



IT5/L – IT Elective 2

2798

**OwlReg**

**SHS Registration System**

*Submitted to:*

*Renz Arriola*

*Submitted by:*

*Lourde Vincent M. Pablo*

October 2025

## Table of Contents

<b>SHS Student Registration System</b> .....	4
Problem 1: Limitations of Manual (Traditional) Registration Setup .....	4
Solution 1: Implementation of a Centralized Digital System .....	5
Problem 2: Data Inaccuracy .....	5
Solution 2: Digital Forms with Validation .....	5
Problem 3: Poor Record Management & Accessibility .....	6
Solution 3: Database Security & Management .....	6
<b>Supporting Statement</b> .....	6
<b>Supporting Statement</b> .....	7
<b>Conclusion</b> .....	7
<b>Tools</b> .....	8
<b>OwlReg: Use Cases</b> .....	8
Entity Relationship Diagram .....	9
Data Dictionary .....	9
References .....	19

## List of Figures

Figures 1: OwlReg .....	4
Figures 2: Effectiveness of Automation in School Registration Systems .....	4
Figures 3: Student Enrolled Statistic DepEd .....	5
Figures 4: Multifunctional school roll self-service registration system .....	6
Figures 5: Management system for interactive on-line system .....	7
Figures 6: OwlReg Use Cases .....	8
Figures 7: OwlReg ERD .....	9
Figures 8: Login Screen .....	12
Figures 9: Student_DigitalForm(A) .....	12
Figures 10: Student_DigitalForm(B) .....	13
Figures 11: Student_DigitalForm(C) .....	13
Figures 12: Student_DigitalForm(D) .....	14
Figures 13: Student_Confirmation .....	14
Figures 14: Admin_List .....	15
Figures 15: Admin_Dashboard .....	15
Figures 16: Admin_StaffManagement .....	16
Figures 17: Staff_Dashboard .....	16
Figures 18: Staff_Dashboard .....	17
Figures 19: Staff_Search_ReferenceCode .....	17

### List of Tables

Table 1: Staff .....	9
Table 2: Students.....	10
Table 3: Family Background .....	10
Table 4: Academic Profile .....	11
Table 5: Emergency Contact.....	11



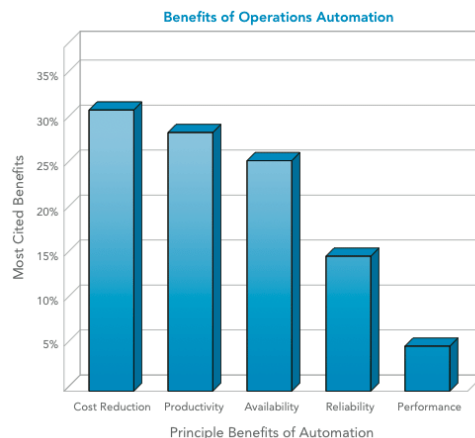
Figures 1: OwlReg

## 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

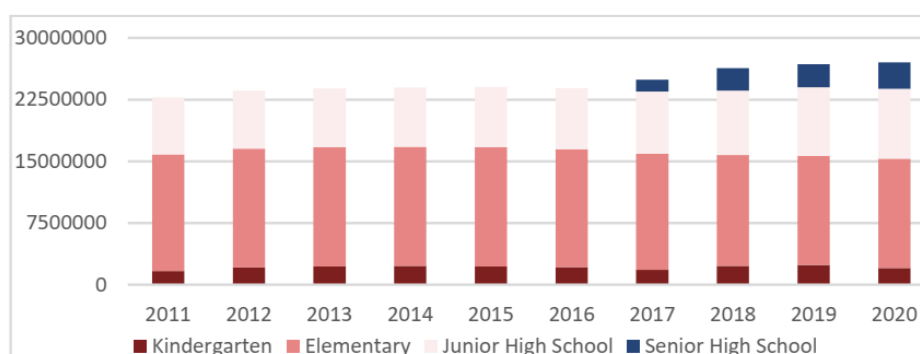
OwlReg addresses this gap by employing a centralized online registration system, where technology and advancements are primarily utilized for this process. OwlReg is designed to be accurate, efficient, and beneficial to the users. Most institutes today recognize the importance of computers in meeting 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

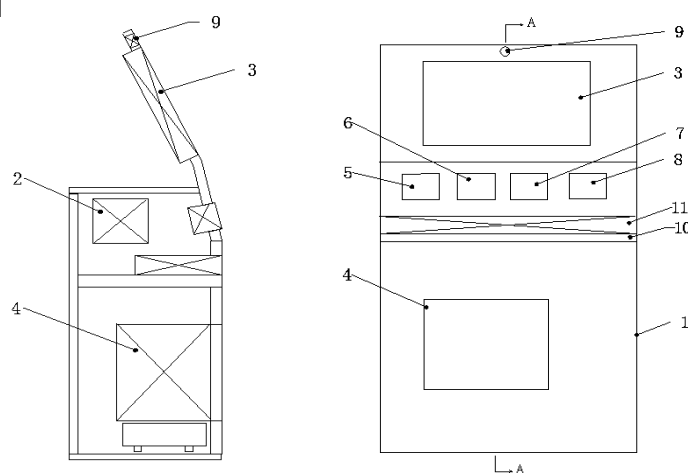
Traditionally, educational institutions, such as government and public high schools, have relied on manual procedures to manage learners' Permanent Records and Report Cards. Based on Figure 3, data from 2011 to 2020 indicate that the majority of schools in the Philippines continued to utilize paper-based 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



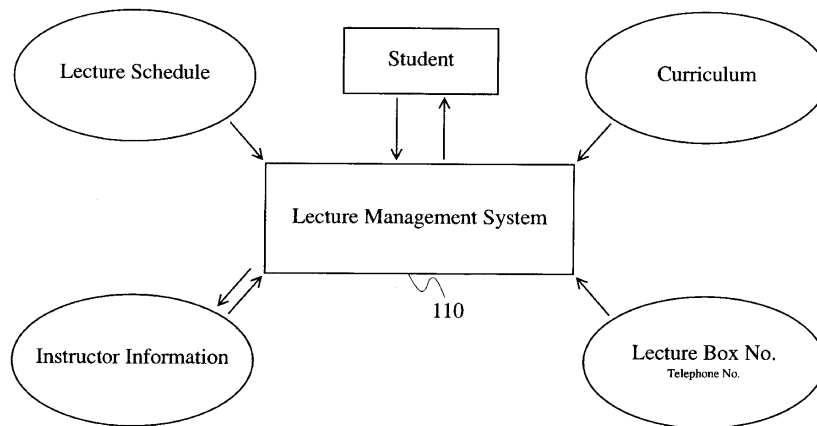
*Figures 4: Multifunctional school roll self-service registration system*

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].

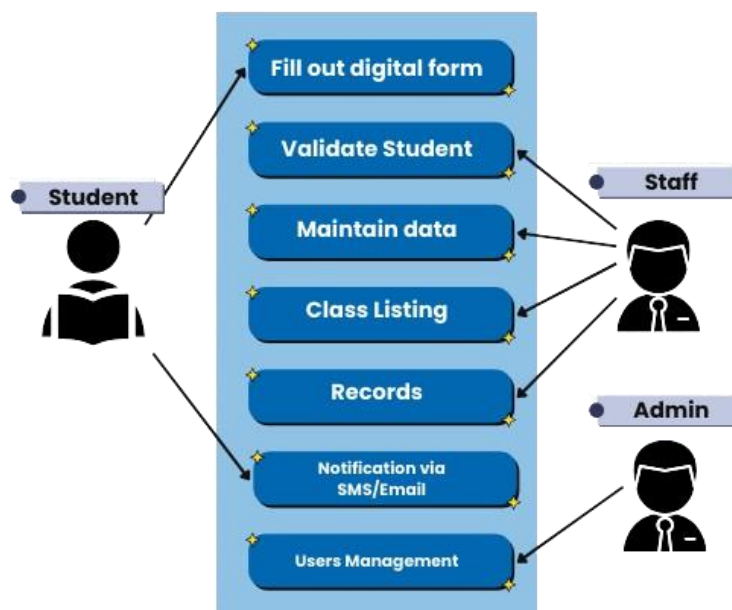
## Conclusion

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.

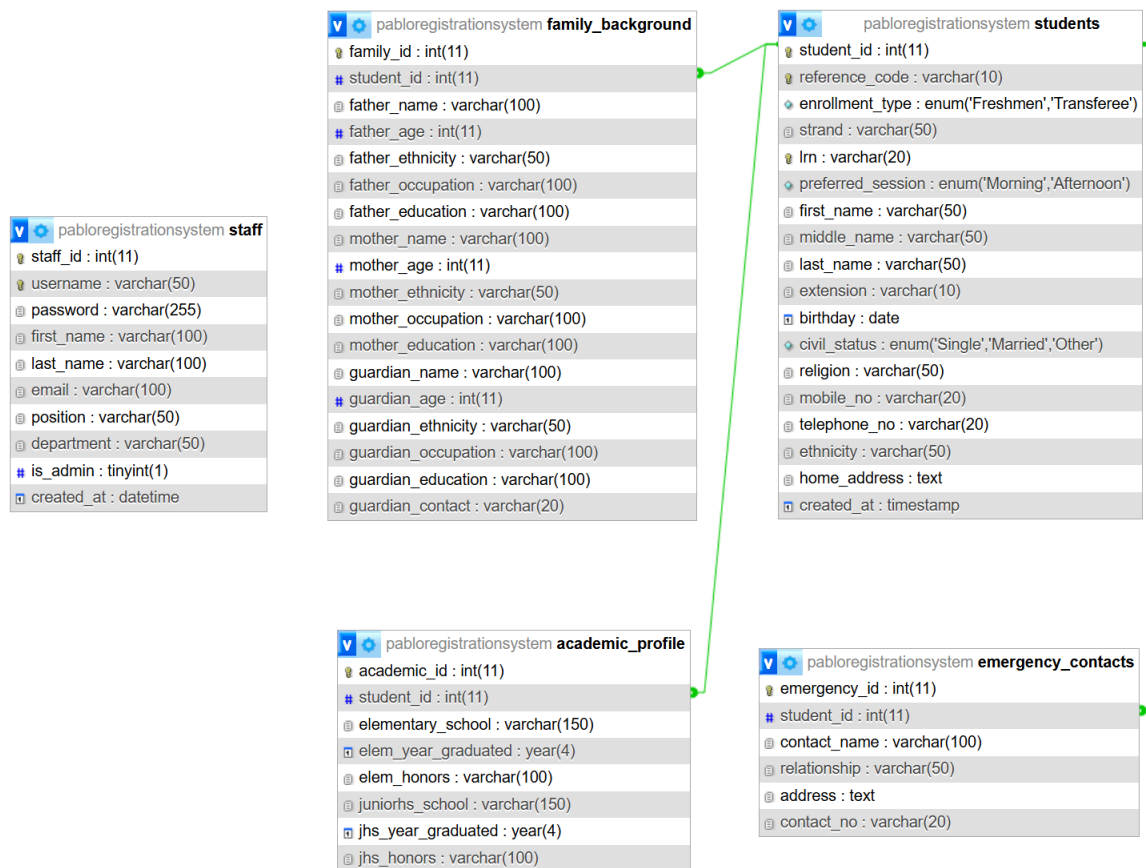
## OwlReg: Use Cases



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 ( <i>Primary</i> )	int(11)	No				
reference_code	varchar(10)	Yes	NULL			
enrollment_type	enum('Freshmen', 'Transferee')	No				
strand	varchar(50)	No				
lrm	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	
lrm	BTREE	Yes	No	lrm	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 ( <i>Primary</i> )	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 ( <i>Primary</i> )	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	

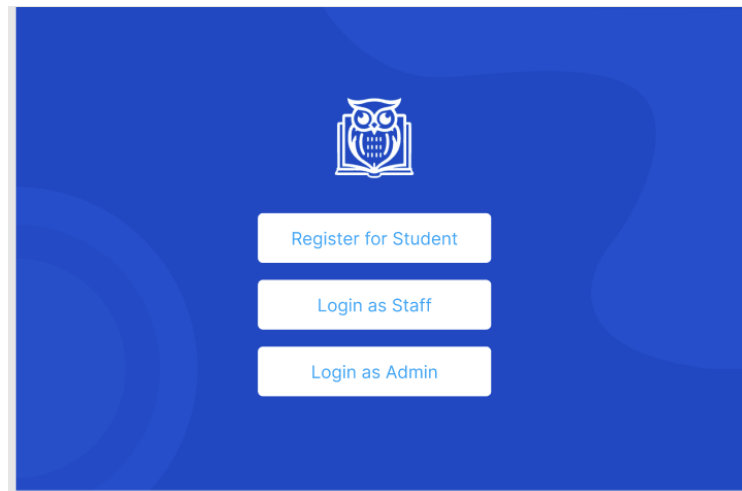
Table 5: Emergency Contact

Column	Type	Null	Default	Links to	Comments	Media type
emergency_id ( <i>Primary</i> )	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

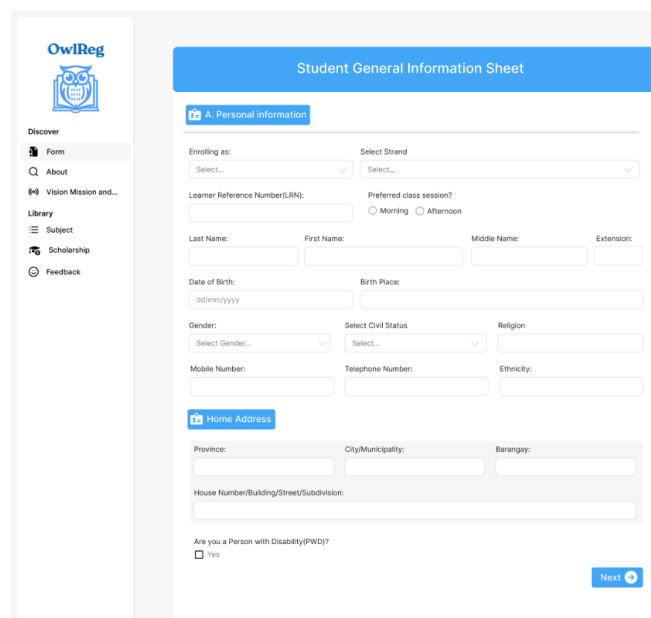
Keyname	Type	Unique	Packed	Column	Cardinality	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	emergency_id	4	A	No	
student_id	BTREE	No	No	student_id	4	A	No	

## 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.

A digital form titled "Student General Information Sheet" with a blue header. On the left is a sidebar with the OwlReg logo and navigation links: Discover, Form, About, Vision Mission and..., Library, Subject, Scholarship, and Feedback. The form is divided into two sections: "A. Personal information" and "Home Address". The "Personal information" section includes fields for Enrolling as (dropdown), Select Strand (dropdown), Learner Reference Number(LRN) (text), Preferred class session? (radio buttons for Morning and Afternoon), Last Name, First Name, Middle Name, Extension, Date of Birth (calendar icon), Birth Place, Gender (dropdown), Select Civil Status (dropdown), Religion, Mobile Number, Telephone Number, and Ethnicity. The "Home Address" section includes fields for Province, City/Municipality, Barangay, and House Number/Building/Street/Subdivision. At the bottom, there is a checkbox for "Are you a Person with Disability(PWD)?" and a "Next" button with a right arrow.

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 information 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 recorded and stored in the system for reference in the registration process.

The screenshot shows the 'Student General Information Sheet' form in the OwlReg system. The form is titled 'Student General Information Sheet' and includes a section for 'E. Person to be Contacted in Case of Emergency'. This section contains fields for Name, Relationship, Address, and Contact Number. Below this, there is a warning: 'APPROVAL WILL BE AUTOMATICALLY REVOKED IF THE SUBMITTED BASIS FOR ACCEPTANCE IS LATER PROVEN FRAUDULENT. ANY UNITS EARNED FROM THE TIME OF ACCEPTANCE SHALL BE CONSIDERED NULL AND VOID.' This is followed by a 'CONSENT' section where the student agrees to the school's data collection and privacy policies. The form also includes a 'CONDITIONAL ENROLLMENT' section with two columns: 'FRESHMEN' and 'TRANSFEREE'. The 'FRESHMEN' column lists 'Form 137', 'PSA Cert. of Live Birth', 'Cert. of Good Moral Character', and 'Others'. The 'TRANSFEREE' column lists 'Cert. of Honorable Dismissal', 'Form 137', 'PSA Cert. of Live Birth', 'Cert. of Good Moral Character', and 'Others'. A paragraph states: 'I hereby acknowledge that my enrollment is conditional upon the submission of the above-mentioned document/s, which I commit to provide within four (4) semesters, except for the JHS Card/F137A which must be submitted within two (2) semesters.' Another paragraph states: 'I further acknowledge that failure to submit the required document/s within the specified period shall result in the cancellation of my enrollment. In such case, I understand that I will not be entitled to credits for the subjects I have enrolled in, nor to any refund of payments made. Additionally, this will not release me from my responsibility to settle any outstanding balance.' At the bottom, there is a checkbox for 'I have read and agree to the terms and conditions stated above.' and buttons for 'Back' and 'Done'.

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.

The screenshot shows the 'Student Confirmation' screen in the OwlReg system. The screen is titled 'Student General Information Sheet' and displays a 'Payment Reference Number (Present your reference number at the Payment Center upon paying your Down Payment)' as 'ST-101'. Below this, there is a large blue text box that says 'THANK YOU FOR CHOOSING US!'. The left sidebar of the OwlReg system is visible, showing the 'Discover' menu with options: Form, About, Vision Mission and..., Library, Subject, Scholarship, and Feedback.

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.

OwlReg.Admin



Discover

- List
- Dashboard
- Feedbacks

Registered Students

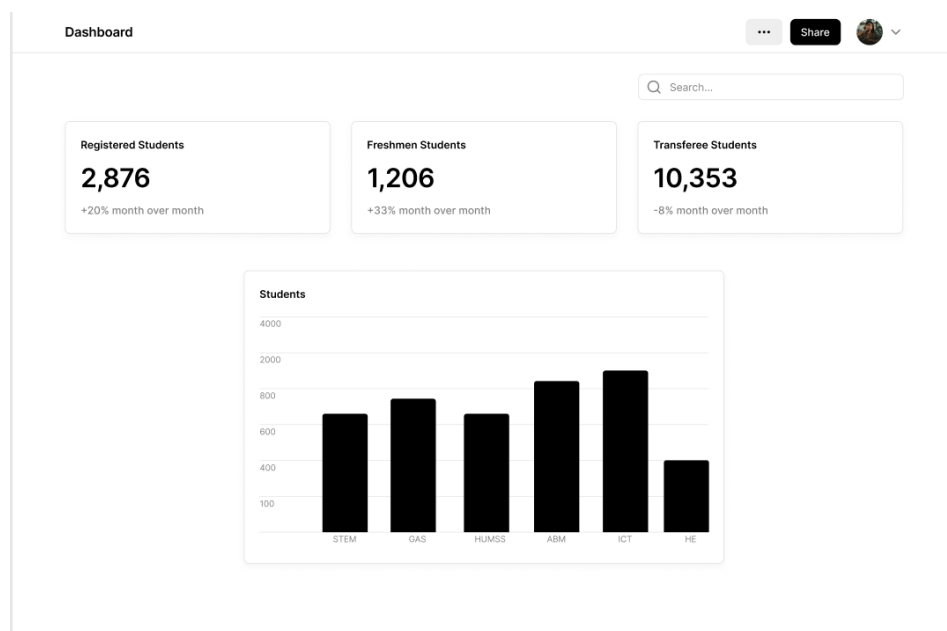
Search Student...

Filter

No.	Student Name	Entry Status	Strand	Date	Details
ST-101	Juan Dela Cruz	Freshmen	STEM	Dec 5	...
ST-102	Maria Teresa	Freshmen	STEM	Dec 5	...
ST-104	Vince Cute	Freshmen	ICT	Dec 5	...
ST-105	Inday Lordez	Freshmen	ICT	Dec 5	...
ST-106	Pedro Luna	Freshmen	ICT	Dec 5	...
ST-107	Camille Montez	Freshmen	HUMSS	Dec 5	...
ST-108	Juan Luna	Freshmen	GAS	Dec 5	...
ST-109	Sarah Discaya	Transferee	ABM	Dec 5	...
ST-110	Zaldy Co	Transferee	ABM	Dec 5	...

Figures 14: Admin\_List

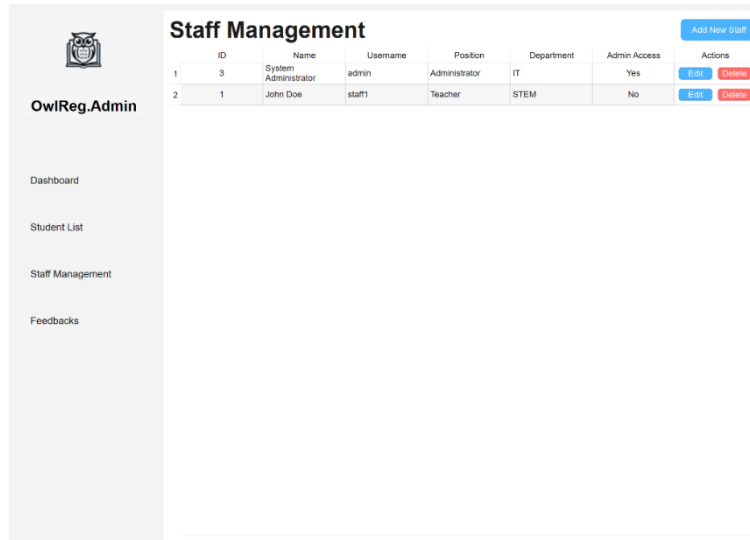
In the OwlReg System, administrators and staff can access a list of students who have completed the registration process. As shown in Figure 14, this screen allows them to view each student’s personal details and other submitted information, ensuring organized records and easier management of registration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

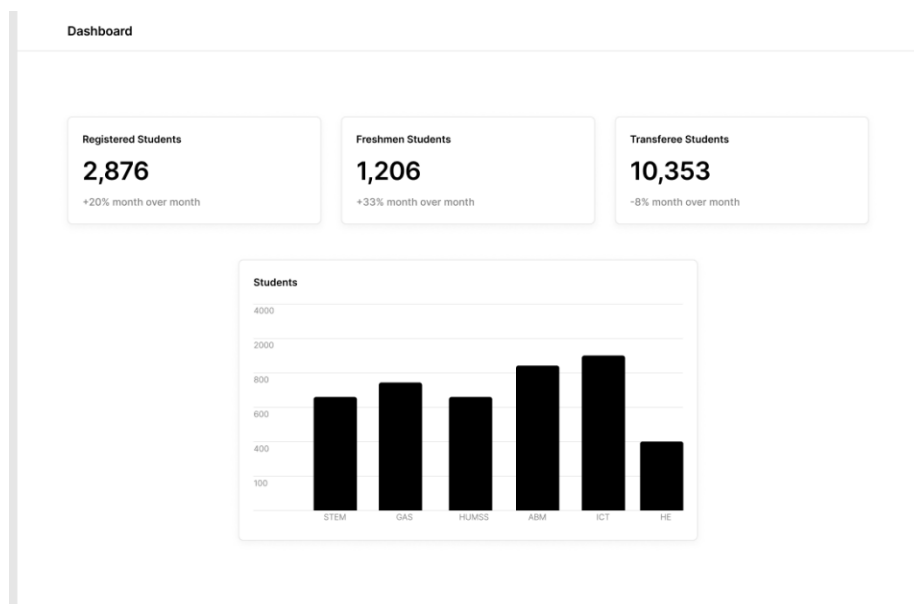
total number of students enrolled. This feature supports efficient monitoring and reporting of the registration process.



ID	Name	Username	Position	Department	Admin Access	Actions
3	System Administrator	admin	Administrator	IT	Yes	<a href="#">Edit</a> <a href="#">Delete</a>
1	John Doe	staff1	Teacher	STEM	No	<a href="#">Edit</a> <a href="#">Delete</a>

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.

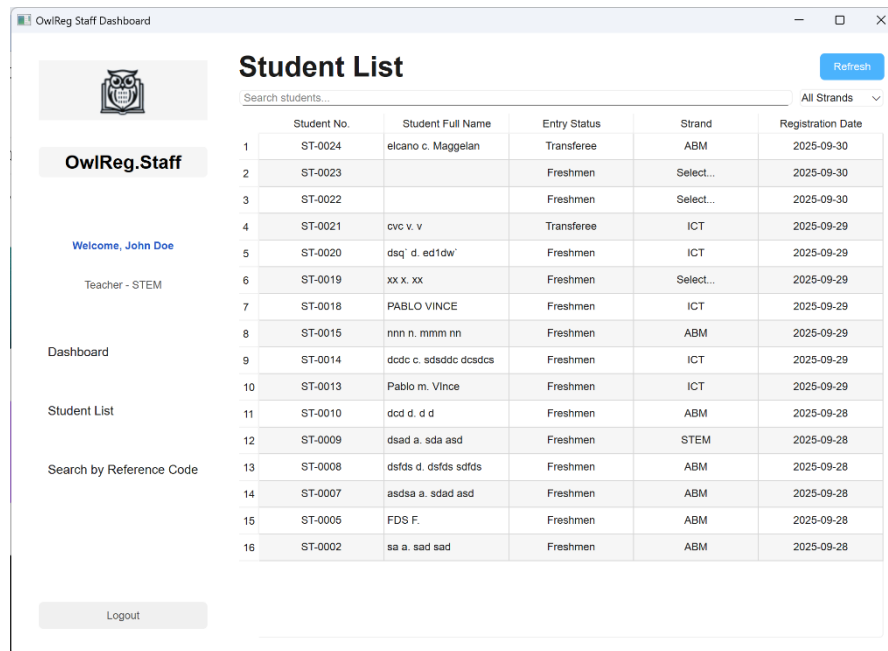


Figures 17: Staff\_Dashboard

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



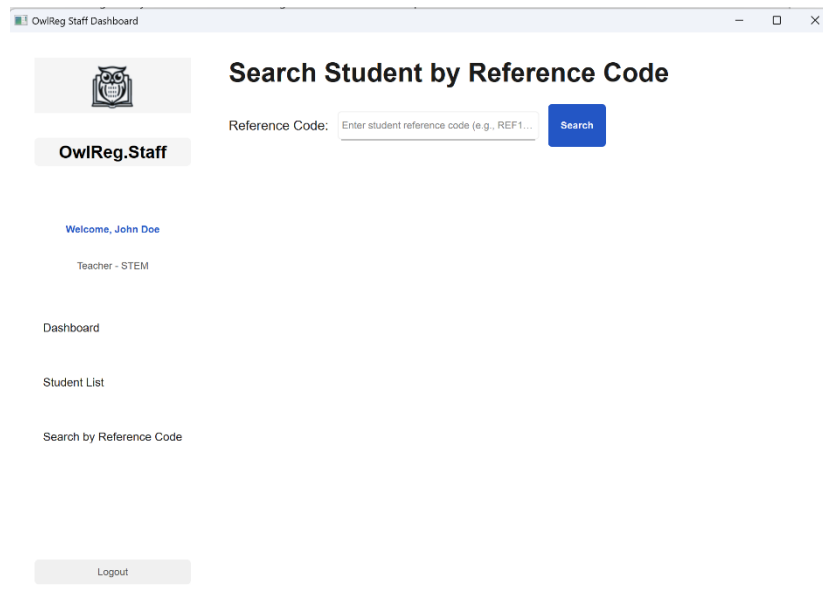
monthly growth trends. A bar chart is also provided to show the distribution of students across different academic strands, giving staff a clear overview of enrollment data.



	Student No.	Student Full Name	Entry Status	Strand	Registration Date
1	ST-0024	elcano c. Maggelan	Transferee	ABM	2025-09-30
2	ST-0023		Freshmen	Select...	2025-09-30
3	ST-0022		Freshmen	Select...	2025-09-30
4	ST-0021	cvc v. v	Transferee	ICT	2025-09-29
5	ST-0020	dsq' d. ed1dw'	Freshmen	ICT	2025-09-29
6	ST-0019	xx x. xx	Freshmen	Select...	2025-09-29
7	ST-0018	PABLO VINCE	Freshmen	ICT	2025-09-29
8	ST-0015	nnn n. mmm nn	Freshmen	ABM	2025-09-29
9	ST-0014	dcdc c. sdsddc dcadcs	Freshmen	ICT	2025-09-29
10	ST-0013	Pablo m. Vince	Freshmen	ICT	2025-09-29
11	ST-0010	dcd d. d d	Freshmen	ABM	2025-09-28
12	ST-0009	dsad a. sda asd	Freshmen	STEM	2025-09-28
13	ST-0008	dsfds d. dsfds sdfds	Freshmen	ABM	2025-09-28
14	ST-0007	asdsa a. sdad asd	Freshmen	ABM	2025-09-28
15	ST-0005	FDS F.	Freshmen	ABM	2025-09-28
16	ST-0002	sa a. sad sad	Freshmen	ABM	2025-09-28

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.

## References

- [1] M. J. W. K. U. e. a. Habib, "Transforming universities in interactive digital platform: case of city university of science and information technology.," *Educ Inf Technol*, pp. 26, 517–541, 2021.
- [2] Modern Campus, "Flaws in the Registration Process for Continuing Education," *Modern Campus Blog*, 2022.
- [3] M. L. J. .. Basilan and . R. G. Baesa, "Integrating ICT toward Efficient Registration System in Division of Batangas Province," *IOER International Multidisciplinary Research Journal ( IIMRJ)*, vol. 1, no. 4, 2019.
- [4] S. Namugenyi Mukisa and A. Feiswal, "An Automated Student Registration System: A Case Study of Lugazi Primary," *International Network Organization for Scientific Research*, vol. 10, no. 2705-1692 , 2022.
- [5] Kiu Publication Extension, "An Automated Student Registration System: A Case Study of Lugazi Primary School," *ResearchGate*, 2022.
- [6] H. Moyo, N. Litshani, T. Mashau and A. Mohale, "Maintaining Accurate Records in a School Environment: Less of Technical Concern and Much of a Management Imperative and Mandate," *Subinet African Journals*, vol. 19, no. 1, 2021.
- [7] R. A. Putri, "Development of Digital Registration Information System in Kelurahan to Improve Administration Efficiency and Transparency," *SAN Scientific*, vol. 2, no. 3031-1187, p. 1, 2024.
- [8] Iris Ruthzelle V. Bagacay et al, "International Journal of Computer Science and Mobile Computing," *Computer Science and Information Technology* , vol. 13, no. 4, pp. 1-5, 2024.
- [9] A. Salihu, "DESIGN AND IMPLEMENTATION OF DATABASE MANAGEMENT SYSTEM FOR STUDENT’S REGISTRATION," *FUTMinna Institutional Repository*, 2021.
- [10] J. LI , S. YU , X. Z. XU and X. HE , "Multifunctional school roll self-service registration system". China Patent 104732334, 24 June 2015.
- [11] T. Shimizu, "Management system for interactive on-line system". United States of America Patent US6002915A, 14 December 1999.