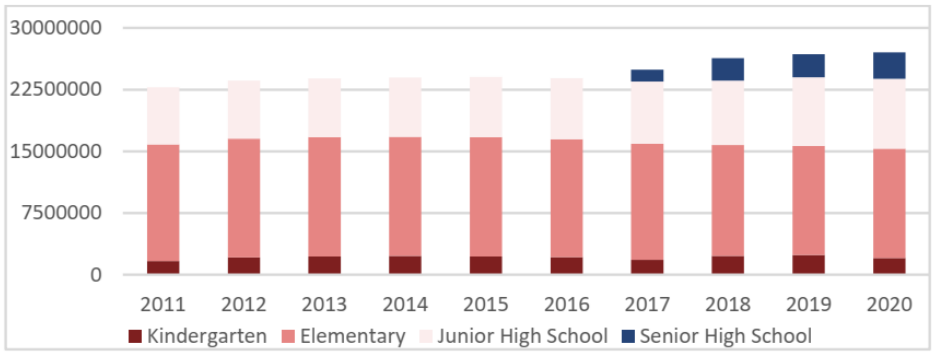
OwlReg addresses this gap by employing a centralized online registration system, where technology and advancements are primarily utilized for this process. OwlReg is designed to be accurate, efficient, and beneficial to the users. Most institutes today recognize the importance of computers in meeting pressing market demands. Based on the figure 2, the most cited benefit of operations automation is cost reduction, followed by productivity and availability. Meanwhile, reliability and performance are identified as less frequently cited benefits. Through the implementation of this registration scheme, both staff and students will be able to process the school registration setup efficiently and accurately. By automating repetitive processes, integrating disparate systems, and providing user-friendly interfaces, this study aims to streamline registrar operations, reduce errors, and enhance productivity [4].

Problem 2: Data Inaccuracy

Studies have shown that manual registration systems are prone to data entry errors, time-consuming processes, and challenges in maintaining data security and integrity. These human errors and inaccuracies occur when staff enter student data incorrectly, misplace forms, or delay updates [5]. Similarly, the study highlights significant issues with the accuracy of school records, finding that 90% of principals and teachers do not prioritize proper record-keeping, resulting in disorganized and unreliable data. It emphasizes that maintaining accurate records should be a collective responsibility involving all stakeholders, and recommends eliminating policies that encourage fake enrolments and improving delegation to uphold data integrity [6].

Solution 2: Digital Forms with Validation

Automated systems, like OwlReg, help mitigate errors and inaccuracies, leading to more effective and accurate data handling, secure, and efficient record retrieval. This system was created to address this issue. OwlReg uses digital forms with built-in validation to prevent missing or incorrect data and can automatically flag duplicate entries, reducing human errors associated with handwriting or manual data entry. This is supported by the results showing that the digital registration system increased administrative efficiency by up to 40% and improved transparency through structured data storage and real-time application status tracking [7].



Source: DepEd EBEIS

Figures 3: Student Enrolled Statistic DepEd

Problem 3: Poor Record Management & Accessibility

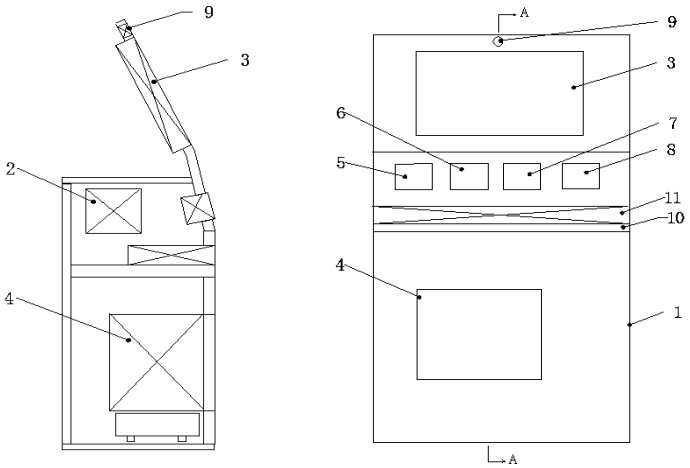
Traditionally, educational institutions, such as government and public high schools, have relied on manual procedures to manage learners' Permanent Records and Report Cards. Based on Figure 3, data from 2011 to 2020 indicate that the majority of schools in the Philippines continued to utilize paper-based manual registration systems, highlighting the substantial administrative burden of handling large volumes of forms. These manual processes involve cumbersome paperwork, extensive data entry, and prolonged turnaround times for requests and issuances. Moreover, physical records are difficult to organize, update, and track. Finding, retrieving, and verifying student records requires significant effort, and physical records are at high risk of damage, such as from bookworms, or even loss of the documents [8].

Solution 3: Database Security & Management

OwlReg collects data from filled-out forms containing the required information from the users. Additionally, OwlReg checks and validates the data inputted by the users to ensure it meets the required criteria. OwlReg has a built-in database where all user information is securely stored, and the system has been shown to improve efficiency and user work effectiveness compared to manual registration methods. Afterwards, the system will respond via the email provided by the user, confirming that the information has been successfully stored [9].

Supporting Statement

Patent Document 1



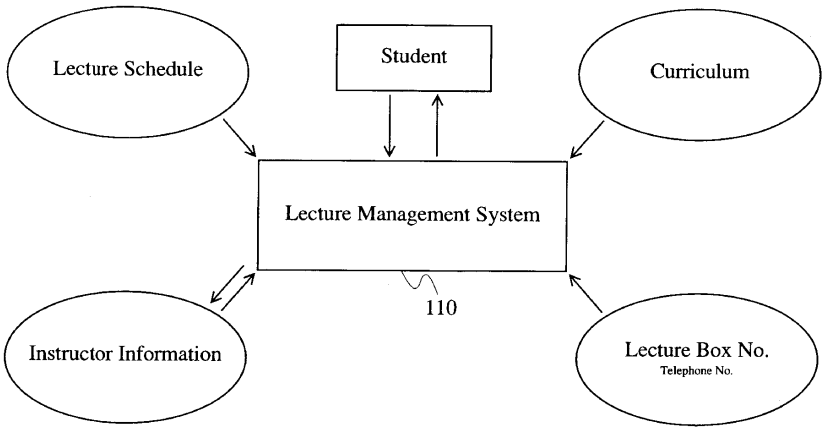
Figures 4: Multifunctional school roll self-service registration system

This patent present in figure 4 is a multifunctional self-service school roll registration system consisting of a registration terminal and a central server. The terminal integrates a touch display, biometric devices, card readers, a printer, and a communication module for secure data processing. It transmits a student's unique ID to the server, retrieves corresponding fingerprint and image data, and performs biometric verification before completing enrollment. The system prevents fraudulent

registration, enables real-time attendance monitoring, reduces queuing and crowding, improves efficiency, and lessens the workload of school staff [10].

Supporting Statement

Patent Document 2



Figures 5: Management system for interactive on-line system

In an interactive online system shown in figure 5, a server-based registration management system integrates both a teaching affairs management module and a reservation management module. The teaching affairs module handles the registration of teaching subjects, schedules, and instructors, while the reservation module enables trainees to book lectures online using this information. It also manages trainee selections of subjects, schedules, and instructors. Through this system, lecture bookings submitted from user terminals and the allocation of service resources—such as subjects, schedules, and instructors—can be efficiently managed [11].

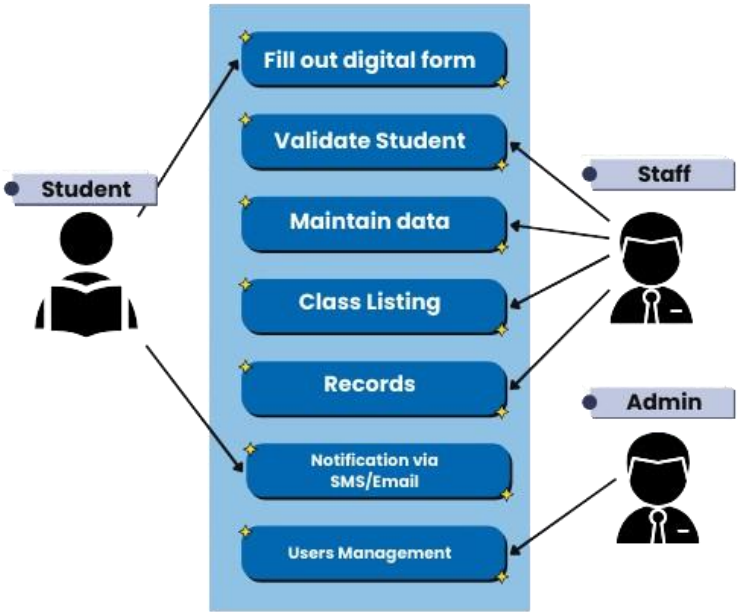
Conclusion

The traditional manual registration process in schools often leads to delays, errors, and inefficiencies, making enrollment difficult for both students and administrators. OwlReg addresses these challenges by providing a centralized and secure online system that ensures accuracy, efficiency, and user convenience through automated validation, secure data storage, and responsive feedback. By reducing errors, improving productivity, and drawing from modern technologies such as biometric verification and server-based management systems, OwlReg offers a scalable and reliable solution that streamlines registration and supports the evolving needs of educational institutions.

Tools

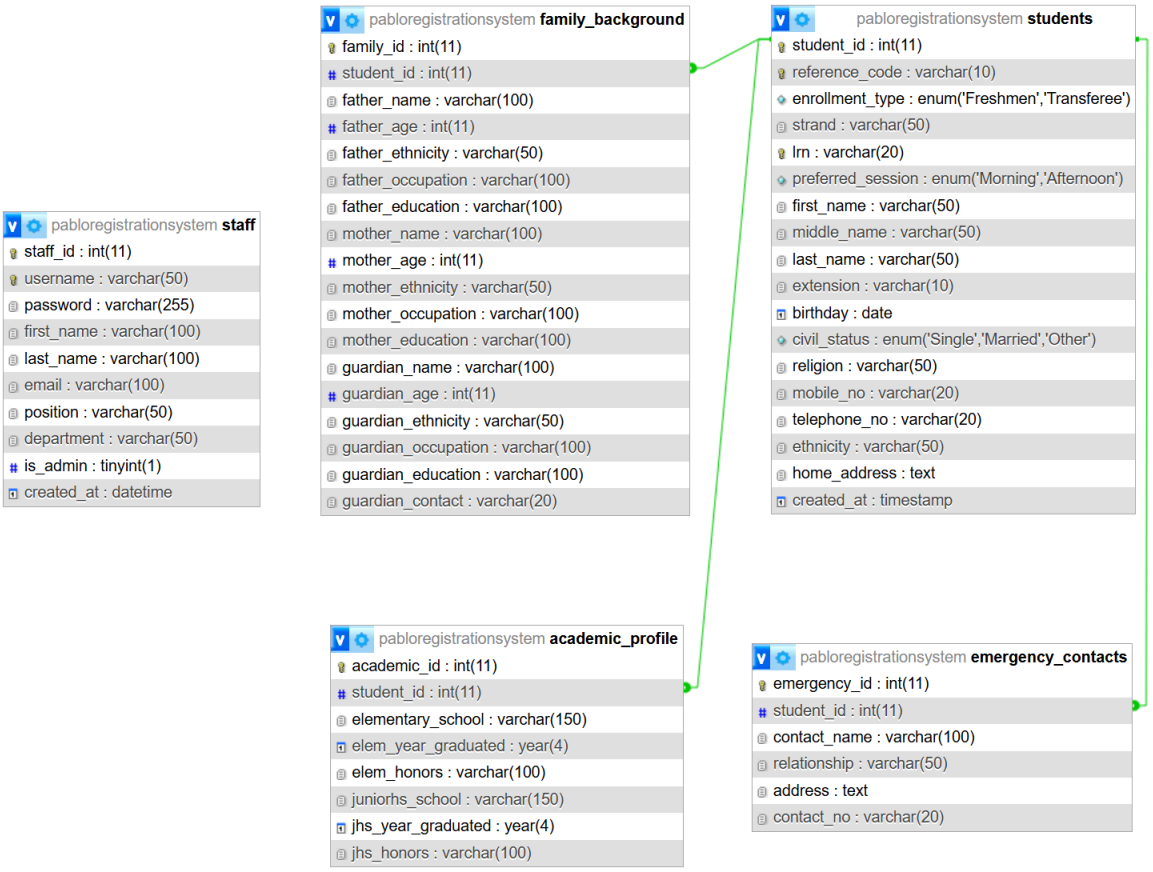
The selection of Python, PyCharm, PyQt, MySQL, XAMPP, and a Laptop as core tools is grounded in their complementary roles in system development. Python, as a high-level programming language, enables efficient handling of logic, data processing, and system functionality due to its readability and extensive libraries. PyCharm functions as the integrated development environment that enhances productivity through features such as code management, debugging, and project organization. PyQt is employed to construct an intuitive graphical user interface, ensuring accessibility and user engagement through interactive windows and forms. MySQL serves as a robust relational database management system, providing secure storage, structured organization, and reliable retrieval of student information. XAMPP facilitates a controlled local server environment, enabling testing and integration of database and server components. The Laptop provides the essential hardware platform to run all development tools, ensuring portability and efficiency. Collectively, these tools form a cohesive technological framework that supports accuracy, usability, and scalability in the implementation of the registration system.

OwlReg: Use Cases



Figures 6: OwlReg Use Cases

Entity Relationship Diagram



Figures 7: OwlReg ERD

Data Dictionary

Table 1: Staff

Column	Type	Null	Default	Links to	Comments	Media type
staff_id *(Primary)*	int(11)	No				
username	varchar(50)	Yes	*NULL*			
password	varchar(255)	Yes	*NULL*			
first_name	varchar(100)	Yes	*NULL*			
last_name	varchar(100)	Yes	*NULL*			
email	varchar(100)	Yes	*NULL*			
position	varchar(50)	Yes	*NULL*			
department	varchar(50)	Yes	*NULL*			
is_admin	tinyint(1)	Yes	0			
created_at	datetime	Yes	*NULL*			

Indexes

Keyname	Type	Unique	Packed	Column	Cardinality	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	staff_id	0	A	No	
username	BTREE	Yes	No	username	0	A	Yes	

Table 2: Students

Column	Type	Null	Default	Links to	Comments	Media type
student_id *(Primary)*	int(11)	No				
reference_code	varchar(10)	Yes	*NULL*			
enrollment_type	enum('Freshmen', 'Transferee')	No				
strand	varchar(50)	No				
lrn	varchar(20)	No				
preferred_session	enum('Morning', 'Afternoon')	No				
first_name	varchar(50)	No				
middle_name	varchar(50)	Yes	*NULL*			
last_name	varchar(50)	No				
extension	varchar(10)	Yes	*NULL*			
birthday	date	No				
civil_status	enum('Single', 'Married', 'Other')	Yes	Single			
religion	varchar(50)	Yes	*NULL*			
mobile_no	varchar(20)	No				
telephone_no	varchar(20)	Yes	*NULL*			
ethnicity	varchar(50)	Yes	*NULL*			
home_address	text	No				
created_at	timestamp	No	current_timestamp()			

Indexes

Keyname	Type	Unique	Packed	Column	Cardinality	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	student_id	4	A	No	
lrn	BTREE	Yes	No	lrn	4	A	No	
reference_code	BTREE	Yes	No	reference_code	4	A	Yes	

Table 3: Family Background

Column	Type	Null	Default	Links to	Comments	Media type
family_id *(Primary)*	int(11)	No				
student_id	int(11)	No		students -> student_id		
father_name	varchar(100)	Yes	*NULL*			
father_age	int(11)	Yes	*NULL*			
father_ethnicity	varchar(50)	Yes	*NULL*			
father_occupation	varchar(100)	Yes	*NULL*			
father_education	varchar(100)	Yes	*NULL*			

mother_name	varchar(100)	Yes	*NULL*			
mother_age	int(11)	Yes	*NULL*			
mother_ethnicity	varchar(50)	Yes	*NULL*			
mother_occupation	varchar(100)	Yes	*NULL*			
mother_education	varchar(100)	Yes	*NULL*			
guardian_name	varchar(100)	Yes	*NULL*			
guardian_age	int(11)	Yes	*NULL*			
guardian_ethnicity	varchar(50)	Yes	*NULL*			
guardian_occupation	varchar(100)	Yes	*NULL*			
guardian_education	varchar(100)	Yes	*NULL*			
guardian_contact	varchar(20)	Yes	*NULL*			

Indexes

Keyname	Type	Unique	Packed	Column	Cardinality	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	family_id	4	A	No	
student_id	BTREE	No	No	student_id	4	A	No	

Table 4: Academic Profile

Column	Type	Null	Default	Links to	Comments	Media type
academic_id *(Primary)*	int(11)	No				
student_id	int(11)	No		students -> student_id		
elementary_school	varchar(150)	Yes	*NULL*			
elem_year_graduated	year(4)	Yes	*NULL*			
elem_honors	varchar(100)	Yes	*NULL*			
juniorhs_school	varchar(150)	Yes	*NULL*			
jhs_year_graduated	year(4)	Yes	*NULL*			
jhs_honors	varchar(100)	Yes	*NULL*			

Indexes

Keyname	Type	Unique	Packed	Column	Cardinality	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	academic_id	4	A	No	
student_id	BTREE	No	No	student_id	4	A	No	

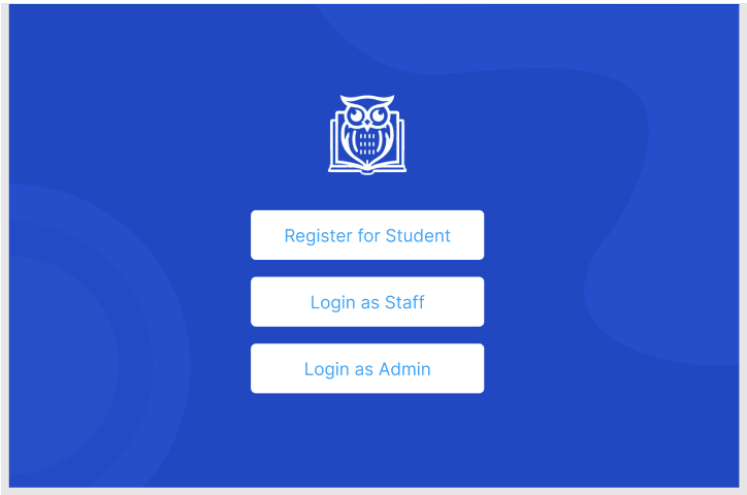
Table 5: Emergency Contact

Column	Type	Null	Default	Links to	Comments	Media type
emergency_id *(Primary)*	int(11)	No				
student_id	int(11)	No		students -> student_id		
contact_name	varchar(100)	No				
relationship	varchar(50)	No				
address	text	No				
contact_no	varchar(20)	No				

Indexes

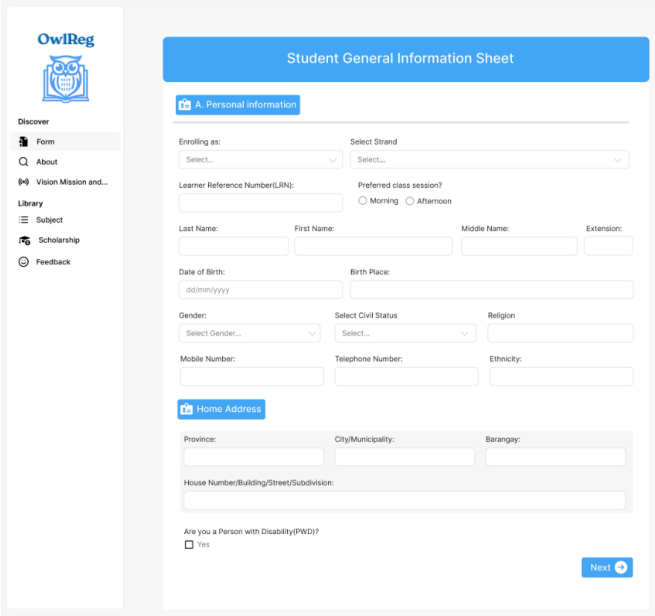
Keyname	Type	Unique	Packed	Column	Cardinality	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	emergency_id	4	A	No	
student_id	BTREE	No	No	student_id	4	A	No	

Prototype



Figures 8: Login Screen

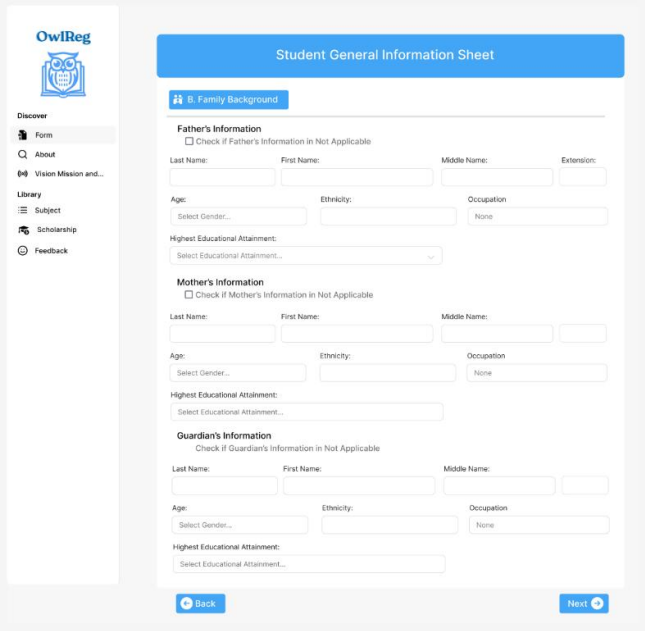
In OwlReg, the first screen serves as the main login page where users can choose their role to access the system. It provides three clear options: students can register, staff members can log in to their workspace, and administrators can log in to manage the overall system. This simple design makes it easy for users to navigate and enter the system based on their role.



Figures 9: Student_DigitalForm(A)

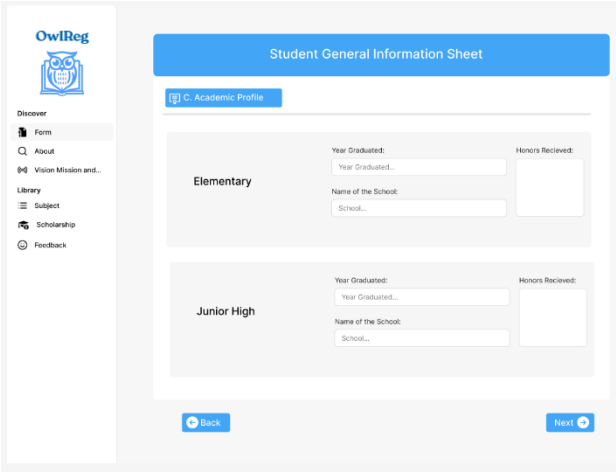
In the OwlReg System, students are required to complete a digital form that gathers essential personal details, such as full name, date of birth, age, gender, and contact number, along with their home address. As shown in Figure 8, this form replaces the traditional paper-based method, reducing errors from manual encoding and making data collection more efficient. The information provided is automatically

stored in the system's database, ensuring accuracy, accessibility, and proper documentation for future reference in the registration process



Figures 10: Student_DigitalForm(B)

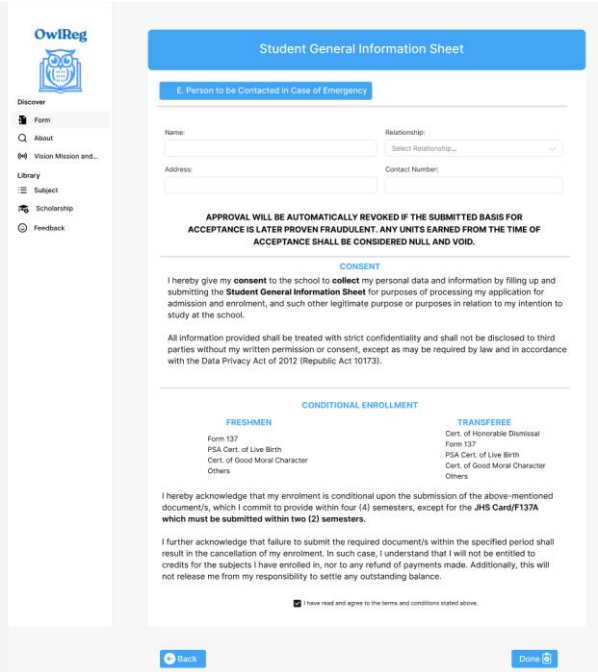
In the OwlReg System, students are prompted to provide details about their family background, including the names of parents or guardians, their occupations, contact numbers, and other relevant information. As shown in Figure 9, this digital form streamlines the collection of important family data that is often required for school records. By digitizing this step, the system minimizes the risks of misplaced informatin and ensures that accurate family background details are securely stored in the database for reference during the registration process.



Figures 11: Student_DigitalForm(C)

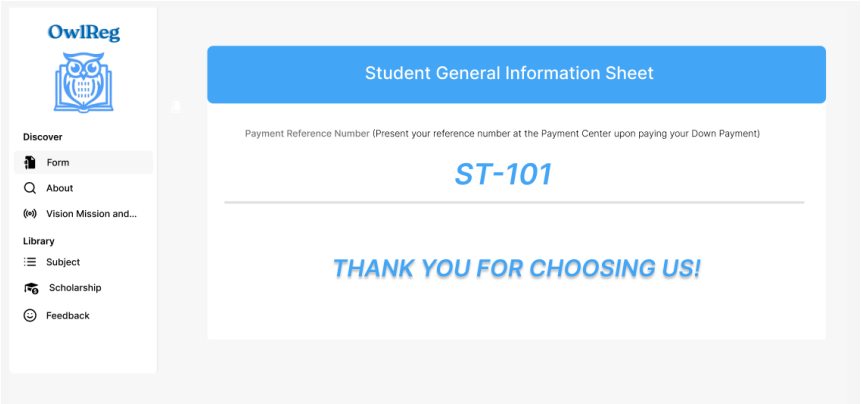
In the OwlReg System, students fill out their academic profile by providing details of their completed elementary and junior high school education. As shown in Figure 10, this form

ensures that basic academic history is properly recordxed and stored in the system for reference in the registration process.



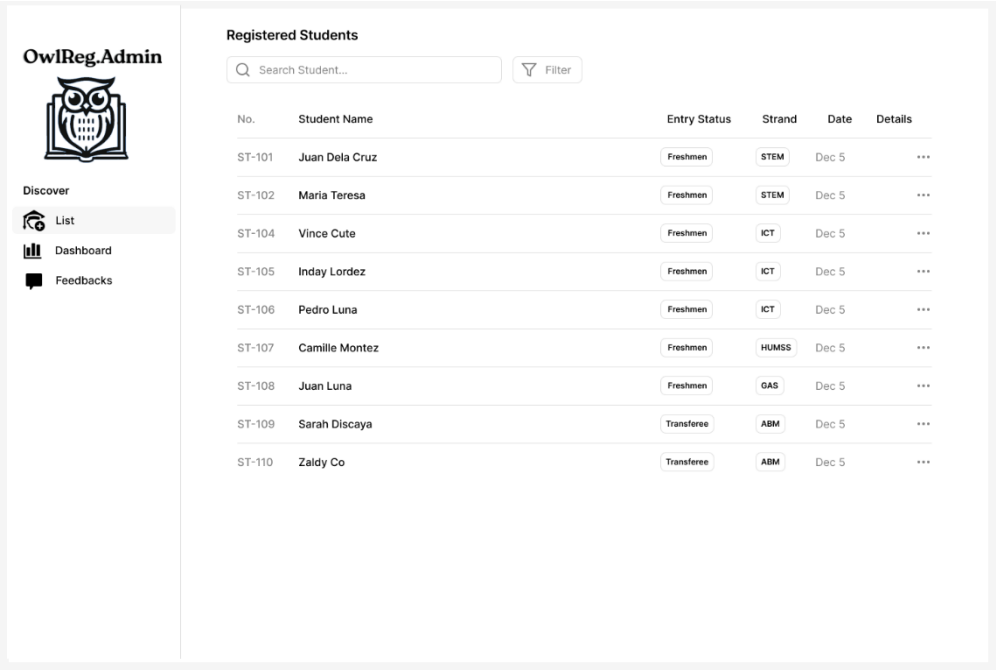
Figures 12: Student_DigitalForm(D)

In the OwlReg System, students provide emergency contact information to ensure immediate communication when needed. As shown in Figure 12, the lower part of the form includes consent and data privacy agreements, along with conditional enrollment confirmation, ensuring that students acknowledge school policies while completing the registration process.



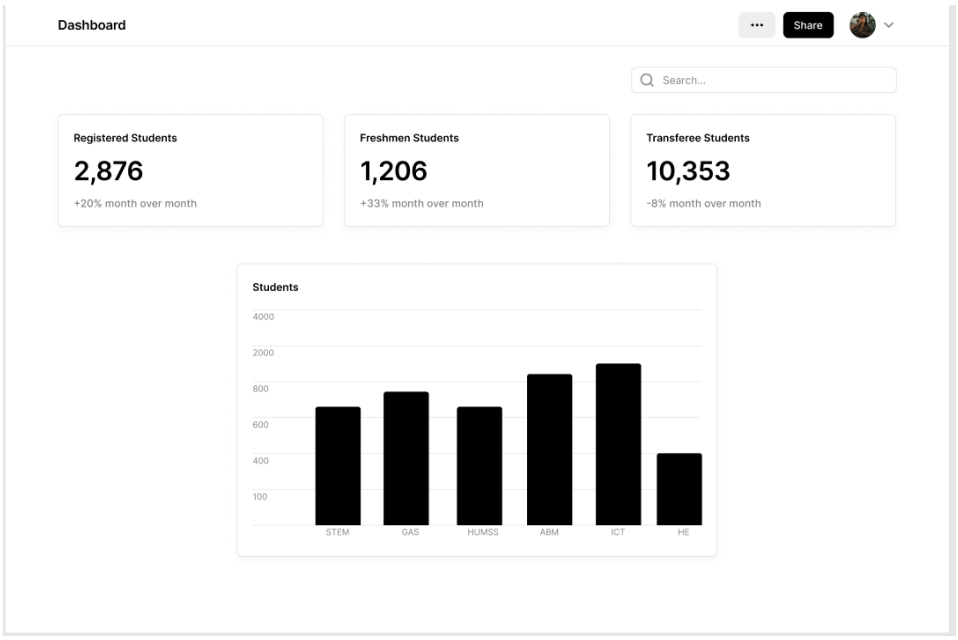
Figures 13: Student_Confirmation

In the OwlReg System, the student screen generates a unique registration code upon completion of the process. As shown in Figure 13, this code is to be presented to the cashier for payment once the student proceeds with enrollment, serving as proof of successful registration.



Figures 14: Admin_List

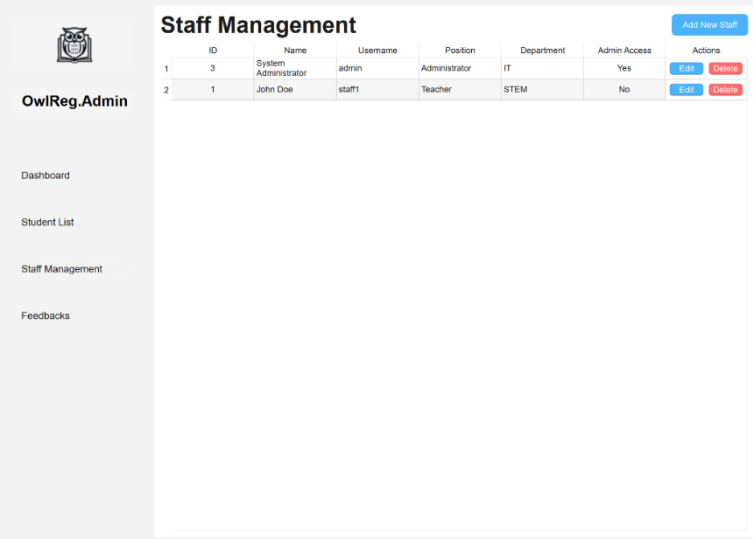
In the OwlReg System, administrators and staff can access a list of students who have completed the registration process. As shown in Figure 14, this screen allows them to view each student's personal details and other submitted information, ensuring organized records and easier management of registration data.



Figures 15: Admin_Dashboard

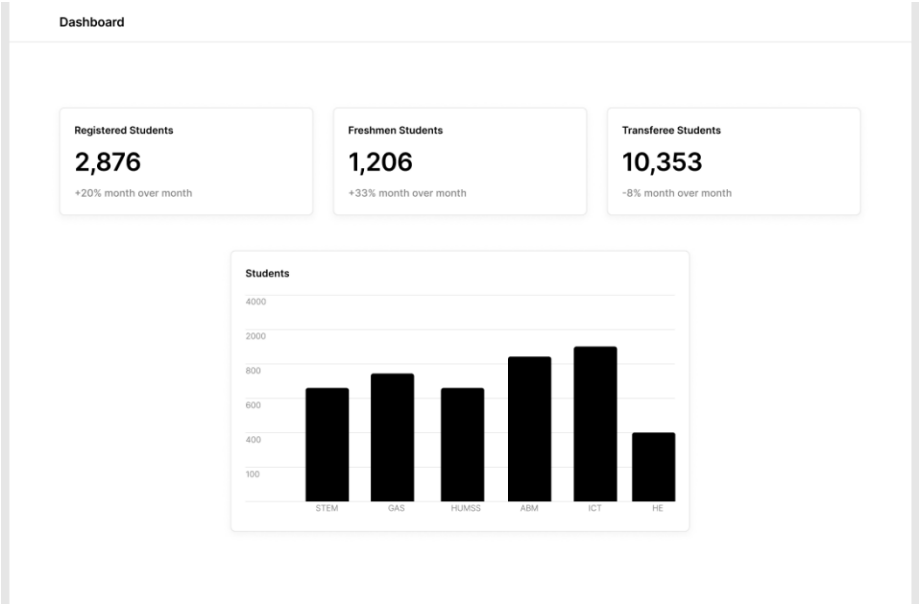
In the OwlReg System, the dashboard provides administrators and staff with an overview of registration data. As shown in Figure 15, it displays the number of students who completed the digital forms, the count of registrants per academic strand, and the

total number of students enrolled. This feature supports efficient monitoring and reporting of the registration process.



Figures 16: Admin_StaffManagement

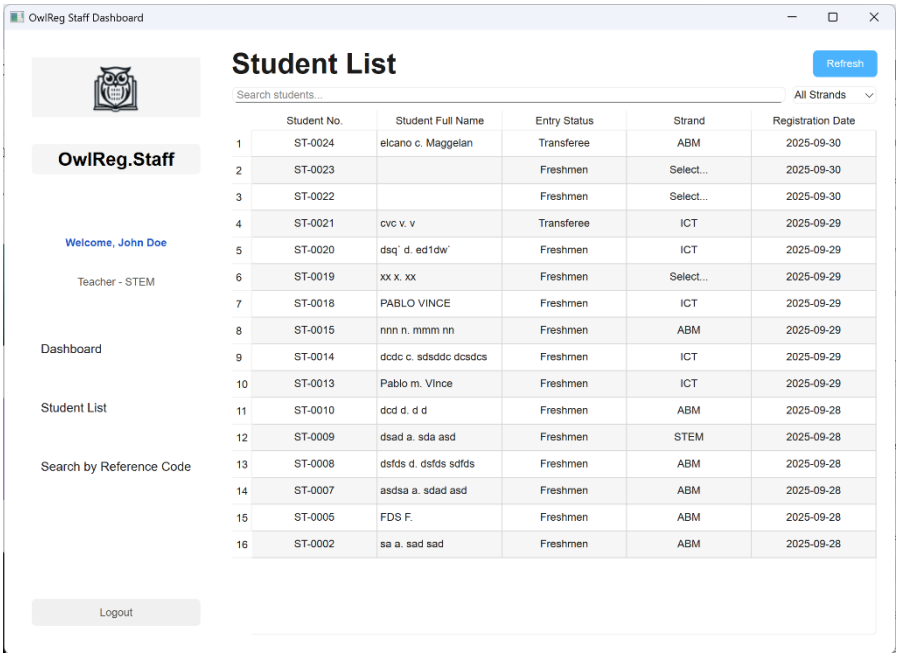
In the Admin navigation of OwlReg, the Staff Management section allows the administrator to view, add, edit, and delete staff records. The table displays important details such as name, username, position, department, and admin access. On the right side, action buttons are provided for editing or deleting staff information, while a button on the top-right corner allows the admin to add new staff members. This feature helps the administrator efficiently manage and organize staff within the system.



Figures 17: Staff_Dashboard

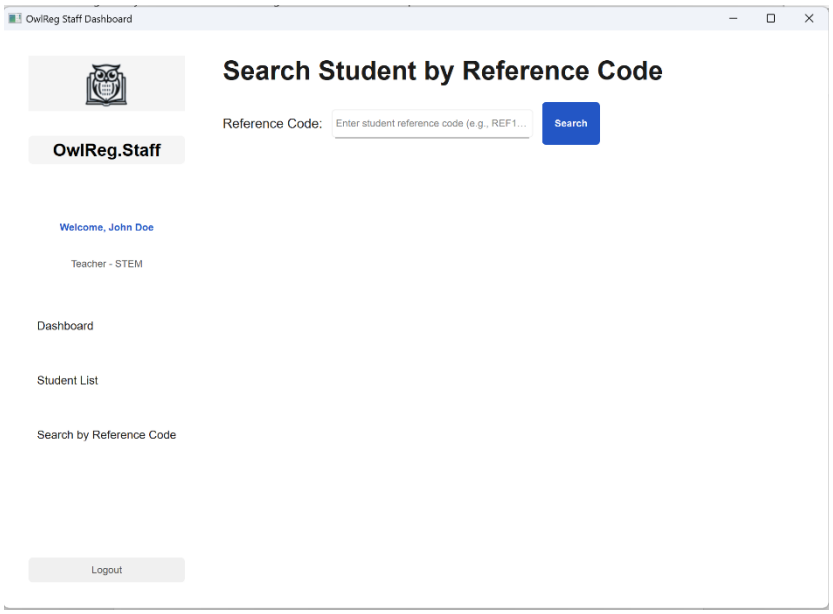
In the **Staff Dashboard of OwlReg**, users can view key student statistics such as the total number of registered, freshmen, and transferee students, along with their

monthly growth trends. A bar chart is also provided to show the distribution of students across different academic strands, giving staff a clear overview of enrollment data.



Figures 18: Staff_Dashboard

In the **Staff navigation of OwlReg**, the Student List section provides staff with a complete view of all registered students. The table displays only the most important details such as student number, full name, entry status, strand, and registration date. A search bar and filter option are also available to quickly find students by name or strand, making it easier for staff to manage and track student records efficiently.



Figures 19: Staff_Search_ReferenceCode

In the **Staff navigation of OwlReg**, the Search by Reference Code feature allows staff to quickly locate a specific student's record. By entering the unique

reference code into the search bar, the system matches it with the database and retrieves the complete details of the student. This function ensures fast and accurate access to individual student information, making record management more efficient.

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