



## POLYTECHNIC UNIVERSITY OF THE PHILIPPINES

### A Comprehensive Appointment and Monitoring System in Children with Special Needs Center Parañaque City

A Capstone Project

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### Chapter 1

#### THE PROBLEM AND ITS SETTING

##### Introduction

The increasing global population has created significant challenges for healthcare systems. Traditional health appointments and monitoring methods often rely on delayed data collection and reactive responses, which can hinder timely interventions. To improve the well-being of residents, it is crucial to adopt real-time health appointments and monitoring solutions that enhance efficiency and effectiveness in healthcare delivery.

The Sustainable Development Goals (SDGs) underscore the crucial importance of integrating people with disabilities into all facets of society. These goals emphasize equal access to education, opportunities for decent work, and the creation of safe, accessible urban environments (United Nations, n.d.). Fadzil et al. (2021) emphasized that consistent appointments are crucial for children with special needs, as they support ongoing interdisciplinary care, promote continuity, and enhance overall health and well-being.

According to Nehal Thanawala (2023), professionals, teachers, and parents have different views on the best approach to conducting health assessments for this diverse group of children and young people. It is crucial to take into account the available resources, time, and support for professionals to ensure efficient reviews. According to Madrid & Cagadas (2023), healthcare is a dynamic field continuously shaped by technological and service advancements. The development of this system provides substantial benefits, especially in an aging growing population with increasing health



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concerns, by improving convenience for healthcare providers like nurses and doctors through remote patient monitoring.

Children with Special Needs Center (CSN) face challenges when it comes to managing the database of their clients served because they do not have a system for their database to sort the child information and they are using Excel application which is time consuming and hard to navigate when finding the information that they need. The researchers aim to develop an Appointment and Monitoring System for the CSN Center which has a significant factor for clear and accurate management of the database as well as appointment scheduling and monitoring.

### Theoretical Framework

An improved technology system can significantly enhance the overall therapy experience at the center in various ways. The Appointment and Monitoring System is one aspect in which technology can play a transformative role. With the continuous improvement of the system for managing a child's appointment and monitoring the child's progress, it can be accomplished much faster.

This study utilizes the Unified Theory of Acceptance and Use of Technology (UTAUT) model introduced by Venkatesh et al. (2003). The UTAUT concept framework serves as an effective tool for assessing the adoption and utilization of emerging technologies. Researchers examine the connections between four key determinants of intention and usage: (i) performance expectancy, (ii) effort expectancy, (iii) social influence, and (iv) facilitating conditions, along with four moderating factors: (i) gender, (ii) age, (iii) experience, and (iv) voluntariness of use (Venkatesh et al., 2003). Utilizing



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the UTAUT framework, the research title Optimizing Accessibility and Care Coordination for Children with Special Needs through a Comprehensive Appointment and Monitoring System in Children with Special Needs Center Parañaque City clarifies the elements influencing the acceptance and utilization of the system by various stakeholders, including employees, parent or guardian of the kids, and administration officers.

According to UTAUT, there are four key components that define a user's intention to utilize a technology:

**Performance Expectancy:** This component assesses the degree to which individuals feel that using the system enhances their performance and aids them in achieving their desired outcomes. For example, guardians may find the system useful for viewing accurate therapy schedules, while administration officers may appreciate its ease of database management.

**Effort Expectancy:** This component relates to how user-friendly and straightforward the system is thought to be. Stakeholders can evaluate the system's ease of use, intuitiveness, and low effort requirements. Acceptance and adoption of the system may be hampered if it is thought to be complicated or challenging to use.

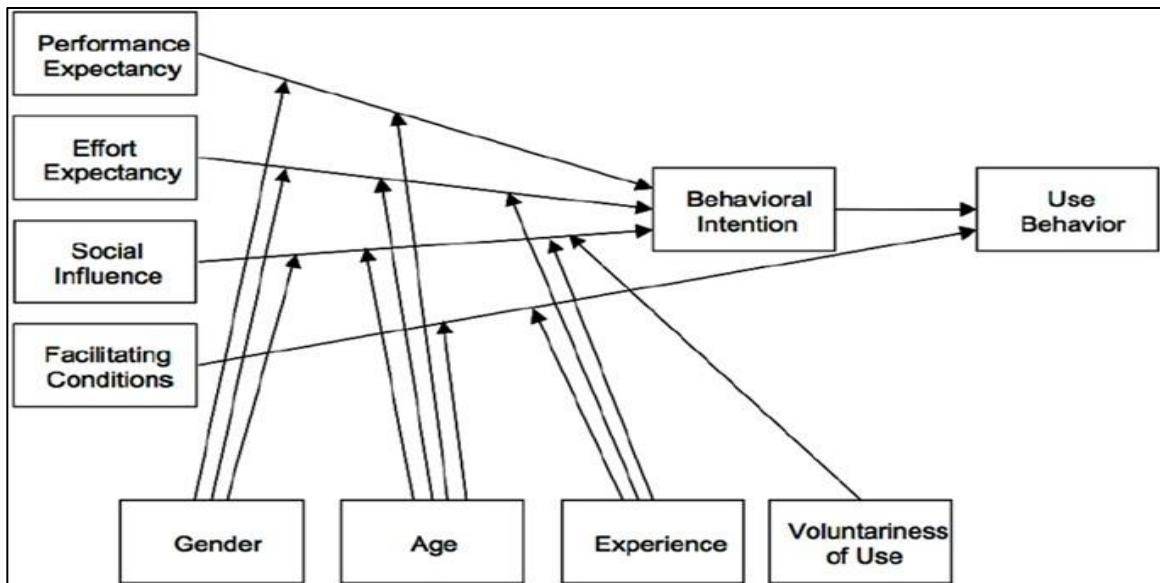
**Social Influence:** This component considers how people's acceptance and use of the system are influenced by social norms and peer pressure. For instance, if administration officers see their colleagues using and benefiting from the system, it may positively affect their own adoption and use.

**Facilitating Conditions:** This component deals with the infrastructure, support, and resource availability required for system deployment and use. Stakeholders can assess if the CSN Center Parañaque is equipped with the tools required, including phones, laptops, and other gadgets.



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**Figure 1. Unified Theory of Acceptance and Use of Technology**



The researchers' examination of the variables affecting the adoption and usage of the suggested Automated Appointment and Monitoring System was guided by the UTAUT model. It is possible to determine how users' gender, age, experience, and voluntariness influence the links between performance expectation, effort expectancy, social influence, and enabling circumstances and technology usage intentions. The aim of the research is to create and execute a solution that improves accuracy of managing the database and scheduled therapy sessions of the patient.

### **Conceptual Framework**

An Appointment and Monitoring System can create a solution that is responsive to user needs, adaptable to changing requirements, and increases service value incrementally throughout the development cycle. Ensuring that the development process becomes more efficient and effective over time. The development of an Appointment and Monitoring System leads to satisfaction in the CSN Center Parañaque.



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**Figure 2. Conceptual Framework**

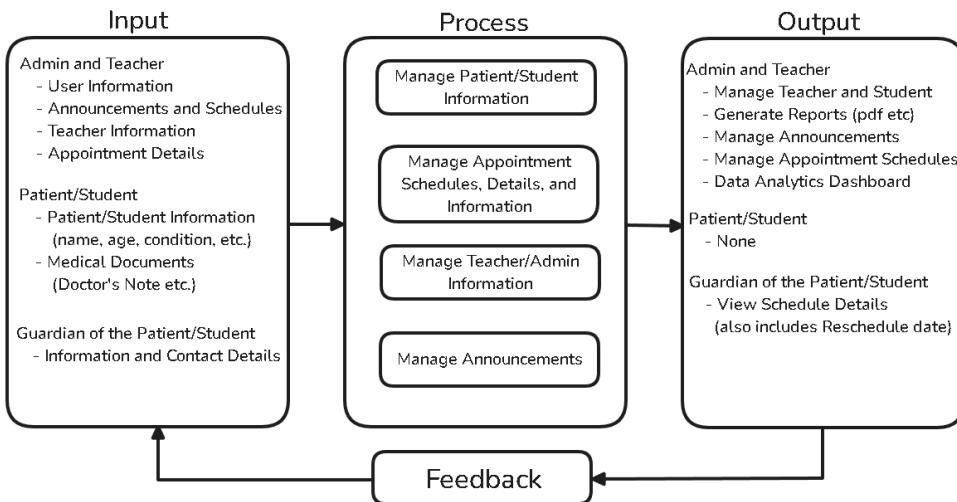


Figure 2 illustrates the Appointment and Monitoring System for Children with Special Needs, which has the potential to greatly enhance care coordination and improve overall efficiency in managing appointments and follow-ups. By automating these processes, the system reduces the manual effort required by caregivers and professionals, allowing them to focus more on the quality of care. This streamlining of tasks not only leads to cost savings but also ensures that services are delivered more effectively and consistently. Lastly, this benefits children with special needs by providing them with timely, well-coordinated care, which is crucial for their ongoing development and well-being.

### Statement of the Problem

The CSN Center Parañaque is currently facing significant challenges in efficiently managing and navigating their database, which hampers their ability to provide accurate and up-to-date information regarding therapy sessions to the guardians of children under their care. The absence of a dedicated system makes it difficult for the administration office to streamline processes, leading to potential



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delays and inaccuracies when scheduling and communicating therapy sessions.

Specific questions to be addressed:

1. To what extent does the current database management and scheduling system at CSN Center Parañaque meet the needs of accurately and efficiently managing therapy sessions?
2. What functionalities and features are essential for an effective Appointment and Monitoring System tailored to the specific needs of CSN Center Parañaque?
3. What strategies can ensure smooth implementation and effective user adoption of the new Appointment and Monitoring System by the administration and teachers?
  - What specific metrics and evaluation methods can be used to assess the smoothness of the system's implementation?
  - What indicators can be used to measure the level of user adoption by the administration and teachers?
  - How can the researchers differentiate between successful implementation and user adoption across different stakeholder groups (e.g., administrators, teachers)?

By addressing these research questions and successfully implementing a well-designed Appointment and Monitoring System, CSN Center Parañaque can overcome its current challenges and pave the way for a more efficient, accurate, and user-friendly environment. This research aims to improve the center's operations and provide valuable insights into the effective implementation of similar systems in other educational and therapeutic settings.



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### Objective

The researchers aim to design, develop and implement an efficient appointment and monitoring system for the Center Paranaque for Neuro-Divergent Children (CSN Paranaque) that streamlines the scheduling process, enhances tracking of student progress, and reduces administrative workload, ultimately improving the overall quality of care and education provided to the students.

### Specific Objectives

This research aims to develop and implement an Appointment and Monitoring System to address the current challenges at CSN Center Parañaque. The specific objectives focus on ensuring the system meets the center's needs, streamlines administrative processes, and enhances the quality of care for students.

1. To gather information through repeated interviews or meetings with the Center Administrator to ensure that the information is up-to-date and to inquire about additional needs in the system.
2. To design and develop an Appointment and Monitoring system based on the gathered information following the quality characteristics defined by ISO/IEC 25010 such as functionality, reliability, usability, efficiency, maintainability, portability, compatibility, and security.
3. To lessen the consumed time of the administration officers when navigating through their database compared when they are using Excel application.
4. To identify and apply specific metrics and evaluation methods used to assess the smoothness of the system's implementation within CSN Center Parañaque.
5. To establish indicators for measuring the level of user adoption by the



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administration and teachers, ensuring that the system is effectively utilized and integrated into daily operations.

6. To implement the system with CSN Parañaque Center, especially for admin and teachers.

### Scope and Limitations of the Study

The scope of this study encompasses the development, implementation, and evaluation of an Appointment and Monitoring System designed explicitly for the Center Parañaque for Neuro-Divergent Children (CSN Parañaque). This system aims to streamline appointment scheduling by offering a user-friendly interface, enabling staff to select convenient dates and times efficiently. In addition, the system includes a monitoring feature to track student attendance and progress, providing real-time data that facilitates informed decisions about the necessity of additional sessions or interventions. Key capabilities include identifying absentees, tracking session completions, and monitoring long-term improvements in student outcomes. The deployment phase ensures accessibility for all relevant staff and teachers, complemented by comprehensive training to promote effective system adoption.

Despite its intended benefits, this study acknowledges several limitations. The system's success heavily depends on the staff's readiness to integrate the technology into their routines, as highlighted by studies emphasizing user adaptation as a critical determinant of technological impact (Venkatesh et al., 2003; Pakpahan, 2024). Furthermore, consistent system usage may face hurdles due to varying levels of staff familiarity with digital tools. Challenges in training, ensuring consistent application across the center, and addressing technical issues such as maintenance and data accuracy may



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also arise, as supported by similar challenges documented in related implementations (Aida-Zade et al., 2024; Madrid & Cagadas, 2023).

Additionally, the scope of this study is confined to CSN Parañaque, with the system's usability and performance evaluated exclusively among its staff and educators. While these constraints may limit the generalizability of findings, the study provides a critical foundation for further exploration and adaptation in comparable settings. The integration of real-time data processing and monitoring aligns with global trends in healthcare and educational technology, promoting proactive care for children with special needs (Fadzil et al., 2021; Thanawala, 2023).

### Significance of the Study

The aim of this study is to implement a comprehensive Appointment and Monitoring System at the Center Paranaque for Neuro-Divergent Children (CSN Paranaque). This system aims to enhance appointment scheduling and monitoring processes, providing several key benefits to different groups:

1. **Administration Officers** – The implementation of this system assists administration officers by reducing the administrative burden associated with paperwork and scheduling. By automating these tasks, the system will make it easier for officers to manage their responsibilities and focus on providing better support to both staff and patients.
2. **Teachers** – The implementation of this system will empower teachers by providing them with a more organized and streamlined approach to managing student progress and scheduling appointments. With automated tools and easy



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access to relevant information, teachers can devote more time to personalized instruction and support, ultimately enhancing the educational experience for their students.

3. **Child** – The children receiving care will benefit from the system through more organized and timely appointments and progress monitoring. The system will ensure that their appointments are efficiently scheduled and that their progress is regularly reviewed, facilitating more effective interventions and enhancing the quality of care they receive.
4. **Future Researchers** – This research serve as a valuable resource for future studies in the field of information technology applications in healthcare and education. Future researchers can use this study as a reference to explore the impact of appointment and monitoring systems on institutional efficiency and patient care.



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### Definition of Terms

This section defines key terms used in the study to ensure clarity and consistency.

These definitions provide precise meanings relevant to the appointment and monitoring system for children with special needs.

**Automated** - Made automatic or controlled to operate without manual intervention.

**CSN** - Children with Special Needs.

**CSS** - Cascading Style Sheets; a language for styling and presenting documents written in markup languages.

**Decking** - The process of organizing and assembling medical information, charts, or visual aids into a structured format for case review or educational purposes.

**HTML** – Hyper Text Markup Language; used for creating and designing web pages.

**JavaScript** - A programming language essential for web development and interactive features on websites.

**Neuro-Divergent Children** - Children with neurological development that differs from typical patterns, such as autism, ADHD, or dyslexia, requiring specialized support.

**VS Code** - Visual Studio Code; a source-code editor developed by Microsoft for various operating systems, used primarily for programming.



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### Chapter 2

#### REVIEW OF LITERATURE AND STUDIES

In this chapter explores relevant topics and studies that support the development of the appointment and monitoring system for children with special needs. It identifies key insights, best practices, and gaps that influence the system's design and effectiveness.

#### Technical Background

The researchers aim to design, develop and implement an efficient appointment and monitoring system for the Center Paranaque for Neuro-Divergent Children (CSN Paranaque) that streamlines the scheduling process, enhances tracking of student progress, and reduces administrative workload, ultimately improving the overall quality of care and education provided to the students. The system is developed using JavaScript within the Node.js runtime due to its versatility, ease of integration with various APIs, and its robust library support for data management and automation tasks. MongoDB is chosen for managing appointment scheduling, student data, and progress tracking. It provides scalability and reliable data management to ensure the integrity of sensitive information. Express is employed as the web framework, enabling the development of a lightweight and modular application that efficiently handles user interactions and backend processes. This consists of the user interface, developed with HTML, CSS, and JavaScript, allowing administrators, teachers, and parents to interact with the system. The business logic, developed in JavaScript, handles appointment scheduling, notification dispatch, and data processing for monitoring student progress. MongoDB serves as the database layer for storing student records, appointments, and monitoring data. The system is developed using Visual Studio Code, chosen for its support of



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multiple languages and development tools, aiding in JavaScript programming and web development. Git is utilized for version control, ensuring that the development team can collaborate effectively and manage code revisions seamlessly. RESTful and Express APIs are utilized to enable communication between the front-end and back-end components of the system. These APIs facilitate efficient data transfer, allowing real-time updates to appointment scheduling and student progress monitoring. The development process follows Agile principles, enabling iterative development and continuous feedback from stakeholders. Although considered for its robust features, Express was selected for its flexibility and minimalistic design, which better suits the project's need for a lightweight and scalable system. Considered as an alternative to MongoDB was ultimately set aside due to the team's familiarity and preference for MongoDB's simplicity in handling structured data. All sensitive information, including student records and medical data, is securely encrypted both during transmission and storage using industry-standard encryption protocols. Role-based access control restricts access, ensuring that only authorized personnel can view or modify specific data. One challenge encountered was ensuring the system's scalability to handle a growing number of users and appointments. Load testing and database optimization strategies were implemented to mitigate performance bottlenecks. Integrating existing student data into the new system posed challenges related to data consistency and migration, requiring thorough validation and transformation processes. The selected technologies and architectural design align with the project's goals of improving accessibility, reducing administrative workload, and enhancing care coordination at CSN Paranaque. By leveraging JavaScript, Express, MongoDB, and modern development



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practices, the system ensures reliability, scalability, and security while providing a user-friendly interface for stakeholders.

### Challenges in Manual Tracking of Appointment and Monitoring

According to Pakpahan (2024), there are many drawbacks to manual attendance methods. They take up a lot of time that could be spent on instructional activities and are very prone to human mistake, which can jeopardize the integrity of the data. Furthermore, the handling and storing of physical records is laborious and inefficient, which raises questions about sustainability because of the overuse of paper. Moreover, maintaining accurate attendance records over the long term is significantly hampered by the possibility of paper records being lost or damaged. Currently, there are two ways to track attendance: manually entering data into spreadsheets or using paper-based systems. These approaches pose substantial obstacles for gathering data and creating reports that are clear and complete. Thus, the necessity for a more precise and effective attendance tracking system is evident.

In most firms according to Kose et al. (2021), managing field staff and their tasks is frequently challenging. In field sales and service industries, firms face challenges when it comes to sharing work plans with staff members because personnel are dispersed across various locations and own distinct geographic information. Geospatial data sometimes referred to as geodata or spatial data is any dataset that includes location-related information like a city, ZIP code, or address. Field sales and service organizations may monitor field workers' task performance, optimize resources, and boost customer interaction in various locations with the use of an efficient scheduling



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system that leverages geographic data. Because real-time monitoring and planning tools automatically generate improved schedules, they can also increase accountability and transparency.

According to Aida-zade et al. (2024), in order to create a class schedule "manually" it is first required to have experienced professionals with the necessary qualifications who have created schedules in a particular educational institution. It also takes a lot of time to prepare a huge quantity of input information and to monitor the final schedule. However, generally speaking, there is no assurance that the outcome is, if not ideal, then at least a workable answer. Automating this process is the answer to this issue. Numerous software programs have been created to help educational institutions schedule their classes. We won't go into them here, but the issue is that they're all made to fit into the conventional educational system's class schedule. In the same way that the credit education system is fundamentally different from the traditional one, so too do the ways in which the educational process is organized and, consequently, how classes are scheduled and what limitations are placed on it.

Aninon et al. (2020) stated that over time, there has been a significant transition in attendance tracking from manual techniques to technological integration. In an institution, manually tracking attendance takes time, is difficult to manage, prone to human error, and can result in lost or missing records. People also frequently exploit the shortcomings of the manual technique, which encourages them to commit forgeries and hoaxes. Barcodes, RFID technologies, and biometric recognition systems all have drawbacks despite the advancements in automated systems.



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According to Fuentes et al. (2021), long wait times, especially in the outpatient department, are a prevalent issue in many hospitals, causing congestion in the waiting room. This is a result of patients following the custom of falling in line. Furthermore, there was a possibility that the doctor was running late and that some consultations took longer than others. Patients find that this takes up a lot of their time, which is why the majority of them attend early in the morning on the belief that their appointment would be completed more quickly. Congestion arises as a result of this even before the service hour begins.

Benitez et al. (2022) stated that due to manual record searching, each transaction completed by the patients would take several minutes. This is inconvenient and a waste of time for the patients as well as the *barangay* health workers. Sometimes the patient's file gets lost in different cabinets. Duplication of patient records is another issue the health center deals with, requiring more room in its storage cabinets. Since their inventory system is primarily manual and there is no monitoring system for their pharmaceutical supply, the *barangay* health workers probably don't keep an eye on their supplies because it's difficult for them to determine which medications have too many or too little stocks.

### **Process in Tracking Appointment and Monitoring**

Gashumba and Wilson (2024) studied the reasons behind, advantages of, and difficulties with parental and school monitoring policies, taking into account things like student autonomy, parental engagement, and privacy issues. The primary goal of the research is to comprehend how parent and school collaboration can improve student



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achievement and the quality of education by implementing a tracking system. The goal of the project is to improve the relationship between parents and the school by examining the effects of parental tracking and creating a more encouraging and involved learning environment. For a thorough grasp of the dynamics and impacts of the tracking system, the methodology used qualitative data collecting techniques including observations and interviews.

Caras and Reyes (2023) stated that RFID technology's rising popularity can be attributed in large part to the advancement of wireless technology. For RFID to reach its full potential, wireless technology was a necessary precondition. The last twenty years have seen a sharp increase in this technology. Two essential needs for modern businesses are high system efficiency and data integrity. This technology can be used in schools, higher education, package processing, courier services, tracking cars and freight, and more.

Amado et al. (2020) developed a monitoring and correction system to optimize the aquaculture environment for fish growth. Their controlled system resulted in a higher growth and survival rate of Nile Tilapia compared to traditional aquaculture methods. Future research could explore applying this approach to other aquatic species across various aquaculture systems. Additionally, implementing an automatic feeding system is recommended to maintain water quality by minimizing leftover feed, as it dispenses small amounts of food at scheduled intervals.



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Almirol et al. stated that automated data processing was performed on the DDC (DOH DataCollect) system-gathered data, which included deduplication and merging of variables recorded in the National Health Facility Registry, including ownership, number of beds, geographic information, and facility service capabilities. Following data analysis, comprehensive internal reports were produced, including weekly health facility capacity reports. These reports were shared with the Department of Health executive, technical, and regional offices, as well as other national government agencies, in order to aid in policy and decision-making. Additionally, the data were accessible via the DOH's open-access DataDrop database, which had dashboards for both internal and external users. These dashboards were utilized to generate public information for the official COVID-19 bulletin and reports for the nation.

According to Attos et al. (2020), the level of the trash in the drainage was measured using ultrasonic sensors, which provided the input data. After that, the web application received these data for visualization. The registered user received a notification notifying them of the waste level's current condition in real time. A strainer was also employed as a stopper for the collected trash in the drainage system. In order to compare the detected levels of water and trash, this strainer was placed in the center of the manhole. Additionally, to detect the garbage level and act as a comparison sensor, ultrasonic sensors were attached on the top and back of the strainer, respectively.

Batoon & Piad (2023) stated that the designed system is an all-inclusive approach that includes common immunizations that may be obtained via neighborhood



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health facilities. The system allows people to book appointments online, significantly reducing the time needed to check vaccine availability. Registered users receive important bulletins and immunization schedule alerts. Geotagging simplifies tracking of vaccination data and individuals who have been immunized. Additionally, other local government agencies offering similar services benefited from the study, as the system can be adapted to meet their specific requirements.

### **Effectiveness of the Appointment and Monitoring System**

According to Ahmadian et al. (2022), the most popular and well-liked appointment scheduling options for patients and their companions are the web-based application and Interactive voice response. The participant's level of satisfaction with these systems was moderate, notwithstanding the infrastructure's availability, because of their shortcomings. Thus, in order to improve system efficiency and boost patient or caregiver satisfaction, healthcare authorities should have a plan in place to address systemic issues and leverage information resources to educate the public about their systems.

Beredjiklian et al. (2022) stated that online scheduling solutions should be used by more orthopedic practices to make patient appointments. There were notable differences in patient no-show rates based on the various subspecialties within the orthopedic practice. Online scheduling also relieves office staff of some of their workload and promotes greater patient autonomy. There are benefits to converting to a newer online-scheduling system, but more practices should employ one in order to acquire more data for comparisons to previous traditionally planned systems.



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According to Li et al. (2020), In Guangzhou, China, Hospital S is a third-class stomatologic hospital. Patients have challenges with registration and lengthy wait times as a result of the high volume of outpatients and lengthy dental consultations. This article analyzes Hospital S's current issues and presents its active use of the AI Guidance System to optimize the appointment registration process and other related measures. It uses Hospital S as a case study and its outpatient appointment registration situation from November 2018 to November 2019. It is anticipated that the implementation outcomes served as a guide for Chinese medical institutions' appointment registration model.

After considering all the studies Armada & Punzalan (2021) concluded that the residents had to spend less time filing complaints, receive a prompt response for their confrontation schedule assessment and notification immediately after one was set, monitor the status of their complaints, and have an easy way to send their concerns directly to the barangay officials so that they could be fully addressed. and officials managed the distribution of the confrontation schedule for each complaint, organized each file according on its status, and used the application's full calendar capability to see the times and dates that they could accommodate confrontations.

According to Anunciacion et al. (2023), due to the fact that all client data can be tracked and stored through the system, the designed healthcare records management system is more appropriate for clients and medical personnel than the conventional pen and paper method. Additionally, it decreased the difficulties that the medical staff had setting up appointments and keeping track of their customers' records, which allowed



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them to work more effectively when reviewing the records of their patients. As a result, the healthcare record and appointment management system that was built allowed the patients and medical personnel to handle record keeping and scheduling.

### Synthesis of Related Literature and Studies

The literature reviewed in this chapter covers various aspects of appointment scheduling, monitoring systems, and accessibility for children with special needs. The synthesis of these studies highlights both the strengths and limitations of current systems, providing a foundation for the development of a comprehensive monitoring and appointment solution.

Gao et al. (2023) explained that healthcare encompasses a broad range of services aimed at promoting, maintaining, monitoring, and restoring health for individuals or communities through the expertise of healthcare professionals and services, extending beyond just medical care. In recent decades, the healthcare system has expanded significantly but now faces challenges such as rising costs, an aging population, increased public awareness of health issues, and a growing demand for high-quality care. Many countries are experiencing both population growth and aging, leading to an oversupply of medical professionals, unequal resource distribution, and inefficiencies. This highlights the profound impact of the healthcare system on the economic stability and prosperity of cities worldwide.

Ismail et al. (2020) stated that recent advancements in ECG (Electrocardiogram) monitoring systems have integrated emerging technologies such as deep learning,



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artificial intelligence, big data, and the Internet of Things, resulting in a highly efficient, cost-effective, and interconnected system. These enabling technologies present significant opportunities for the further development of ECG monitoring systems. The Internet of Things (IoT) offers services that use data to make timely, important, and relevant decisions for better living. It also comes with unrestricted, remote access. Moreover, fog and cloud processing improve efficiency and enable scalable application services to meet growing demands. Additionally, blockchain technology enhances security in a distributed environment, ensuring secure transactions across multiple layers of the ECG monitoring system architecture.

Huda et al. (2020) concluded that accessibility refers to the convenience provided to children with special needs by providing or altering everyday resources and facilities, such as the physical environment, to meet their needs and conditions. This allows the children to participate in daily activities independently. An adaptation of the architectural design to the physical environment is known as physical accessibility, and it is a component of overall accessibility for children with special needs that allow them to utilize all of the amenities. In order to give people with disabilities equal opportunities in all spheres of life and to live in society at large, physical accessibility is a critical component in promoting their independence.

In comparing these studies, it becomes clear that while there are successful models for both appointments scheduling and monitoring, there is a lack of integrated systems that combine these functions while also being fully accessible. Most existing solutions excel in one area but fall short in others. For example, an appointment system



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might be highly efficient but does not offer the real-time monitoring needed by caregivers of special needs children, or a monitoring system might be comprehensive but difficult for parents to use due to complex interfaces.

The gaps identified in the literature indicate a need for a unified system that not only schedules appointments and tracks progress but also prioritizes accessibility and ease of use for caregivers and children with special needs. This project aims to address these gaps by developing a platform that integrates both monitoring and appointment scheduling functionalities while ensuring that it is user-friendly and accessible to all.

In conclusion, the existing literature provides valuable insights into the design and functionality of scheduling and monitoring systems. However, the need for an integrated, accessible solution specifically tailored to children with special needs remains unmet. This project builds upon these findings to create a system that bridges the identified gaps, ultimately enhancing the quality of care and support for special needs children and their families.



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### Chapter 3

#### Research Methodology

This chapter deals with the methodology of the study. It covers research design, source of data, research instrument, ethical consideration, data gathering procedure, population, sample size and population technique, data analysis plan, software development methodology, initial planning, design stage, development, testing, development stage, review stage, implementation plan, system architecture and design, system requirements, and system costing table.

#### Research Design

This study uses a mixed-methods approach to gather comprehensive insights from staff and teachers at the Center Paranaque for Neuro-Divergent Children (CSN Paranaque). In-depth, semi-structured interviews explore their experiences with the appointment and monitoring system, focusing on current processes, perceived benefits, and challenges faced. These interviews are recorded, transcribed, and analyzed to identify key patterns. Additionally, quantitative data is gathered through surveys and system usage metrics to assess the system's effectiveness and efficiency. The combination of qualitative and quantitative data helps refine the system to better address the center's needs, improving its overall effectiveness.

In the post-implementation phase, respondents assess the automated reporting system according to the ISO/IEC 25010 quality characteristics after its deployment, which includes:



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1. Functionality: Completeness of functions, accuracy, and suitability.
2. Performance Efficiency: Speed of operation, resource consumption, and scalability.
3. Usability: Ease of learning, prevention of user errors, and visual appeal of the user interface.
4. Security: Protection of confidentiality, assurance of data integrity, and prevention of denial of service.

Respondents consist of 11 IT experts, 2 admission service department, 1 admin service department and 6 teachers who participate in the evaluation to ensure the system is assessed from the technical, administrative, and user perspectives. They provide critical feedback to confirm the system's effectiveness and quality in meeting the appointment and monitoring requirements.

### **Source of Data**

The primary source of the data gathered focuses only on one group:

**CSN Administration Officer and Teachers:** Interviews were conducted with key administration officer and teachers at the Center Paranaque for Neuro-Divergent Children. These interviews aimed at understanding their current methods of handling and monitoring students, as well as to evaluate how the proposed appointment and monitoring system might enhance process efficiency and care coordination.

### **Research Instrument**

To evaluate the effectiveness and performance of the developed appointment and monitoring system for children with special needs, system logs and performance



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monitoring tools were used as the primary research instruments. These instruments facilitated the collection of quantitative data on system performance and usage, essential for assessing key quality characteristics aligned with ISO/IEC 25010, including reliability, efficiency, and usability. System logs automatically recorded user interactions, such as appointment scheduling, updates to student progress records, and login activities. The logs were instrumental in monitoring user behavior and identifying potential system issues. The accuracy of these logs was verified by manually cross-checking a subset of recorded activities with real-time system interactions, ensuring the reliability of the data. Data collection was automated during system operation, and the logs were securely stored on a server, accessible only to the development team for analysis. In adherence to ISO/IEC 25010, the system emphasized compliance with security and privacy standards. All user data collected through system logs was anonymized, with no personally identifiable information included, and stored securely in compliance with data protection laws. This approach ensured that the system met the standard's quality attributes, supporting its reliability and maintaining user trust.

### Ethical Considerations

Throughout the research process, strict adherence to ethical guidelines was assured to protect the rights and privacy of all participants. A formal letter was sent to the primary beneficiary, aligning with the provisions of Republic Act 10173 – Data Privacy Act of 2012, to explain the study's objectives and outline how collected data would be handled.



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During data gathering through interviews and surveys, the letter emphasized that participation was entirely voluntary. It assured all participants of the confidentiality of any information shared and explicitly stated that their identities would be protected throughout the study.

All data gathered was anonymized and used strictly for research purposes. Security measures were implemented to ensure that sensitive information remained private and accessible only to authorized members of the research team.

### Data Gathering Procedure

In this study, the data collection process involved two phases: data gathering prior to the development of the Appointment and Monitoring System and data collection following its implementation at CSN Parañaque.

The initial phase involved conducting in-depth interviews with the center's administrators, staff, and teachers to identify existing challenges with the manual appointment and monitoring processes. These interviews were semi-structured and scheduled in advance to allow participants to share their insights comprehensively. A purposive sampling technique was used to ensure feedback from individuals directly involved in scheduling and monitoring processes. Additionally, interviews with key stakeholders such as the center administrator were conducted to gather recommendations for system requirements and features.

Following the system's deployment, a second phase of data collection was carried out to evaluate its effectiveness. This post-implementation phase utilized surveys based on the ISO/IEC 25010 quality standards, assessing the system's functionality,



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performance efficiency, usability, reliability, security, maintainability, and portability. Feedback from administrators, staff, and teachers was collected to measure satisfaction with the system and its impact on administrative efficiency and care coordination.

This two-phase approach was designed to gather comprehensive insights during both the development and evaluation stages, ensuring that the system addressed the identified challenges and met the technical and operational needs of the center.

### Population, Sample Size and Sampling Technique

This study applied purposive sampling technique also referred to as judgmental or expert sampling (Bisht, 2024). This technique allowed the researchers get necessary insights specifically from participants who possessed relevant expertise and experience in scheduling and monitoring appointments.

Two (2) Admission Services Department, (1) Admin Service Department and (6) selected teacher from the center and Ten (11) selected IT experts and professionals – with a total of 20 respondents. The description of respondents provided the researchers with an understanding of their perspectives on the proposed system are among the primary focus of this study.

**Table 1. Distribution of the Respondents by Employee Category**

Category	Frequency
Admission Service Department	2
Admin Service Department	1
Teacher	8
IT Professionals/System Administrators	11



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Total	20
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Table 1 shows the distribution of respondents in four categories: admission service department, admin service department, teacher and IT Professionals. The IT Professionals/System administrators have the most respondents as they providing necessary feedback to evaluate the technical aspects of the proposed system.

### Data Analysis Plan

Data analysis is a structured approach that entails reviewing, cleaning, transforming, and modeling data to derive meaningful insights and facilitate decision-making. The system's development was informed by insights obtained during the evaluation stage to ensure it aligned with the users' requirements and expectations. In this part, data collected from the administrator, admin staff, and teachers were analyzed to identify common patterns, challenges, and areas for improvement.

The data gathered from the evaluation survey is analyzed using the weighted average mean based on the Likert scale. The mean score is calculated using the following formula:

**Figure 1. Mean Formula**

$$\bar{x} = \frac{\sum x_i}{n}$$

where:

- $\bar{x}$  = Mean score



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- $x_i$  = Represents individual response score
- $n$  = is the number of responses.

**Table 2. Likert Scale**

Rating	Mean Range	Verbal Interpretation
5	4.21 - 5.00	Strongly Agree
4	3.31 - 4.20	Agree
3	2.61 - 3.30	Neutral
2	1.81 - 2.60	Disagree
1	1.00 - 1.80	Strongly Disagree

### System Architecture and Design

During the development process of the Appointment and Monitoring System, the researchers carefully considered the system's architecture and design to enhance its functionality, scalability, and usability. The architecture describes the comprehensive framework of the system, encompassing its modules, components, and the interactions among these elements. The main modules consist of the Appointment Management Module, Progress Monitoring Module, and User Management Module. These modules communicate through RESTful APIs, enabling secure and seamless data exchange between the system components (Gashumba & Wilson, 2024).

In the design stage, a software blueprint served as the foundational reference for system development. The blueprint included tools such as flowcharts and diagrams to map system workflows and data relationships. Use Case Diagrams, Data Flow Diagrams (DFDs) and Entity-Relationship Diagrams (ERDs) were utilized to plan the system's logic



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and database structure efficiently. This systematic approach minimized errors and ensured alignment with the system's requirements (Pakpahan, 2024).

User Interface (UI) Design focused on creating a visually engaging and intuitive experience. The system incorporated feedback from users, including administrators, teachers, and caregivers, to ensure the interface was both functional and accessible. Features such as simple navigation, clear visuals, and mobile-friendly layouts were prioritized to enhance usability. Research supports that a well-designed UI improves user satisfaction and supports seamless adoption of new technologies (Huda et al., 2020).

The design process also included usability testing with administrators and teachers at CSN Parañaque, enabling the identification of potential issues. Adjustments based on user feedback ensured that the system aligned with its goals of efficiency and accessibility. By addressing the needs of target users and incorporating real-time feedback, the system guarantees a positive user experience that supports the effective delivery of care and education for children with special needs (Fadzil et al., 2021).

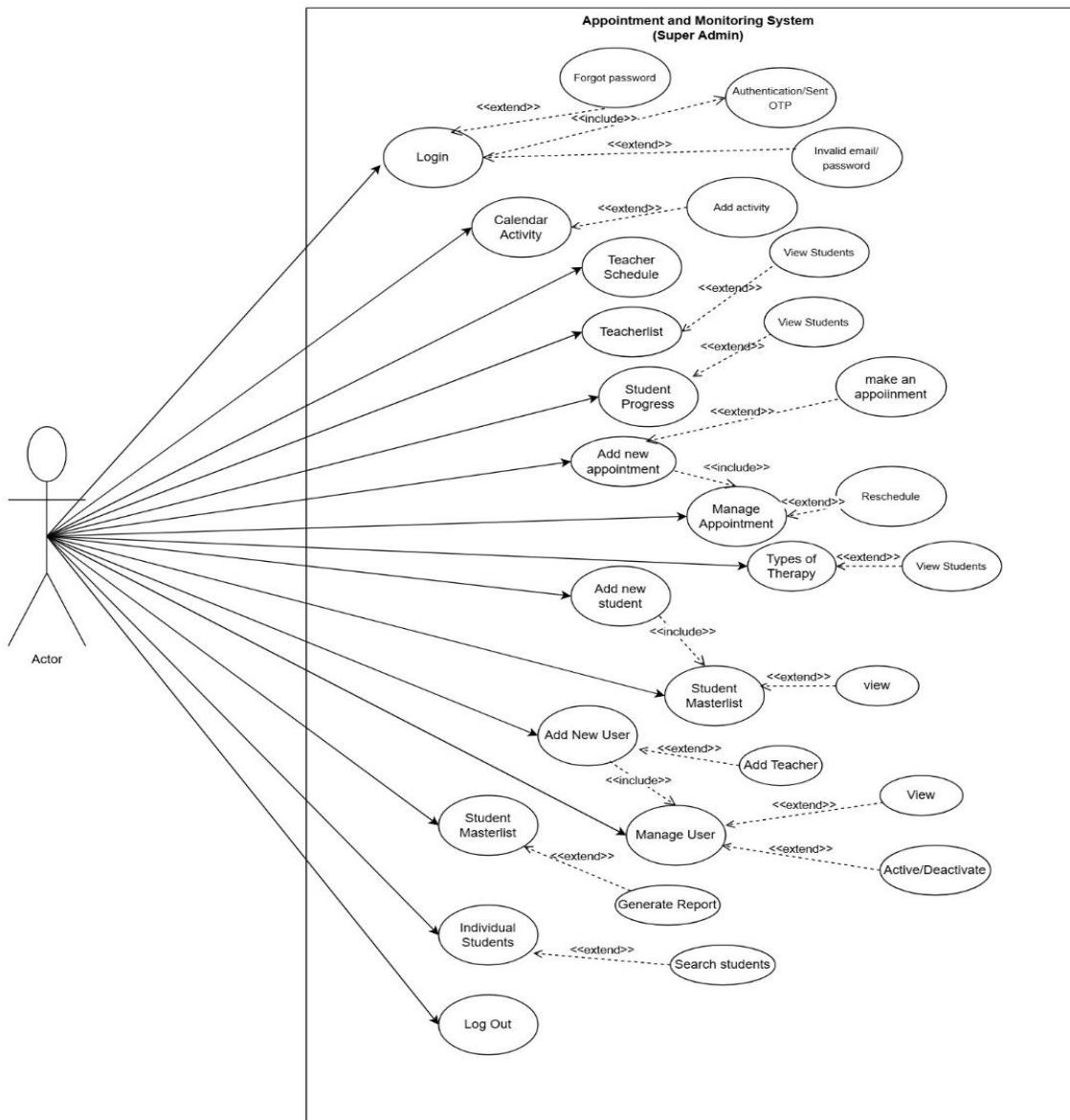
### Use Case Diagram

A use case diagram illustrates how the system connects with users and other entities by outlining different scenarios. It provides a clear view of the system's functionalities and the ways people interact with it.



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Figure 4. Admin Use Case Diagram

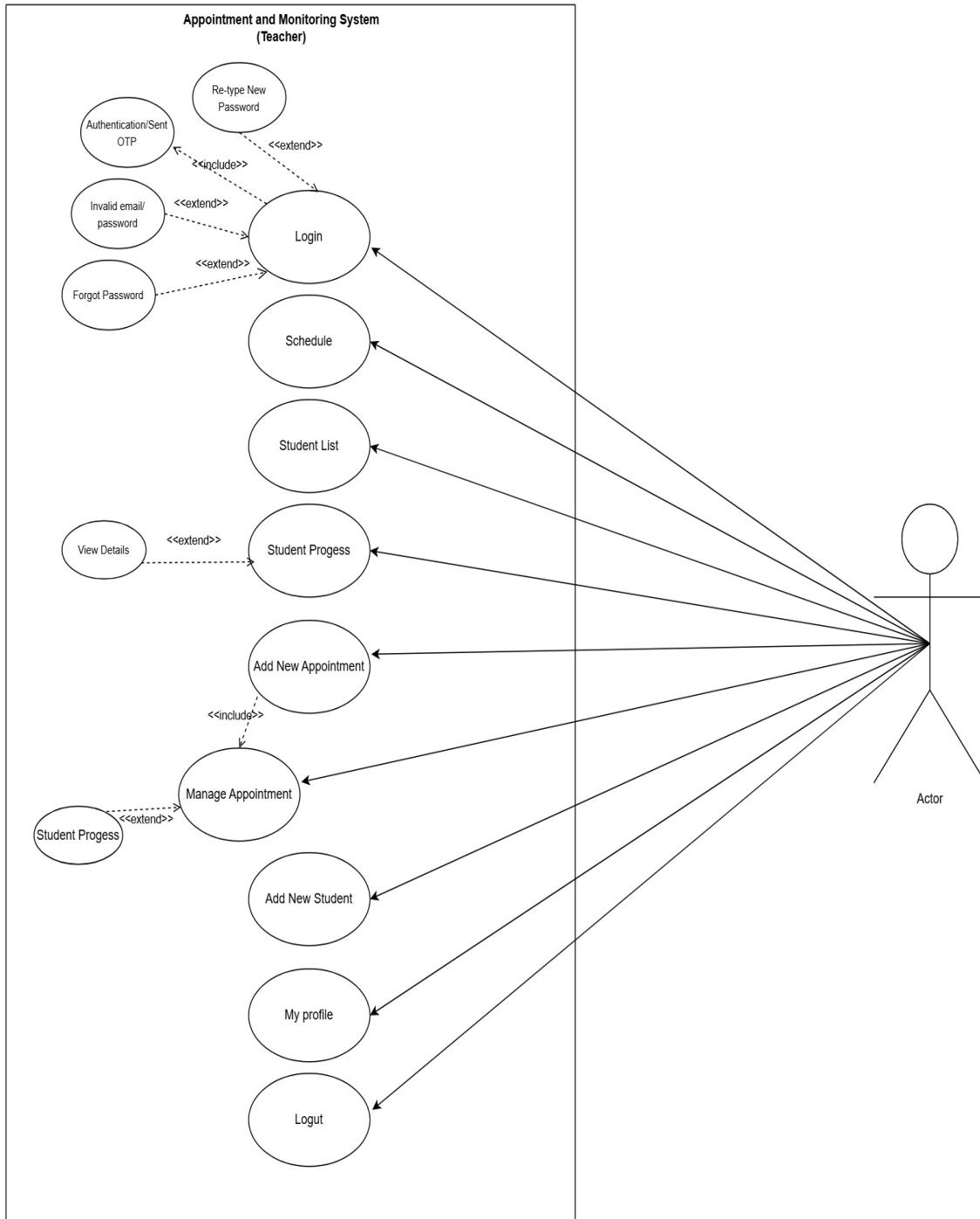


This diagram shows the interaction between Admin and the System



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**Figure 5. Teacher Use Case Diagram**

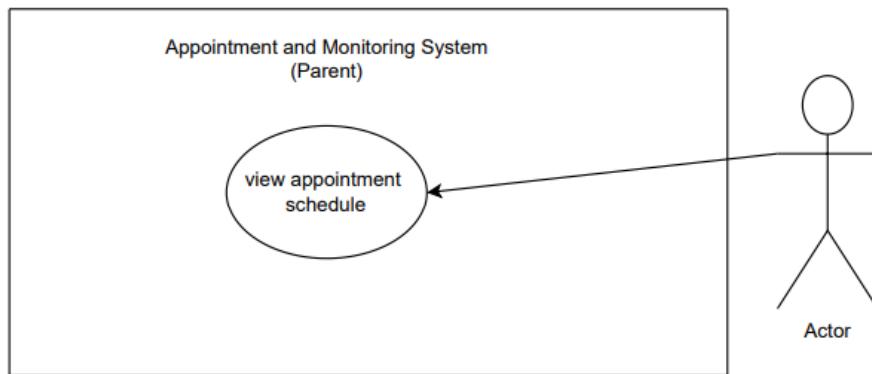


This diagram shows the interaction between the Teacher and the System



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**Figure 6. Parent Use Case Diagram**



This diagram shows the interaction between the student's parent and the system.

### Use Case Description

A use case description provides an overview of how users interact with a system or website to achieve specific goals. It explains the system's behavior in response to user requests, offering insights into the user's perspective and how their objectives are accomplished.

**Table 3. Use Case Description: Admin Login**

<b>Use Case:</b>	Admin login	
<b>Scenario:</b>	Logging in as an admin in the system.	
<b>Triggering Event:</b>	Admin attempts to log in to the system.	
<b>Brief Description:</b>	Admin logs in to the system using the username and password provided.	
<b>Actors:</b>	Admin	
<b>Stakeholders:</b>	Administration Officer	
<b>Preconditions:</b>	Admin must have a valid username and password.	
<b>Postconditions:</b>	Admin successfully logs into the system and gains access to the entire system.	
<b>Flow of Activities:</b>	<b>Actor</b>	<b>System</b>
	1. Admin inputs his/her login credentials. 2. Admin gains access to the entire system	1. The system validates the login credentials. 2. The system checks all modules that are accessible for Admin.
<b>Exception Conditions:</b>	Incorrect username or password: The system prompts the admin to retry.	



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**Table 4. Use Case Description: Admin User Management**

<b>Use Case:</b>	Admin User Management	
<b>Scenario:</b>	Add user as an admin in the system	
<b>Triggering Event:</b>	Admin clicks the “add new user” button.	
<b>Brief Description:</b>	The admin accesses the system to manage users by adding new user details, including hire date, name, email, and password. The system verifies if the email is already in use. Once successfully added, the admin can manage users by activating/deactivating accounts, viewing user profiles, or searching for usernames. Updates and actions are reflected in the system promptly.	
<b>Actors:</b>	Admin	
<b>Stakeholders:</b>	Administration Officer, Teacher	
<b>Preconditions:</b>	The admin must have the necessary permissions and access rights to manage users.	
<b>Postconditions:</b>	The admin successfully adds, activates, deactivates, or views users, and the updated user information is saved in the system.	
<b>Flow of Activities:</b>	<b>Actor</b>	<b>System</b>
	1. Admin adds a new user by entering details such as the hire date, full name, email, and password. 2. Admin manages users by activating or deactivating their status.	1. The system verifies if the email is already in use. 2. The system saves the user details after successful validation. 3. The system updates the user's status upon activation or deactivation.
<b>Exception Conditions:</b>	1. Email already in use: The system displays an error message and prevents adding the user. 2. Failed status update: The system notifies the admin of an unsuccessful status change.	



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**Table 5. Use Case Description: Admin Student Management**

<b>Use Case:</b>	Admin Student Management	
<b>Scenario:</b>	Adding a new student to the system	
<b>Triggering Event:</b>	Admin clicks the "add new student" button	
<b>Brief Description:</b>	The admin adds a new student by filling in the required information, such as intake date, child details, family information, education, and health details. The system then updates the student master list, allowing the admin to view or search for the added student.	
<b>Actors:</b>	Admin	
<b>Stakeholders:</b>	Administration Officer, Guardian	
<b>Preconditions:</b>	The admin must have the necessary permissions and access rights to manage student information.	
<b>Postconditions:</b>	The admin successfully adds a new student, and the student information is saved in the system's master list.	
<b>Flow of Activities:</b>	<b>Actor</b>	<b>System</b>
	1. Admin fills in intake date, child information, family information, child education, and health information.	1. The system verifies if the student is successfully added. 2. The system updates the student master list and displays the student information when viewed or searched.
<b>Exception Conditions:</b>	If the intake date or mandatory information is incomplete, the system prompts the admin to provide the missing details.	

**Table 6. Use Case Description: Admin Student Appointment**

<b>Use Case:</b>	Admin Student Appointment	
<b>Scenario:</b>	Adding a new appointment to the system	
<b>Triggering Event:</b>	The admin clicks the "Add new appointment" button.	
<b>Brief Description:</b>	The admin schedules a student appointment by entering the date, time, therapy session, category, and selecting a teacher. The system updates the appointment list, allowing the admin to reschedule or search for appointments.	
<b>Actors:</b>	Admin	
<b>Stakeholders:</b>	Administration Officer, Guardian, Teacher	
<b>Preconditions:</b>	The admin must have the necessary permissions and access rights to manage student appointments.	



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<b>Postconditions:</b>	The admin successfully schedules a student appointment, and the appointment details are saved in the system.	
<b>Flow of Activities:</b>	<b>Actor</b>	<b>System</b>
	1. Admin enters the date of appointment, time, therapy session, category, and selects the teacher. 2 Admin manages appointments by rescheduling or searching for specific appointments.	1. The system saves the student information and updates the master list. 2. The system displays the student's details when viewed or searched.
<b>Exception Conditions:</b>	If required fields like intake date or child details are incomplete, the system prompts the admin to fill in the missing information.	

**Table 7. Use Case Description: Teacher Login**

<b>Use Case:</b>	Teacher login	
<b>Scenario:</b>	The teacher inputs their username and password.	
<b>Triggering Event:</b>	The teacher enters their username and password to log in to the system.	
<b>Brief Description:</b>	The teacher logs in to the system using their username and password.	
<b>Actors:</b>	Teacher	
<b>Stakeholders:</b>	Teacher	
<b>Preconditions:</b>	The teacher must have a valid username and password.	
<b>Postconditions:</b>	The teacher successfully logs in and is redirected to update their password as mandated by the system.	
<b>Flow of Activities:</b>	<b>Actor</b>	<b>System</b>
	1. Teacher enters their username and password. 2. Teacher is prompted to update their password upon successful login.	1. The system validates the teacher's login credentials. 2. The system forces the teacher to change their password if the login is successful.
<b>Exception Conditions:</b>	Incorrect username or password: The system denies access and prompts the teacher to re-enter the credentials.	



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**Table 8. Use Case Description: Teacher Student Appointment**

<b>Use Case:</b>	Teacher Student Appointment	
<b>Scenario:</b>	Adding a New Appointment to the System	
<b>Triggering Event:</b>	The teacher initiates the process by selecting "Add New Appointment" in the system.	
<b>Brief Description:</b>	The teacher schedules a student appointment by entering the date, time, therapy session, category, and selecting a teacher. The system confirms the appointment and allows the teacher to reschedule or search for appointments as needed.	
<b>Actors:</b>	Teacher	
<b>Stakeholders:</b>	Teacher, Guardian, Administration Officer	
<b>Preconditions:</b>	The teacher must have the necessary permissions and access rights to create and manage student appointments.	
<b>Postconditions:</b>	The teacher successfully schedules a student appointment, and the appointment details are saved in the system.	
<b>Flow of Activities:</b>	<b>Actor</b>	<b>System</b>
	1.Teacher enters the date of appointment, time, therapy session, category, and selects the teacher. 2.Teacher manages appointments by rescheduling or searching for specific appointments.	1.The system saves the appointment details and updates the master list. 2.The system displays the appointment details when viewed or searched.
<b>Exception Conditions:</b>	If required fields like date, time, session type, category, or teacher selection are incomplete, the system prompts the teacher to fill in the missing information.	

**Table 9: Use Case Description: Teacher Student Management**

<b>Use Case:</b>	Teacher Student Management	
<b>Scenario:</b>	Adding a New Student to the System	
<b>Triggering Event:</b>	The teacher clicks the "Add New Student" button.	
<b>Brief Description:</b>	The teacher adds a new student by entering the intake date, child information, family details, child education, and health information. The system saves the student details for future management.	
<b>Actors:</b>	Teacher	
<b>Stakeholders:</b>	Teacher, Guardian, Administration Officer	
<b>Preconditions:</b>	The teacher must have the necessary permissions and access rights to add and manage student information.	
<b>Postconditions:</b>	The teacher successfully adds a new student, and the student details are saved in the system.	



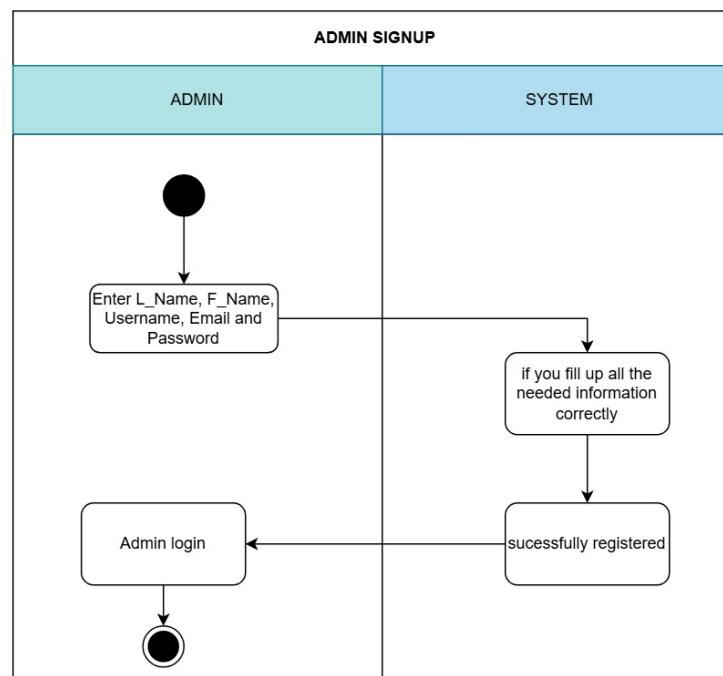
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Flow of Activities:	Actor	System
	1. Teacher submits the student information for saving. 2. Teacher manages student records by updating or searching for specific student information.	1. The system saves the student information and updates the master list. 2. The system displays the student's details when searched or viewed.
<b>Exception Conditions:</b>	If required fields like intake date, child information, family details, or health information are incomplete, the system prompts the teacher to fill in the missing information.	

### Activity Diagram

An activity diagram is an illustration used in system modeling to show how processes or activities move through a system. It shows how tasks are carried out and how they interact with one another, giving a clear and visual representation of the decisions, actions, and workflows.

**Figure 7. Activity Diagram: Admin Signup**

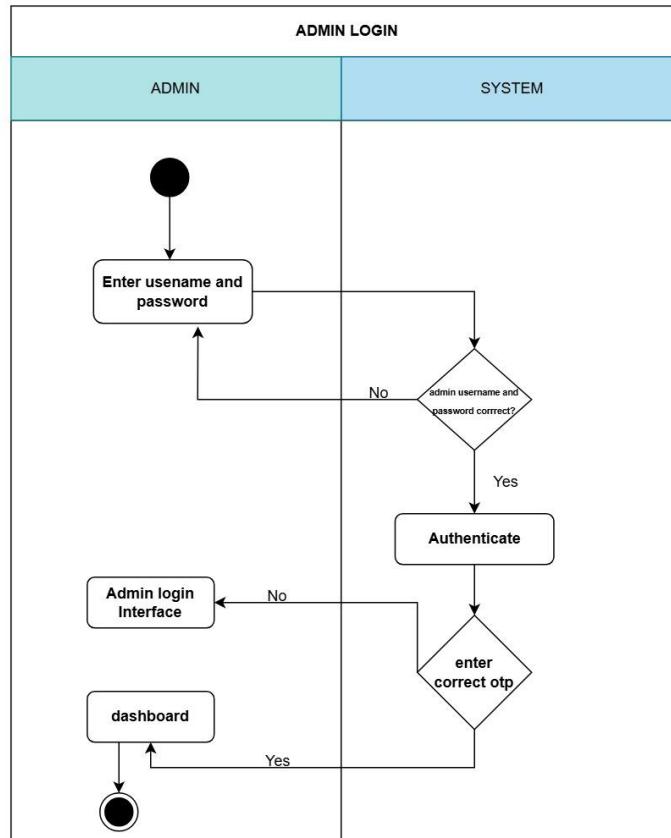




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This figure illustrates the flow on how to sign up an admin account. The admin enters all the information needed, and if the information entered is correct, the registration is successful.

**Figure 8. Activity Diagram: Admin Login**



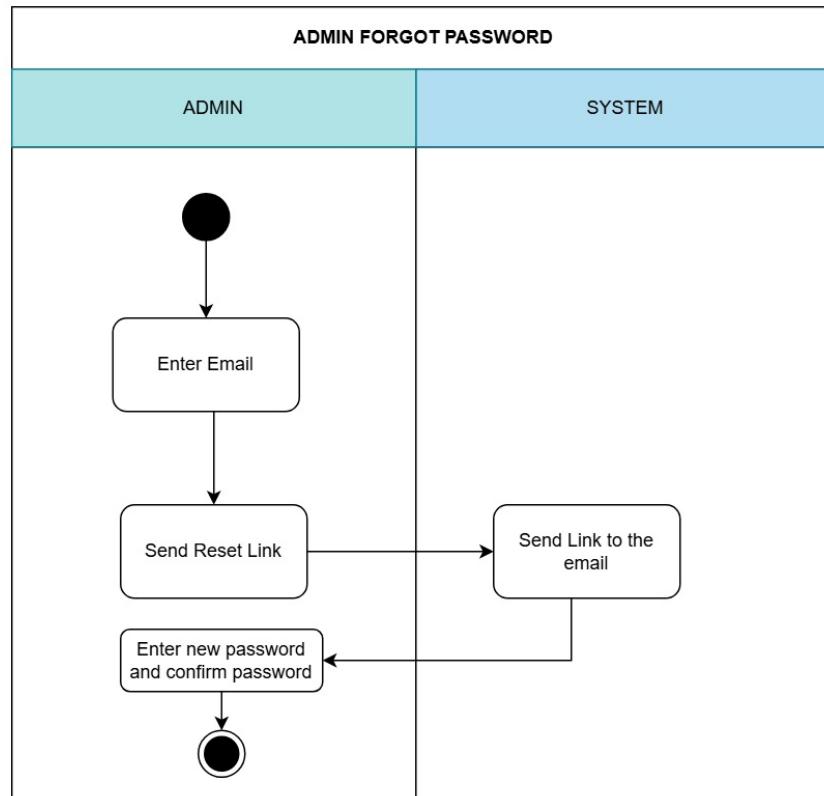
The "Admin Login" activity diagram shows how to log into the administrator account. The system validates the administrator's account and password. The system requires the correct OTP (One-Time Password) to authenticate the administrator if the credentials are correct. The administrator can access the dashboard after successfully



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authenticating. The administrator is returned to the login screen if any of the steps are unsuccessful.

**Figure 9. Activity Diagram: Admin Login**

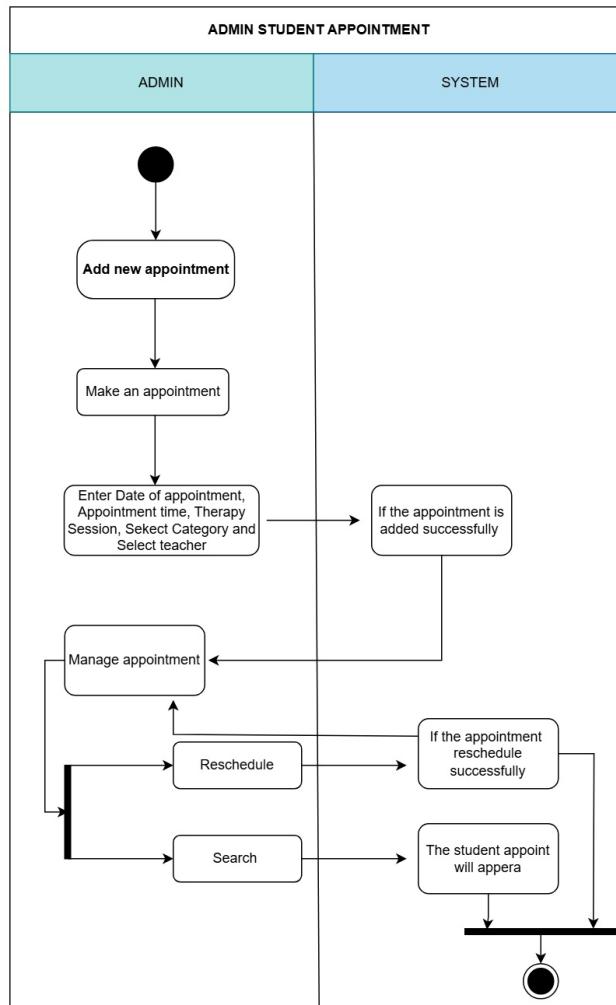


The "Admin Forgot Password" activity diagram outlines the process of resetting an admin's password. First, the admin provides their email address. The system sends reset password link to the entered email. Using the link, the admin sets and confirms a new password, completing the reset procedure.



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**Figure 10. Activity Diagram: Student Appointment**

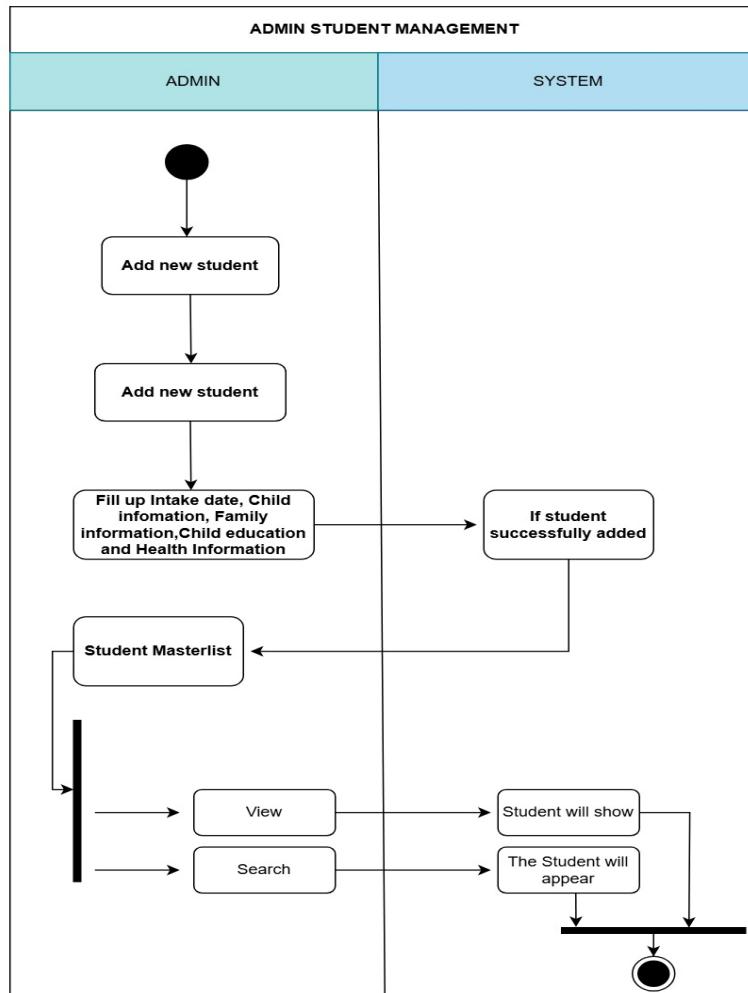


The "Admin Student Appointment" activity diagram illustrates the process of managing student appointments. The admin starts by adding a new appointment, entering details such as the date, time, therapy session, category, and teacher. The system confirms if the appointment is successfully added. The admin can then manage appointments by rescheduling or searching for specific appointments. Successful rescheduling updates the appointment, and searching displays the relevant appointment details.



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**Figure 11. Activity Diagram: Admin Student Management**

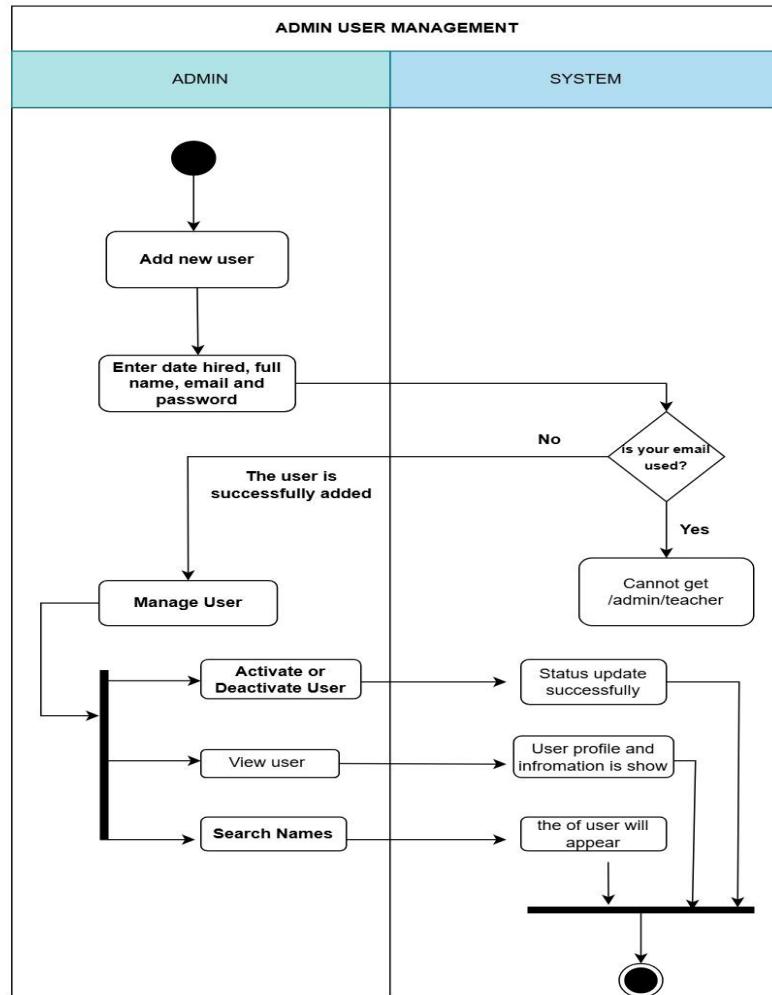


The "Admin Student Management" activity diagram outlines the process of managing student information. The admin begins by adding a new student, providing details such as intake date, child information, family information, education, and health information. The system confirms if the student is successfully added. The student is then included in the master list, where the admin can view or search for specific student records. Viewing or searching displays the relevant student details.



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**Figure 12. Activity Diagram: Admin User Management**

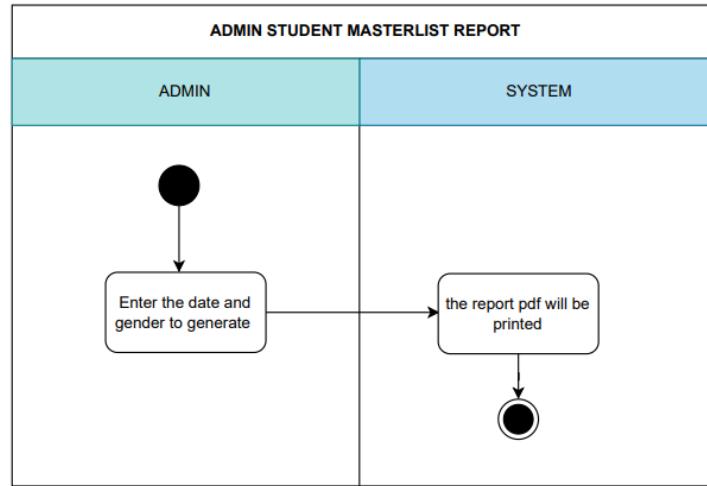


The "Admin User Management" activity diagram illustrates how an admin can manage user accounts. The process begins with adding a new user by inputting the date hired, full name, email, and password. The system checks if the email is already in use. If so, the operation fails; otherwise, the user is successfully added. Admins can then manage users by activating, deactivating, viewing, or searching for users. Each action updates the user's status or retrieves relevant information for administrative purposes.



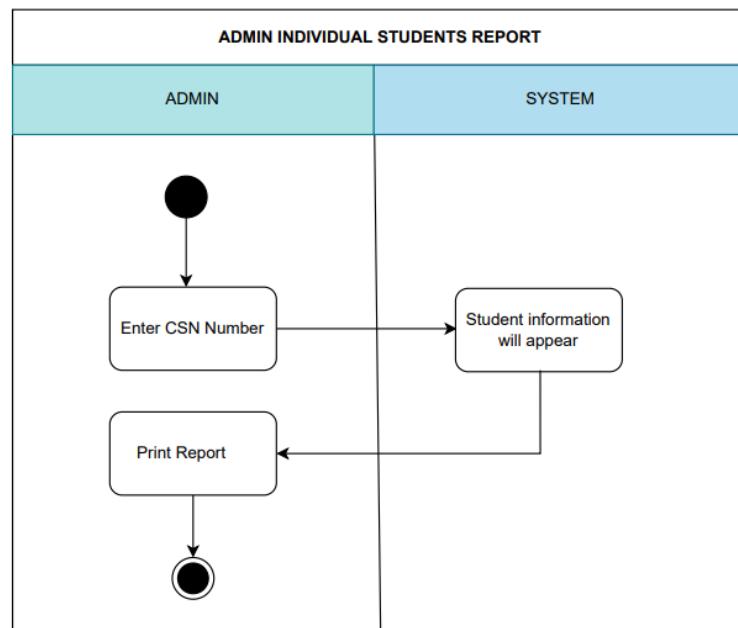
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**Figure 13. Activity Diagram: Admin Student Master List Report**



The steps involved in creating a student report are illustrated in the "Admin Student Master List Report" activity diagram. To create the report, the administrator chooses the gender and inputs the date. After processing the input, the system creates a report in PDF format that may be printed.

**Figure 14. Activity Diagram: Admin Individual Students Report**

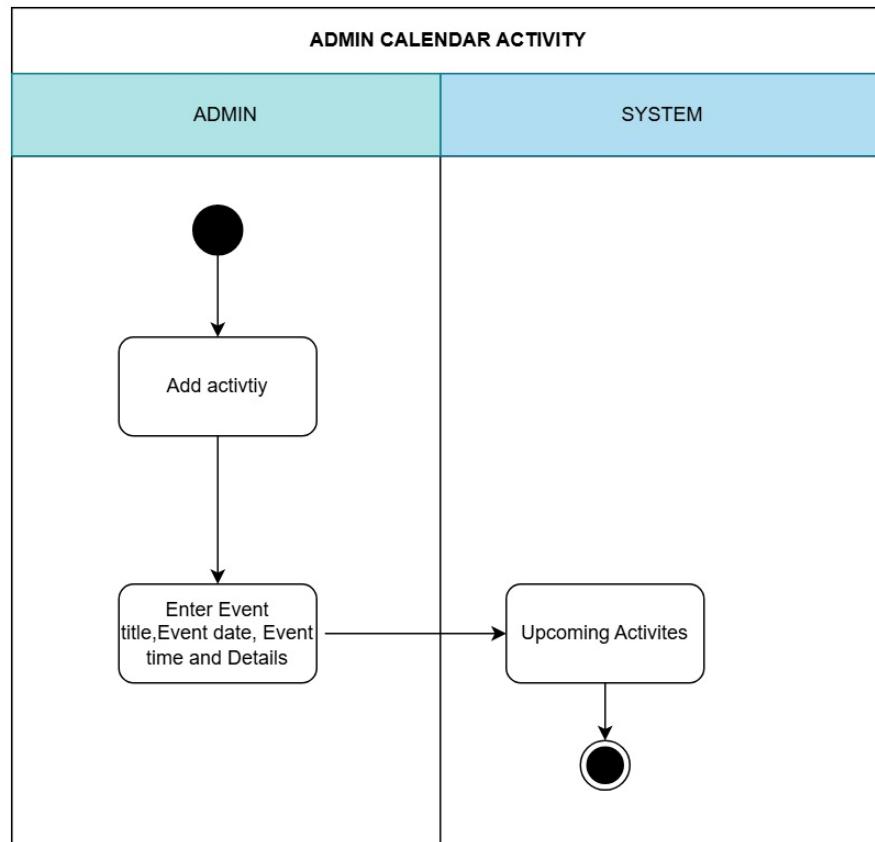




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The activity diagram for "Admin Individual Students Report" shows how an administrator creates a report for a specific student. The system retrieves and presents the student's data after the administrator enters the CSN (student) number. To finish the process, the administrator prints the report.

**Figure 15. Activity Diagram: Admin Calendar Activity**

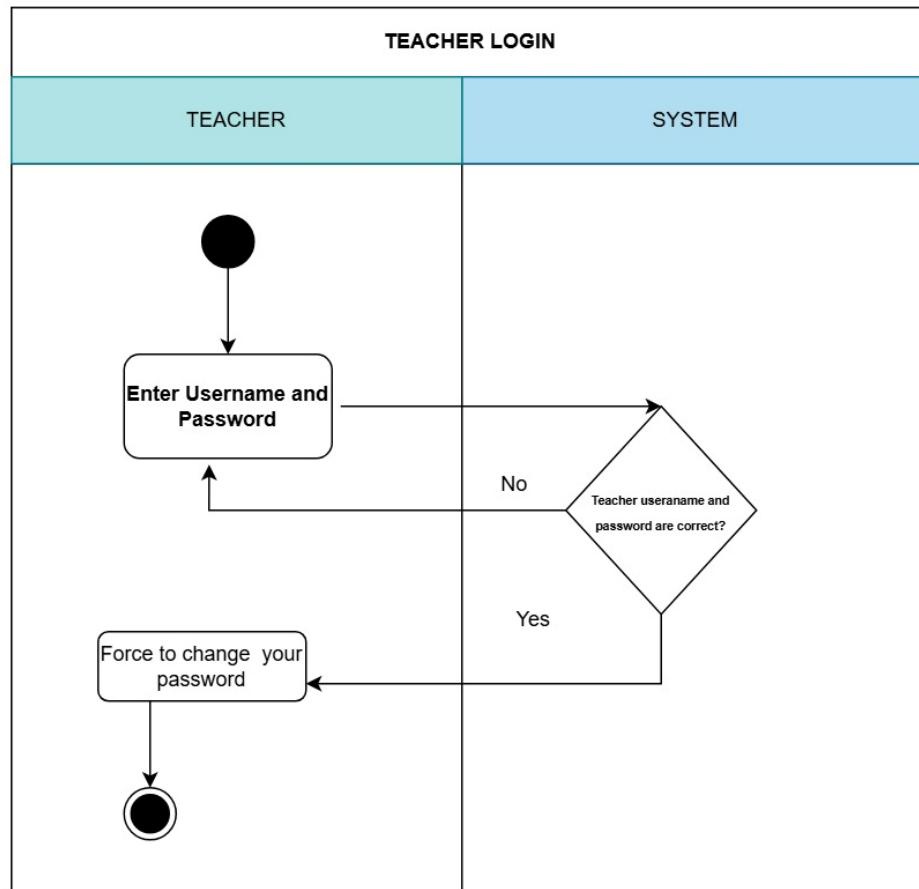


The "Admin Calendar Activity" activity diagram illustrates the process for adding events to the calendar. The admin begins by selecting the option to add an activity and enters the event title, date, time, and details. The system saves the information, displaying the event in the list of upcoming activities.



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**Figure 16. Activity Diagram: Teacher Login**

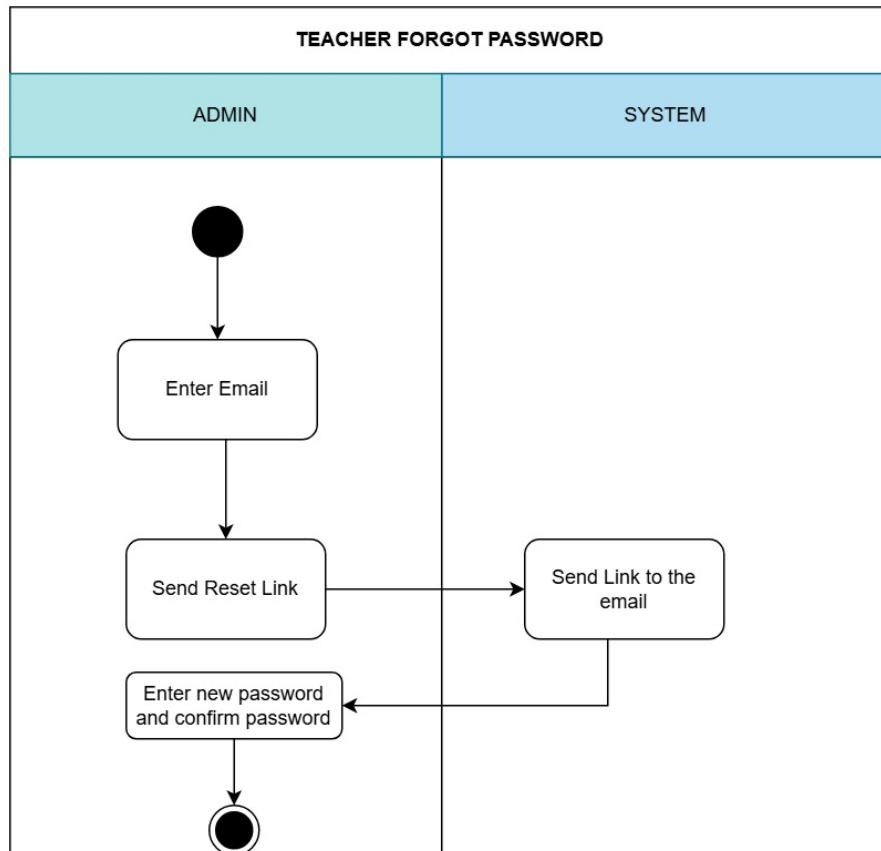


The "Teacher Login" activity diagram shows the process for teachers to log into their account. The teacher enters their username and password. The system verifies the credentials. If they are incorrect, the teacher is prompted to re-enter them. If correct, the teacher is required to change their password before proceeding.



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**Figure 17. Activity Diagram: Teacher Forgot Password**

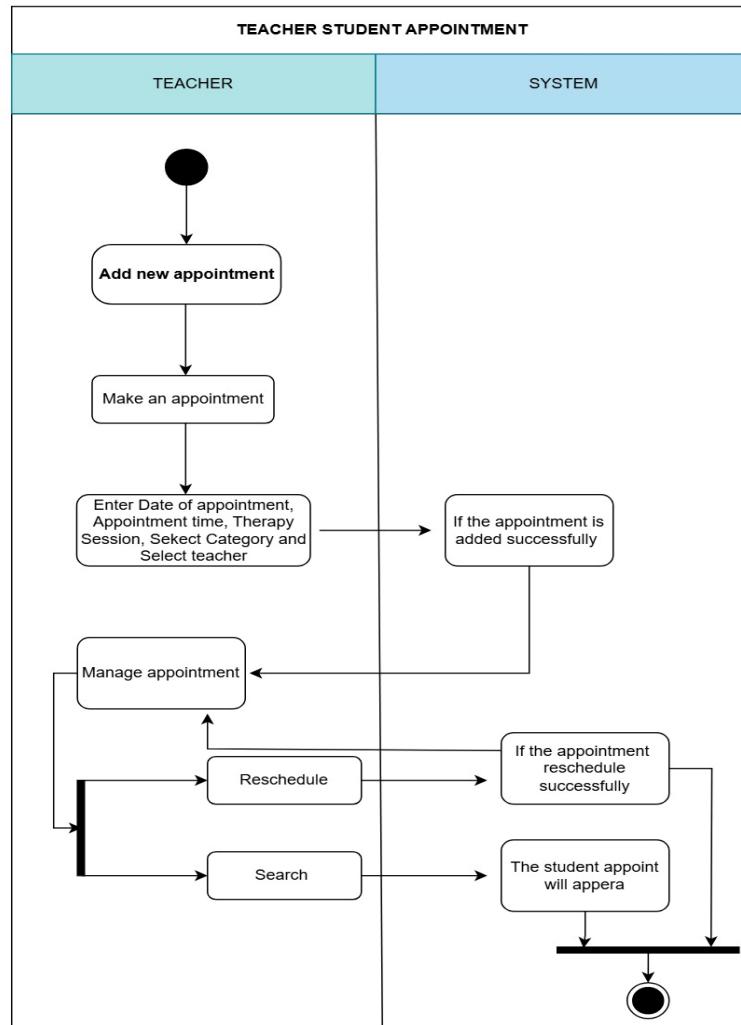


The "Teacher Forgot Password" activity diagram illustrates the password recovery process for teachers. The teacher enters their registered email address. The system sends a reset password link to the email address. Once the teacher clicks the link, they can set a new password by entering and confirming it.



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**Figure 18. Activity Diagram: Teacher Student Appointment**

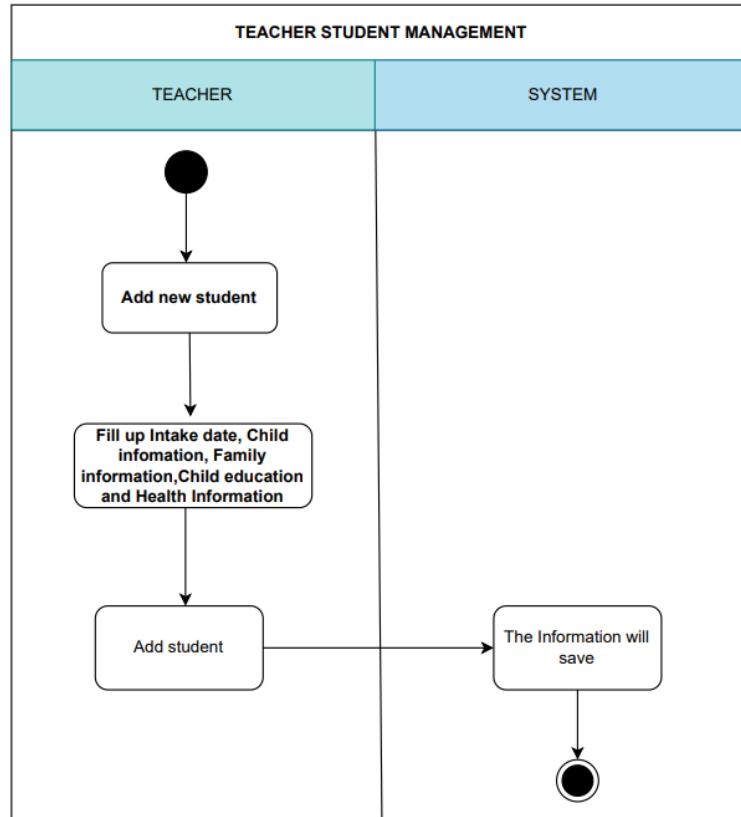


The "Teacher-Student Appointment" activity diagram explains how teachers can set up and manage appointments. Teachers start by filling in details like the date, time, type of session, and category, then selecting the teacher for the appointment. Once it's saved, they can update it by rescheduling or searching for existing appointments. The system confirms changes or shows the scheduled appointments when needed.



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**Figure 19. Activity Diagram: Teacher Student Management**

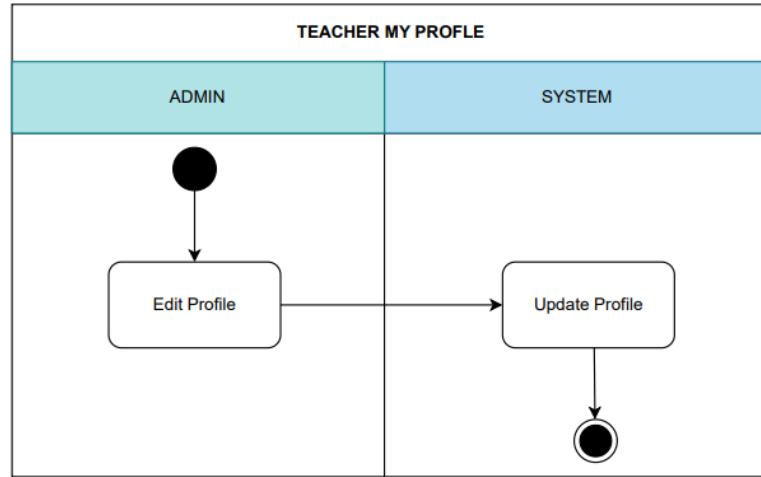


The "Teacher Student Management" activity diagram illustrates the process of adding a new student. The teacher initiates the process by selecting "Add New Student," then fills out details such as intake date, child information, family background, education, and health records. Once submitted, the system saves information successfully.



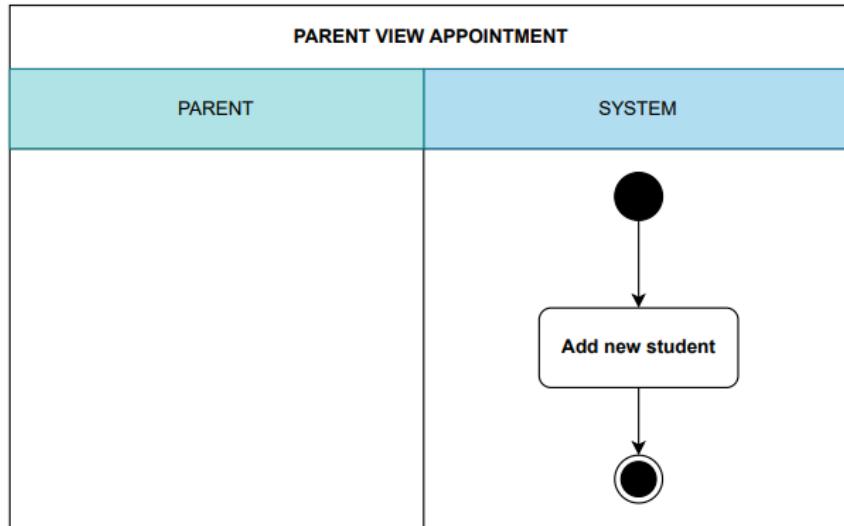
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**Figure 20. Activity Diagram: Teacher My Profile**



The "Teacher My Profile" activity diagram outlines the process of updating a teacher's profile. The teacher initiates the process by editing their profile. The system then updates the profile with the provided changes, completing the process.

**Figure 21. Activity Diagram: Parent View Appointment**



The "Parent View Appointment" activity diagram outlines the process for a parent to view their child's appointment details.

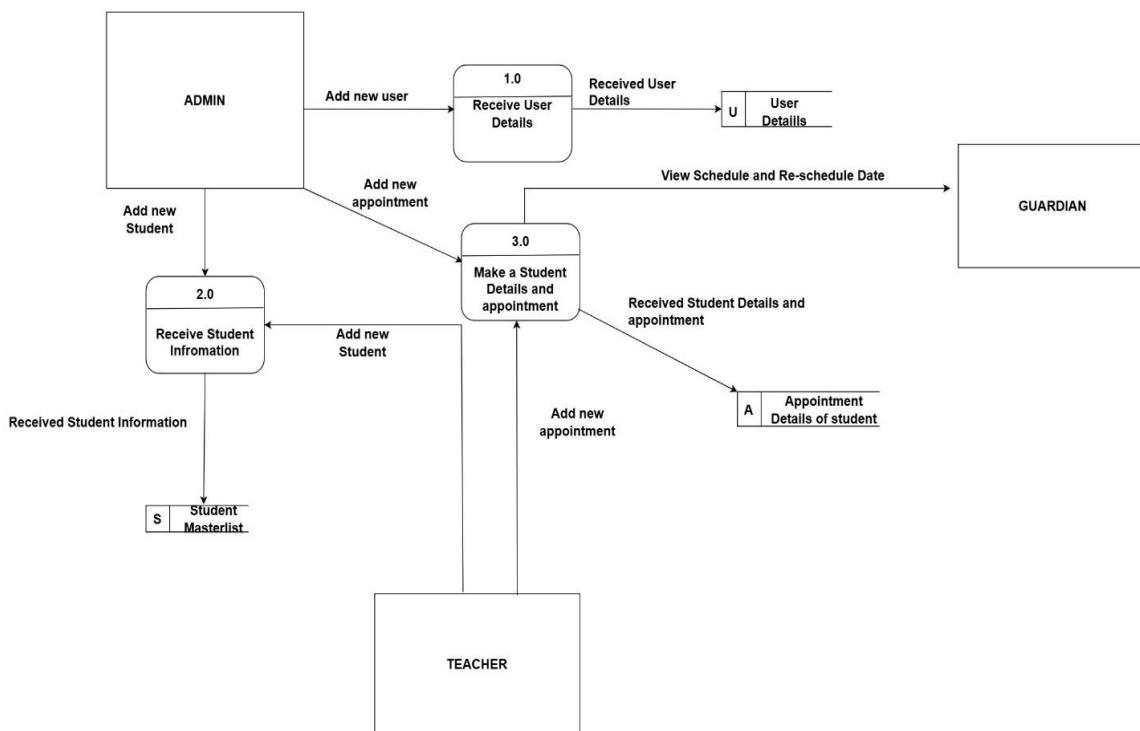


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### Data Flow Diagram

A Data Flow Diagram (DFD) is a visual tool that illustrates how data moves through a system. It highlights the various processes where data is stored, external entities involved, and the flow of information. This makes it easier to understand and communicate the system's design and operations in a straightforward way.

**Figure 22. Data Flow Diagram**



The diagram illustrates the data flow for students and appointment management. The admin can add new users, students, and appointments. User details are received and stored, while student information is added to the master list. The system handles appointment details, which are accessible to teachers and guardians for scheduling and rescheduling. Each step ensures proper flow and handling of data between users and the system.

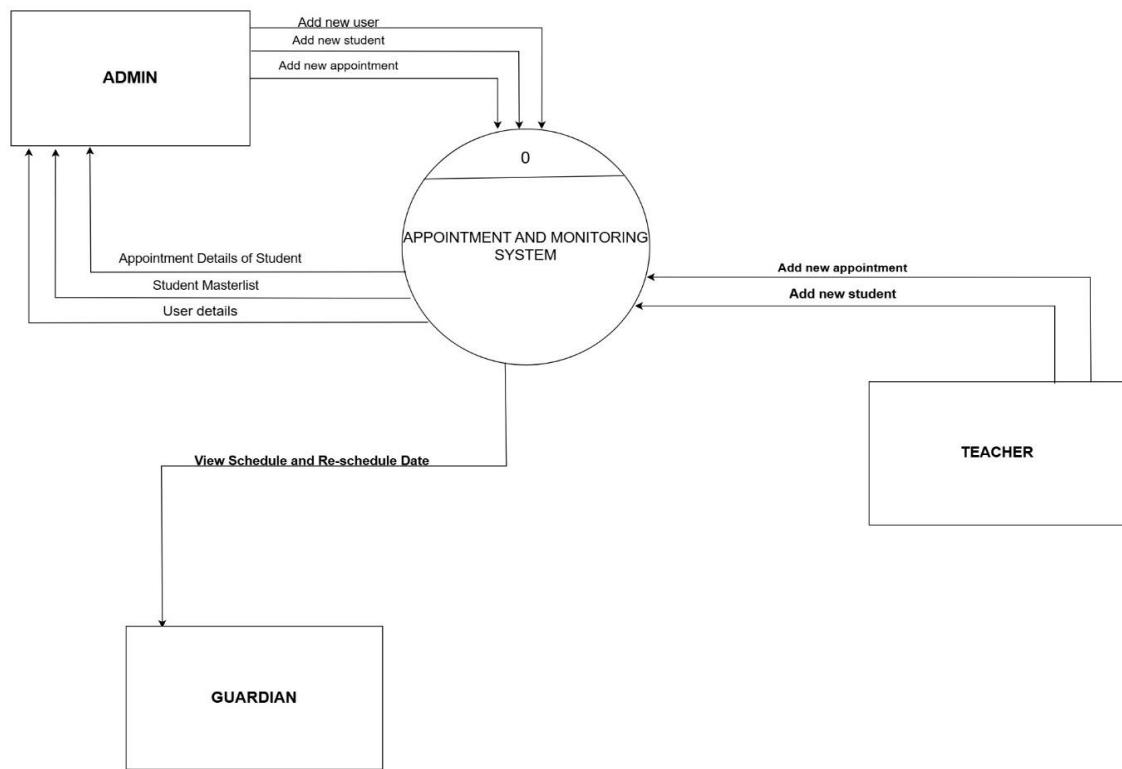


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### Context Flow Diagram

A Context Flow Diagram (CFD), also referred to as a Level 0 DFD, is a top-level diagram that represents a system as a single process and illustrates its interactions with external entities through data flows. It focuses on the system's scope, boundaries, inputs, and outputs, offering a clear summary without delving into internal specifics.

**Figure 23. Context Flow Diagram**



The context diagram illustrates the "Appointment and Monitoring System," highlighting its interaction with external entities. The admin manages user accounts, student records, and appointments, which are stored in the system. Teachers can add student information and appointments. Guardians can view appointments as needed. The system centralizes and streamlines appointment and student data management.



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### Entity Relationship Diagram

The CSN Parañaque City Center is dedicated to supporting children with special needs through a structured and comprehensive appointment and monitoring system. It provides a platform that allows parents, teachers, and administrators to collaborate effectively in managing therapy sessions and monitoring progress. By streamlining scheduling, notifications, and updates, the system ensures that each child's developmental needs are prioritized. This fosters a seamless and supportive environment tailored to the unique requirements of the center's students.

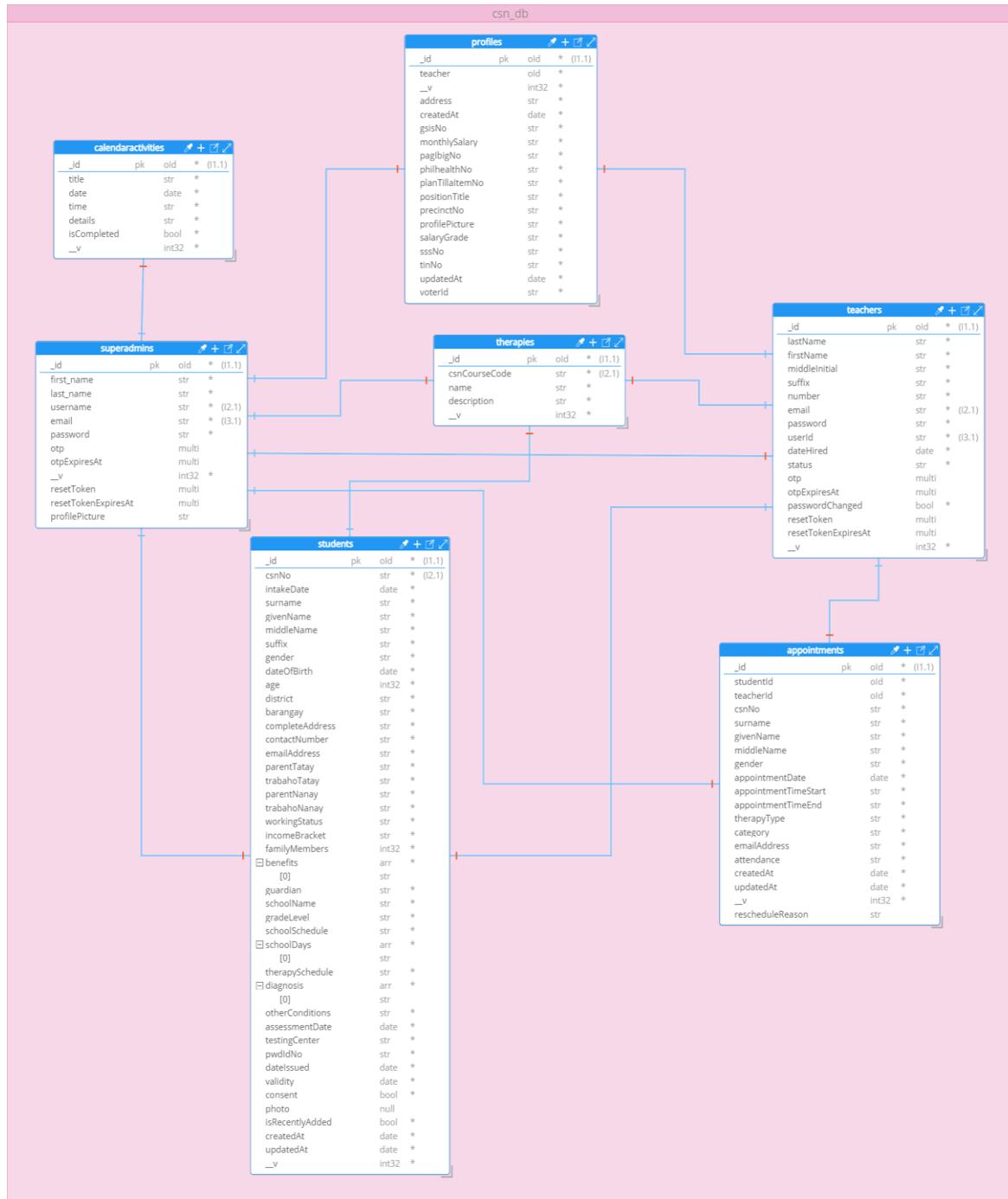
At the core of the system is an efficient database that tracks student information, therapy types, and appointments while maintaining transparency through activity logs and notifications. Teachers can manage their schedules, provide feedback on sessions, and monitor student progress, ensuring targeted and impactful interventions. Parents benefit from timely updates and the ability to stay engaged in their child's therapy journey. Administrators can use the system to optimize resource allocation and enhance overall operations at the center.

Community engagement is enhanced through features like announcements and polls, promoting a sense of collaboration and inclusion among stakeholders. Regular updates ensure that all users stay informed about important developments, while the polls enable decision-making that reflects the collective voice of the community. The CSN Parañaque City Center's system demonstrates a commitment to accessibility, innovation, and holistic child development. By integrating technology with compassionate care, it empowers everyone involved to achieve meaningful outcomes for children with special needs.



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**Figure 24. Entity Relationship Diagram**



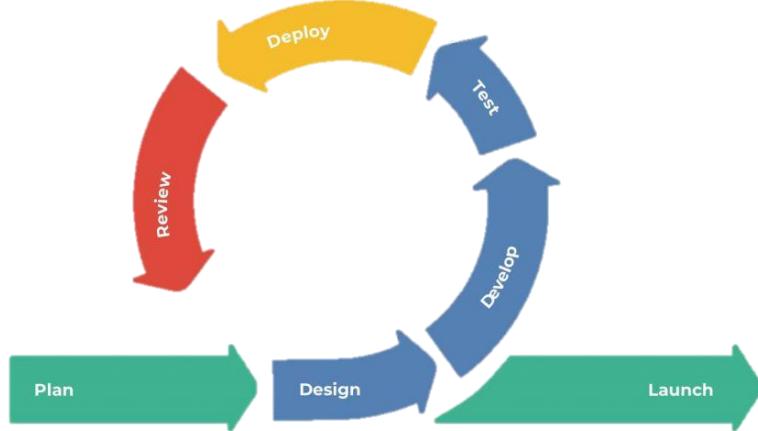


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### Software Development Methodology

This study adopts the Agile Methodology for developing the Appointment and Monitoring System for CSN Center Parañaque, focusing on optimizing accessibility and care coordination for children with special needs. Similar to the approach used by Al-Saqqa et al. (2020), Agile offers flexibility by enabling stakeholders to make adjustments throughout the development process. This adaptability is essential in ensuring the system aligns with the evolving needs of the center and the children it serves. The Agile framework promotes a continuous feedback loop, ensuring the system is regularly evaluated and refined to meet the center's objectives.

**Figure 25. Agile Methodology**



Agile's iterative process allows the researcher to make incremental improvements, responding to user feedback and adapting the system based on real-world usage. In the study by Esang et al. (2024), have shown the effectiveness of Agile in enhancing the functionality of systems through continuous updates. By breaking down the project into smaller, manageable tasks, the researcher can focus on delivering key



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features that address immediate needs while ensuring long-term scalability. This method of constant evaluation ensures that the system evolves in line with user expectations.

Figure 25 shows the Agile approach emphasizes frequent communication with the CSN staff to ensure that the system evolves based on their input and real-time experiences. Regular testing and reviews at the end of each development cycle are integral to making necessary adjustments. As the needs of the children with special needs may shift over time, Agile enables the system to quickly adapt and incorporate new requirements. This iterative process fosters a close alignment between the system's development and the center's mission, ensuring a responsive and effective tool for care coordination.

### Initial Planning

The initial planning phase aimed to identify the project's goals, objectives, and requirements. Stakeholder interviews were conducted with the CSN administration officers and teachers to gather insights into the challenges of the existing manual processes. This step aligns with the recommendations of Pakpahan (2024), who emphasized the importance of understanding user needs in the development of attendance and appointment systems.

During this phase, the scope and timeline of the project were defined, with key milestones identified to guide development. Resources, including software tools and team roles, were allocated to ensure the project's efficient execution. A risk analysis was also conducted to anticipate potential challenges, such as data migration issues and user adoption barriers, ensuring the necessary mitigation strategies were in place.



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### Design Stage

In the design stage, the system architecture and database schema were developed based on the requirements identified during the planning phase. Wireframes and prototypes were created to visualize the user interface, ensuring the design's usability and accessibility. This step mirrors best practices highlighted by Reyes and Caras (2023), who emphasized the importance of user-centered design in creating web-based systems.

Stakeholder feedback played a crucial role in refining the prototypes. Features such as automated scheduling, student progress tracking, and user-friendly dashboards were prioritized to address the pain points identified in the planning phase. The system's architecture was designed to be scalable, incorporating MongoDB for database management and Express as the web framework.

### Development

The development phase involved implementing the system's functionality in alignment with the designed architecture. The backend was developed using JavaScript within the Node.js runtime, and Express, chosen for their flexibility and robust library support (Madrid & Cagadas, 2023). MongoDB was utilized for database management due to its scalability and reliability in handling structured data.

The frontend interface was built using HTML, CSS, and JavaScript, ensuring responsiveness and accessibility across devices. RESTful and Express APIs were developed to facilitate seamless communication between the frontend and backend.



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components, enabling real-time updates for appointment scheduling and student progress monitoring.

Version control was managed using Git to ensure collaboration and track changes efficiently. Agile principles guided the development process, allowing for iterative updates based on stakeholder feedback after each sprint cycle.

### Testing and Bug Fixing

Thorough testing was carried out to verify the system's functionality, reliability, and usability. This phase involved unit testing, integration testing, and system testing, adhering to principles outlined by Aninon et al. (2020), who emphasized the significance of detecting potential issues early in the system deployment process.

User acceptance testing (UAT) was performed with CSN administrators and teachers to validate that the system met their requirements. Load testing was also conducted to evaluate the system's performance under high user demand, ensuring scalability. Identified bugs and issues were resolved promptly, with subsequent testing iterations confirming the fixes.

### Deployment Stage

The deployment phase involved setting up the system on production servers and migrating existing data from Excel to the new system. Data integrity was validated during the migration process to ensure accurate information transfer (Benitez et al., 2022). Security measures, such as encryption and role-based access control, were implemented to protect sensitive information.



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Initial training sessions were provided to staff and administrators, equipping them with the knowledge to navigate the system effectively. Technical support was made available to address any challenges encountered during the transition.

### **Review Stage**

Post-deployment, the system's performance and user adoption were evaluated through feedback collection and system usage metrics. Stakeholders provided insights into the system's strengths and areas for improvement, aligning with the iterative feedback approach recommended by Ahmadian et al. (2022).

Performance data, such as task completion times and error rates, were analyzed to assess the system's efficiency. Updates were made based on the feedback, ensuring continuous improvement in usability and functionality.

### **Implementation Plan**

The implementation plan followed a phased approach to ensure a smooth transition from manual to automated processes at CSN Parañaque. Initially, the preparation phase involved briefing stakeholders on the system's capabilities and distributing training materials to equip staff with the necessary knowledge. Technical resources, including hardware and software, were thoroughly inspected to ensure readiness.

Next, pilot testing was conducted in a controlled environment. This phase enabled the identification of potential issues and provided an opportunity to refine the system based on real-world usage. Stakeholder feedback during this phase was crucial for addressing any shortcomings and ensuring that the system met the center's operational requirements.



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Finally, the system was fully deployed across the center. This phase involved rolling out the system to all relevant staff and administrators, accompanied by ongoing technical support to address any post-deployment issues. Periodic updates were implemented to enhance the system's functionality and ensure sustained user satisfaction (Bagheri et al., 2022). This structured approach minimized disruptions, maximized user engagement, and ensured a successful transition to the new system.

**Table 10. Implementation Plan**

Approach	Activities	Responsible Person(s)	Duration
Approval	Acquire a proposal from the Administrator of CSN Center Parañaque before proceeding with the deployment	Researchers, Project Manager, CSN Center Parañaque Administrator	1 day
Technology Transfer	Transition of the developed system to the CSN Center Parañaque for full ownership.	Teachers, Administration Officer, Researchers	1 day
Pilot Testing	Identify issues, gather user feedback, and refine functionalities.	IT Experts, Validators, Research Adviser, Researchers	1 day
User Training	Conduct a hands-on tutorial for users.	Target users (Administrator Officer, Teachers), Researchers	3-6 hours estimate
Documentation	Prepare user manuals and technical guides and the documents should be accessible for future reference.	Researchers	1 day
Performance Monitoring	Monitor system performance, address bugs, and provide technical support.	IT Experts, Researchers	1 month



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### System Requirements

The hardware and software requirements for the creation and deployment of the suggested system are covered in this part, together with information on device compatibility and software dependencies.

**Table 11. System Development Software Requirements**

Component	Recommended
Operating System	Windows 10 or 11
Web Browser	Google Chrome
Programming Language	JavaScript
User Interface Libraries	HTML, CSS, JavaScript
Database	MongoDB
API Framework	RESTful, Express
Server-side Runtime	Node.js
Cloud Service	Render

**Table 12. System Development Hardware Requirements**

Component	Recommended
Processor	Intel Core i5 (8 <sup>th</sup> Generation or Higher)
Memory (RAM)	8gb (minimum)
Storage	100gb SSD (minimum for development)
Video Card Memory	2gb (minimum)
Development Environment	Visual Studio Code for development



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**Table 13. System Implementation Software Requirements**

Component	Minimum	Recommended
Operating System	Windows 7 (64-bit)	Windows 10 or 11 (64-bit)
	macOS 10.13 or higher	macOS 12+
	Linux (Ubuntu 18.04+)	Linux (Ubuntu 20.04+)
Memory (RAM)	Google Chrome (latest version)	Google Chrome (latest version)

**Table 14. System Implementation Hardware Requirements**

Component	Minimum	Recommended
Processor	Intel Core i3 or AMD Ryzen 3	Intel Core i5 or AMD Ryzen 5
RAM	4gb	8gb
Storage	50gb Solid-State Drive	100gb Solid-State Drive
Internet Connection	2 Mbps	5 Mbps or higher

**Table 15. Monthly Cost Breakdown**

Item/Service	Description	Cost (US Dollar)	Cost (Philippine Peso)
Render	Domain, Hosting, File Manager and Database	29 USD	1,699.79 PHP
Total Monthly Cost	Monthly Cost for the System	29 USD	1,699.79 PHP



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In table 15, it shows the monthly cost breakdown that identifies the essential services required for operation. The basic site infrastructure, such as domain registration, hosting, file management, capabilities, and database access, is available for \$29 per month from Render. The total monthly running cost is \$29 (₱1669.79).

**Table 16. Annual Cost Breakdown**

Item/Service	Description	Cost (US Dollar)	Cost (Philippine Peso)
Render	Domain, Hosting, File Manager and Database	348 USD	20,409.50 PHP
Total Annual Cost	Annual Cost for the System	348 USD	20,409.50 PHP

The annual cost projection compounded by monthly spending over a 12-month period is shown in Table 16. Render services cost \$348 per year, there is a clear financial need, as evidenced by the \$348 (₱20,409.50) total annual operating cost.

**Table 17. 5-Year Cost Estimate**

Item/Service	Description	Cost (US Dollar)	Cost (Philippine Peso)
Render	Domain, Hosting, File Manager and Database	1740 USD	102,048.39 PHP
Total Monthly Cost	Monthly Cost for the System	1740 USD	102,048.39 PHP

The cost forecast for the next five years offers a long-term view of operational costs. During this time, Render services costs \$1740. The anticipated operating cost for the next five years is ₱102,048.39, or roughly \$1740. This long-term estimate shows the



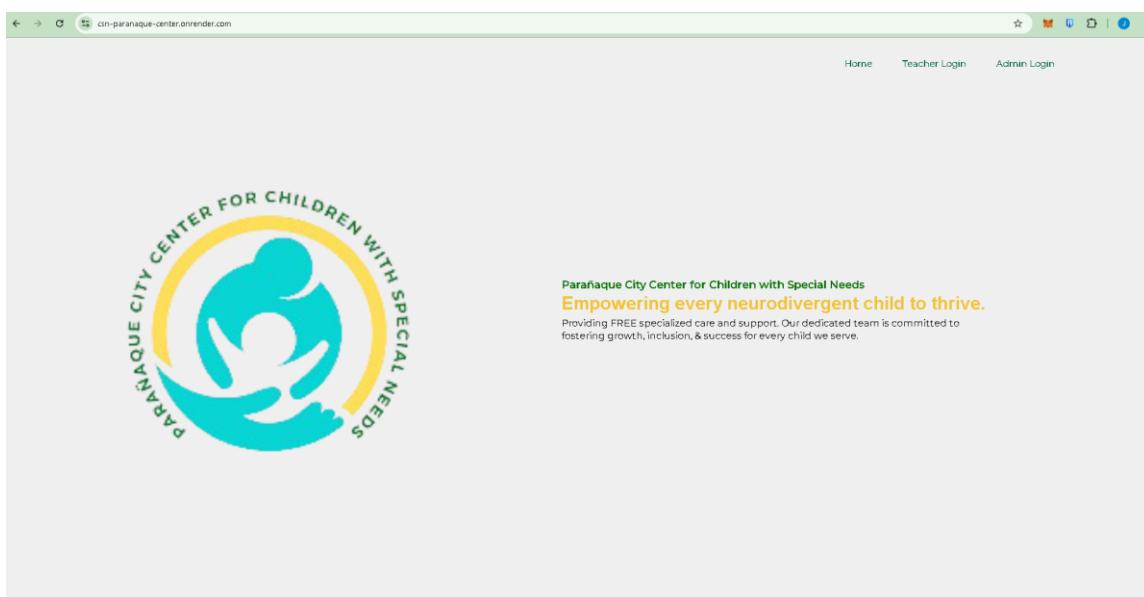
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continuous financial commitment needed to maintain these services for a long time and helps with budget planning.

### User Interface Design

The user interface (UI) and its ability to provide a clean Web-based and seamless experience is covered in this section. Target users' expectations and preferences were gathered, and then UI design concepts were created to act as visual depictions of the recommended interface that was discussed during the sessions. The design plan includes interactive elements like buttons and textboxes that consider certain UI design goals, like creating an aesthetically pleasing interface and employing suitable color schemes to ensure coherence. To help target users visualize the system's functional requirements, modules and other recommended system features are integrated into the interface in addition to the design plan. Lastly, the system is usable and designed to support only desktop.

**Figure 26. Home Page**

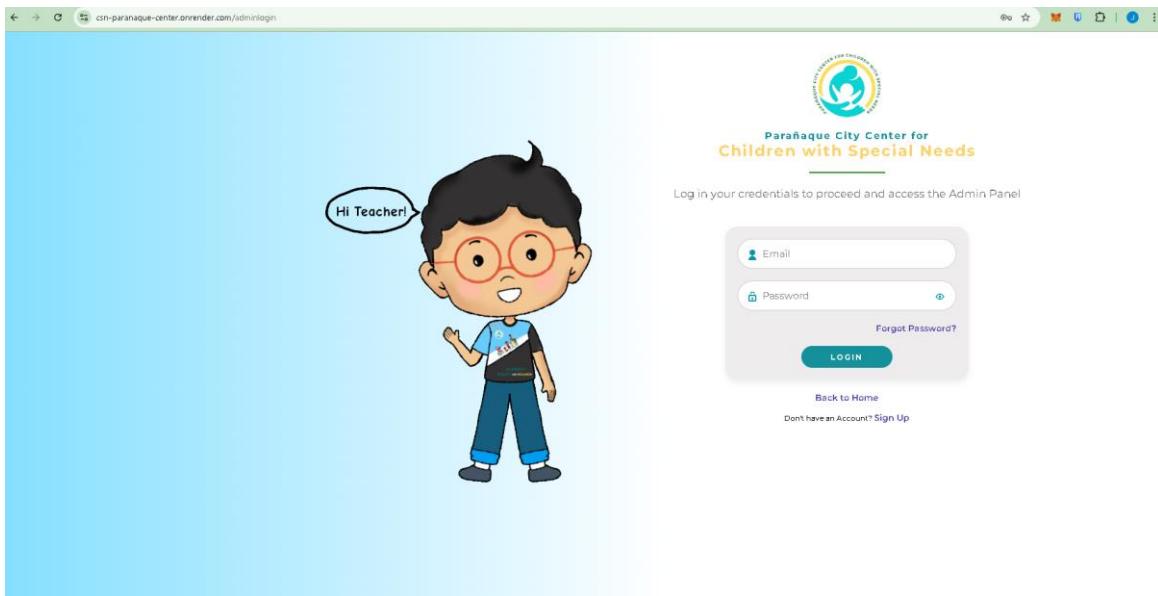




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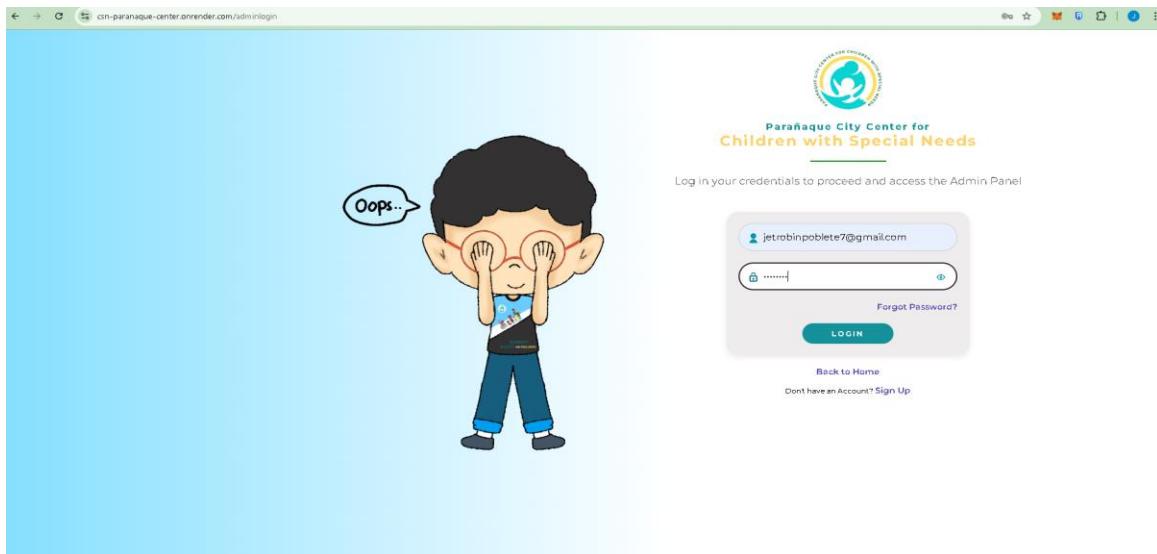
The interface shows the “Home” page to be accessed by Teacher User and Admin User. Two possible login portals may be accessed.

**Figure 27. Admin Login Page**



The interface shows the “Admin Login” page to be accessed by Admin User.

**Figure 28. Admin Login Page**



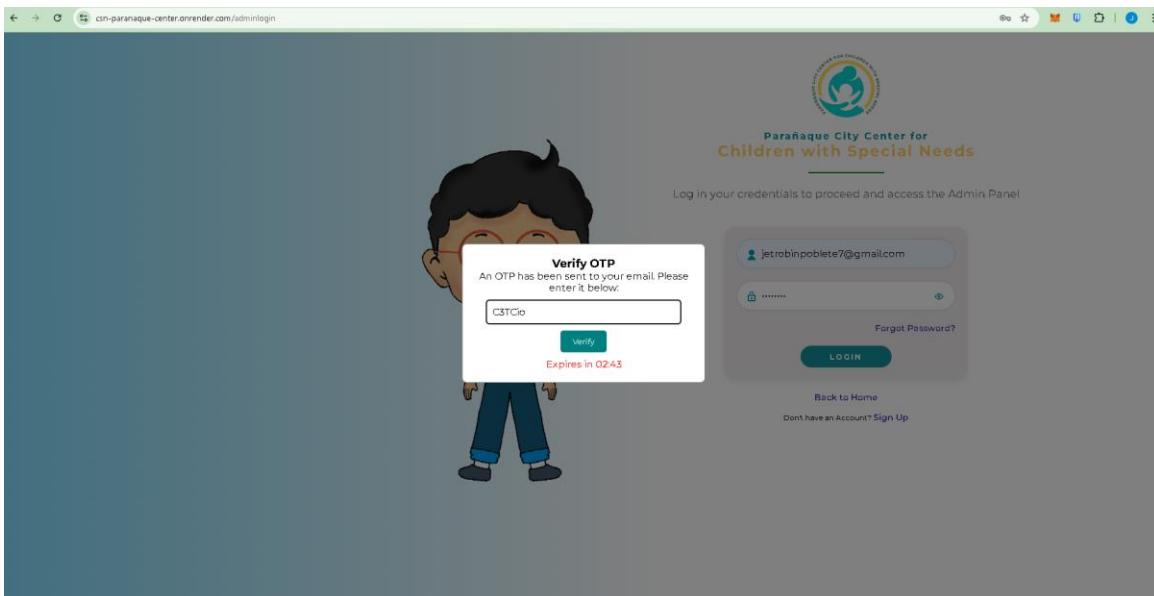


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The interface shows the “Admin Login” page filled by credentials of Admin User.

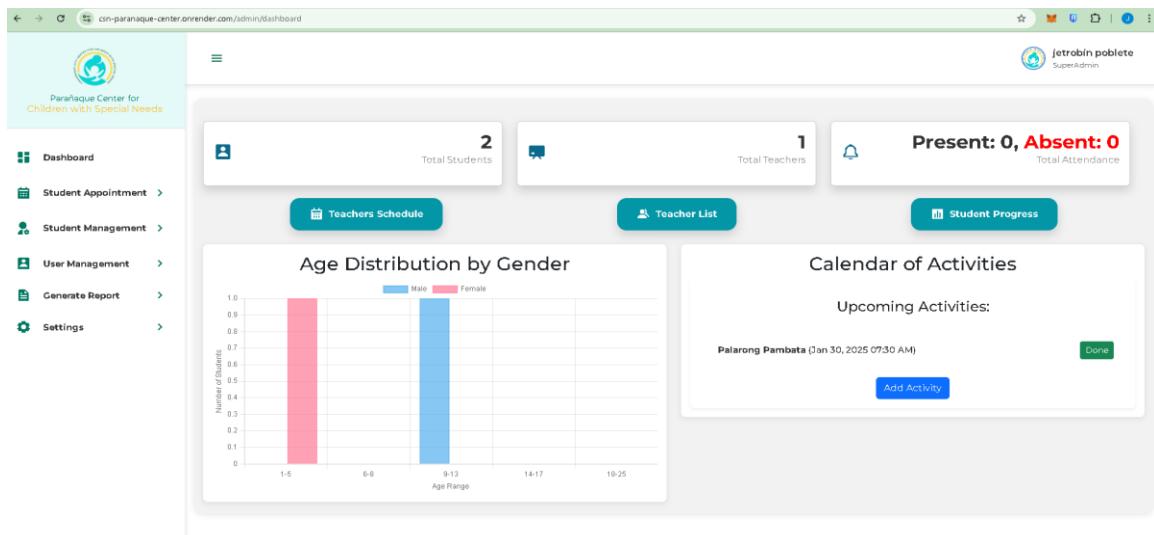
Interactive design can be triggered by typing the password.

**Figure 29. One-time Password for Admin Login Page**



The interface shows the “OTP Modal” page to be filled by Admin User’s email sent via Gmail. Two-factor Authentication was implemented to improve security of the system.

**Figure 30. Admin Dashboard Page**

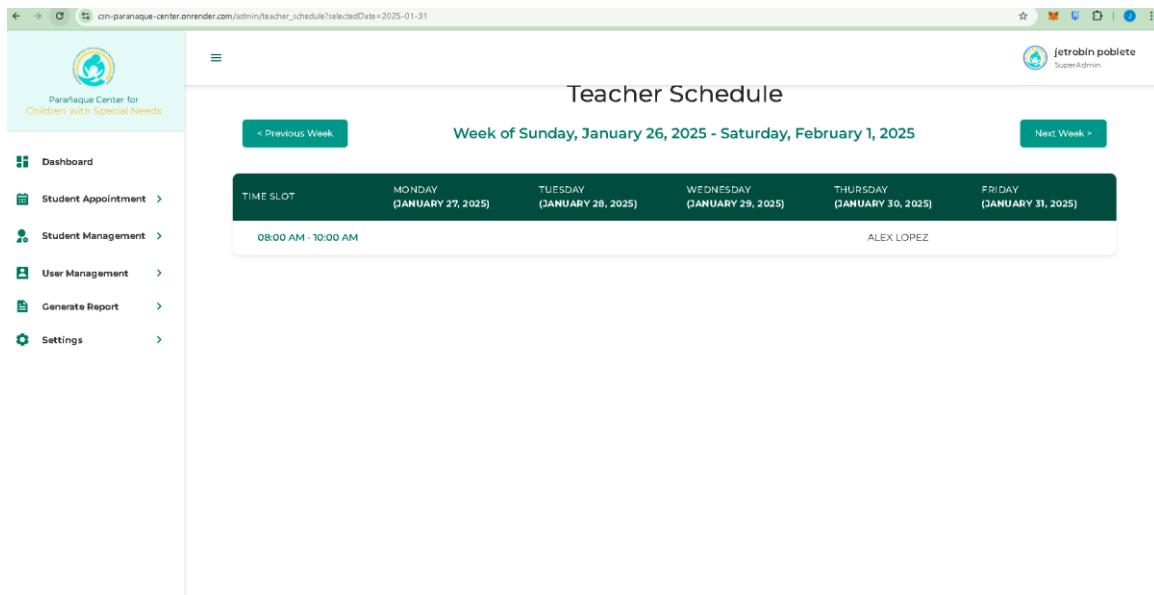




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The interface shows the “Dashboard” for Admin User. Teacher’s Schedule, Teacher List, Student Progress, Calendar of Activities, and Responsive Age Distribution by Gender Graph are all displayed in the Admin User’s dashboard.

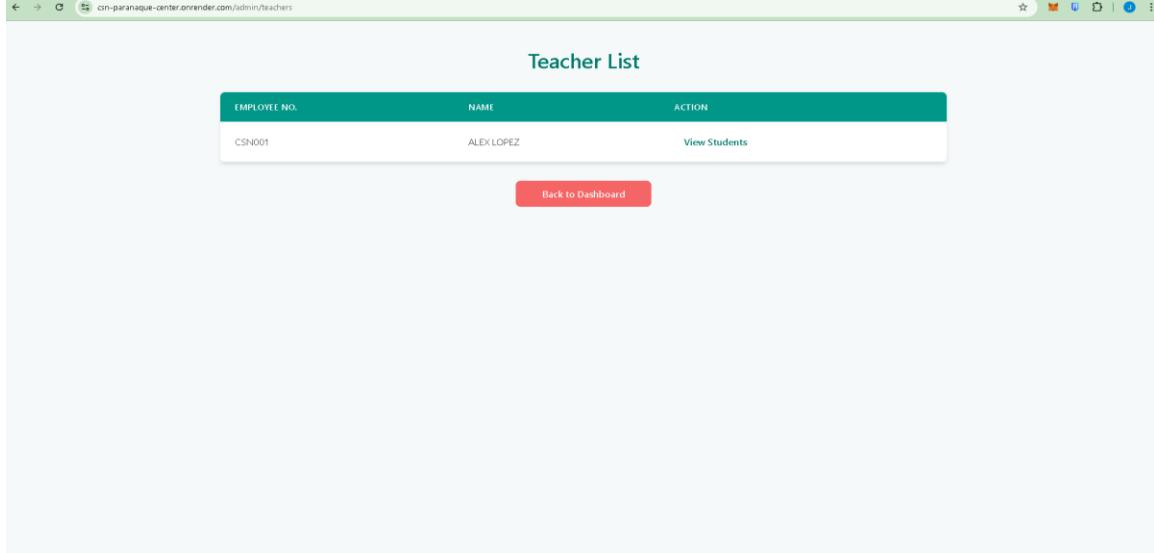
**Figure 31. Teacher Schedule Page**



A screenshot of a web-based application interface titled "Teacher Schedule". The header includes the university logo, the title "Teacher Schedule", and a user profile for "jetrobin pobleto SuperAdmin". The main content area displays a weekly schedule from Sunday, January 26, 2025, to Saturday, February 1, 2025. The schedule grid shows time slots from 08:00 AM to 10:00 AM for Monday through Friday, with "ALEX LOPEZ" listed under the Friday slot. On the left side, there is a sidebar with navigation links: Dashboard, Student Appointment, Student Management, User Management, Generate Report, and Settings. The URL in the browser bar is "cni-paranaque-center.onrender.com/admin/teacher\_schedule?selectedDate=2025-01-31".

The interface shows the “Teacher’s Schedule” for Admin User.

**Figure 32. Teacher List Page**



A screenshot of a web-based application interface titled "Teacher List". The header includes the university logo and a user profile for "jetrobin pobleto SuperAdmin". The main content area displays a table with one row, showing "CSN001" in the Employee No. column, "ALEX LOPEZ" in the Name column, and a "View Students" button in the Action column. At the bottom of the table is a red "Back to Dashboard" button. The URL in the browser bar is "cni-paranaque-center.onrender.com/admin/teachers".

The interface shows the “Teacher List” for Admin User.



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**Figure 33. Student Progress Page**

A screenshot of a web-based application titled "Student Progress". The interface includes a header with a search bar and a "Back to Dashboard" button. Below the header is a table with columns: CSN ID, Name, Age, Gender, Diagnosis, and Action. Two student records are listed:

CSN ID	Name	Age	Gender	Diagnosis	Action
2022-CSN-000-01	CRUZ JUAN DELA	10 yrs old	Male	ADHD,Autism Spectrum Disorder	<a href="#">View Details</a>
2024-CSN-000-01	GOLEZ JUANA SANTOS	3 yrs old	Female	Cerebral Palsy,Down Syndrome	<a href="#">View Details</a>

The interface shows the “Student Progress” for Admin User. Searchable information about the student is available.

**Figure 34. Details in Student Progress Page**

A screenshot of a web-based application titled "Progress Details for CRUZ JUAN DELA". The page displays the student's diagnosis (ADHD,Autism Spectrum Disorder) and a table for an ABA session. The table has columns: Date, Time, and Status. One row is shown: 1/30/2025, 08:00 AM - 10:00 AM, Pending.

Date	Time	Status
1/30/2025	08:00 AM - 10:00 AM	Pending

The interface shows the details of student in “Student Progress” for Admin User.



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**Figure 35. Calendar of Activities Page**

The screenshot shows a web-based administrative interface for the Polytechnic University of the Philippines. The top navigation bar includes the university's name and a logo. On the left, a sidebar menu lists 'Dashboard', 'Student Appointment' (with 'Add New Appointment' and 'Manage Appointment' options), 'Student Management', 'User Management', 'Generate Report', and 'Settings'. The main content area features a 'Teachers Schedule' section with a bar chart titled 'Age Distribution' showing student counts across age ranges (1-5, 6-8, 9-13, 14-17, 18-25). To the right, a modal window titled 'Add An Event' is open, prompting for 'Event Title' (Tree Planting), 'Event Date' (01/30/2025), and 'Event Time' (08:30 AM). A detailed description field contains 'Tree planting activity in the designated location'. A 'Save Event' button is at the bottom of the modal. Above the main content, a header displays 'Present: 0, Absent: 0' and 'Total Attendance'. Below the main content, a 'Calendar of Activities' section lists 'Upcoming Activities': 'Palarong Pambata' (Jan 30, 2025 07:30 AM) and 'Tree Planting' (Jan 30, 2025 08:30 AM), each with a 'Done' button.

The interface shows the details of activities and allows adding activity and recording it in the system “Calendar of Activity” for Admin User.

**Figure 36. Student Appointment Page**

The screenshot shows a web-based administrative interface for the Polytechnic University of the Philippines. The top navigation bar includes the university's name and a logo. On the left, a sidebar menu lists 'Dashboard', 'Student Appointment' (with 'Add New Appointment' and 'Manage Appointment' options), 'Student Management', 'User Management', 'Generate Report', and 'Settings'. The main content area features a 'Teachers Schedule' section with a bar chart titled 'Age Distribution by Gender' showing student counts across age ranges (1-5, 6-8, 9-13, 14-17, 18-25) for Male (blue) and Female (red). To the right, a 'Calendar of Activities' section lists 'Upcoming Activities': 'Palarong Pambata' (Jan 30, 2025 07:30 AM) and 'Tree Planting' (Jan 30, 2025 08:30 AM), each with a 'Done' button. A 'Teacher List' button is also visible.

The interface shows the “Student Appointment” for Admin User. Three options to pick from the sidebar of Student Appointment.



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**Figure 37. Make Appointment in Student Appointment Page**

A screenshot of a web-based administrative interface titled "Student Appointment". On the left is a sidebar with the "Paranaque Center for Children with Special Needs" logo and menu items: Dashboard, Student Appointment (selected), Student Management, User Management, Generate Report, and Settings. The main content area has a header "Student Appointment" and a search bar "Search by name or CSN number". Below is a table with columns CSN NO., NAME, and ACTION. Two rows are shown: "2022-CSN-000-01 CRUZ JUAN DELA" and "2024-CSN-000-01 GOLEZ JUANA SANTOS", each with a "Make an Appointment" button.

The interface shows the information on making an appointment an appointment in “Student Appointment” for Admin User. Making an appointment for students that is scheduled for therapy session.

**Figure 38. Schedule Appointment in Student Appointment Page**

A screenshot of the "Schedule Appointment" page. It features a sidebar with the same menu as Figure 37. The main area has a header "Schedule Appointment" and a "Personal Information" section. It includes fields for CSN Number (2022-CSN-000-01), Last Name (CRUZ), First Name (JUAN), Middle Name (DELA), Gender (Male), and Email Address (gastrinegastine@gmail.com). Below this is an "Appointment Details" section with a placeholder "Please add Appointment Details".



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A screenshot of a web-based application interface titled "Paralapage Center for Children with Special Needs". The left sidebar includes links for Dashboard, Student Appointment (selected), Student Management, User Management, Generate Report, and Settings. The main content area shows fields for "Gender" (Male), "Email Address" (gastrinegastrine@gmail.com), and "Appointment Details" including "Date of Appointment" (01/30/2025), "Appointment Time" (08:00 AM to 12:00 PM), "Therapy Session" (CBT - COGNITIVE BEHAVIORAL THERAPY), "Category" (Cycle 2), and "Teacher" (ALEX LOPEZ). A large teal button at the bottom right says "Schedule Appointment".

The interface shows the information of scheduling an appointment in "Student Appointment" for Admin User. Making an appointment of students scheduled for therapy session.

**Figure 39. Manage Appointment in Student Appointment Page**

A screenshot of the "Manage Appointments" page. The left sidebar has "Student Appointment" selected under "Add New Appointment" and "Manage Appointment". The main table lists two entries:

CSN No.	Name	Date of Appointment	Time of Appointment	Actions
2022-CSN-000-01	CRUZ JUAN	January 30, 2025	08:00 AM	<button>Reschedule</button>
2022-CSN-000-01	CRUZ JUAN	January 31, 2025	08:00 AM	<button>Reschedule</button>

A search bar at the top right says "Search by student name or CSN Nr." and a note below the table says "Showing 1 to 2 of 2 entries".

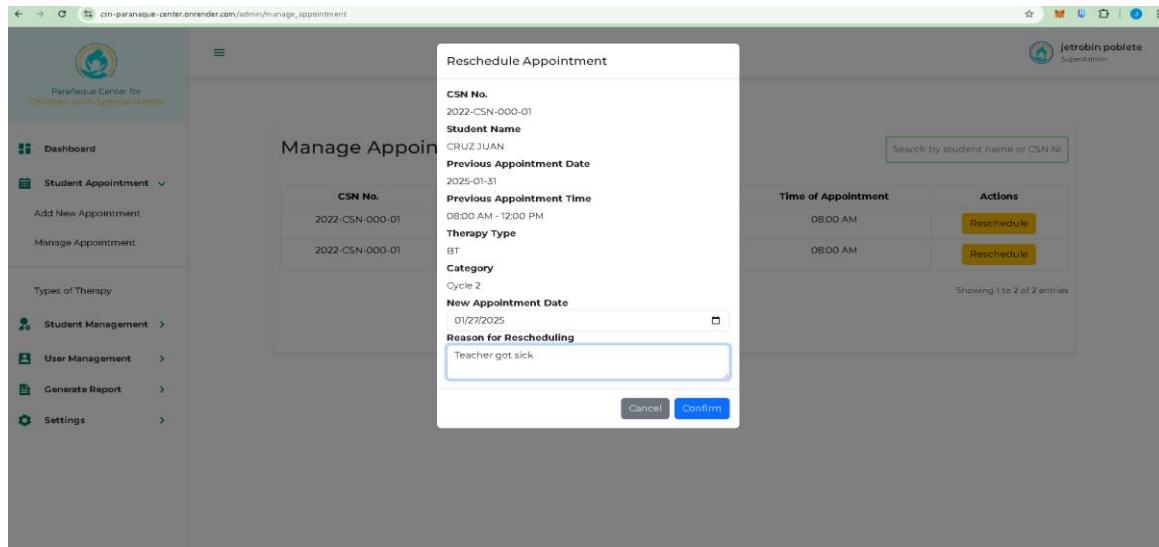
The interface shows the information of rescheduling appointment in "Student Appointment" for Admin User. Managing an appointment of students scheduled for therapy session. Rescheduling is an option.

The interface shows the information of rescheduling appointment in "Student Appointment" for Admin User. Managing an appointment of students scheduled for therapy session. Rescheduling is an option.



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**Figure 40.** Reschedule Modal on Manage Appointment in Student Appointment Page



The interface shows the modal for Rescheduling appointments in "Student Appointment" for Admin User. Rescheduling an existing appointment informs the client.

**Figure 41.** Types of Therapy in Student Appointment Page

A screenshot of a web application interface. The sidebar is identical to Figure 40. The main content area has a title 'Types of Therapy' and a button '+ Add Therapy'. Below is a table with three rows of therapy types:

CSN Course Code	Therapy	Description
CSN001	BT	BEHAVIORAL THERAPY
CSN002	CBT	COGNITIVE BEHAVIORAL THERAPY
CSN003	ABA	APPLIED BEHAVIOR ANALYSIS

Showing entries 1 to 3 of 3

The interface shows Types of Therapy in "Student Appointment" for Admin User. Admin User can add a type of therapy.



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**Figure 42. Add Therapy on Types of Therapy in Student Appointment Page**

A screenshot of a web application interface. The header shows the URL "csn-paranaque-center.onrender.com/admin/types\_of\_therapy" and a user "jetrobin poblete SuperAdmin". On the left, a sidebar menu includes "Dashboard", "Student Appointment" (selected), "Add New Appointment", "Manage Appointment", "Types of Therapy" (selected), "Student Management", "User Management", "Generate Report", and "Settings". The main content area has a title "Types of T" and a sub-section "Add Therapy". It contains fields for "Therapy Name" (SST) and "Description" (Social Skills Therapy). A button "Add Therapy" is at the bottom. To the right, a table lists three entries: "BEHAVIORAL THERAPY", "COGNITIVE BEHAVIORAL THERAPY", and "APPLIED BEHAVIOR ANALYSIS". A footer note says "Showing entries 1 to 3 of 3".

The interface shows the information of adding a type of therapy on Types of Therapy in “Student Appointment” for Admin User.

**Figure 43. Add New Student in Student Management Page**

A screenshot of a web application interface. The header shows the URL "csn-paranaque-center.onrender.com/admin/add\_new\_student" and a user "jetrobin poblete SuperAdmin". On the left, a sidebar menu includes "Dashboard", "Student Appointment", "Student Management" (selected), "Add New Student" (under Student Management), "Student Masterlist", "User Management", "Generate Report", and "Settings". The main content area has a title "Add New Student". It contains sections for "Child Information" (In-take Date: mm/dd/yyyy, Last Name, First Name, Middle Name, Suffix, Gender, Date of Birth, Age, District, Barangay, Complete Address, Contact Number, Email Address) and "Family Information" (Pangalan ng Tatay, Trabaho ng Tatay, Pangalan ng Nanay, Trabaho ng Nanay, Working Status, Income Bracket, Ilan ang Miyembro ng Pamilya [Nanay, Tatay, Mga Anak], Benefits/Memberships checkboxes for SSS, 4Ps, PAG-IBIG, GSIS, PWD, Senior Citizen, Solo Parent, Other).



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The screenshot shows the 'Add New Student' form. On the left is a sidebar with navigation links: Dashboard, Student Appointment, Student Management (selected), User Management, Generate Report, and Settings. The main form area has fields for 'Oras ng Pasok sa School' (Select), 'Araw ng Pasok sa School' (Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, Sunday, N/A), 'Preferred Schedule of Therapy' (Select), 'Health Information' (Diagnosis: ADHD, Autism Spectrum Disorder, Cerebral Palsy, Down Syndrome, Epilepsy, Global Developmental Delay, Hearing Loss, Hydrocephalus, Intellectual Disability, Language Disorder, Learning Disability, Speech Delay, Other (Specify Below)), 'Other Conditions (Specify)', 'Date of Assessment' and 'Date of Re-Assessment' (mm/dd/yyyy), 'Testing Center', 'PWD ID No.', 'Date Issued' and 'Validity (Expiration Date)' (mm/dd/yyyy), 'Upload Photo' (Choose File, No file chosen), 'Allow CSN Consent for Taking Photos and Videos' (Yes, No), and a large teal 'Add Student' button.

The interface shows the information of adding a student in "Student Management" for Admin User. Requirements are based on the Client and contact person in the CSN Center.

**Figure 44. Masterlist of Student Page**

The screenshot shows the 'Masterlist of Students' page. The sidebar includes links for Dashboard, Student Appointment, Student Management (selected), User Management, Generate Report, and Settings. The main content area displays a table titled 'Masterlist of Students' with columns: CSN No., Name, Gender, Age, Contact Number, Email Address, Guardian, Barangay, and Actions. Two rows of data are shown:

CSN No.	Name	Gender	Age	Contact Number	Email Address	Guardian	Barangay	Actions
2022-CSN-000-01	CRUZ JUAN	Male	10	0987654321	gastrineastrine@gmail.com	PEDRO DELA CRUZ	Sto. Niño	<button>View</button>
2024-CSN-000-01	GOLEZ JUANA	Female	3	09345287782	jetrobinpoblete29@gmail.com	GLORIA GOLEZ	La Huerta	<button>View</button>

The interface shows the "Masterlist" for Admin User. Viewing details of a student is available.



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**Figure 45. Student Details in Masterlist of Student Page**

Screenshot of the "Student Information" page from the Polytechnic University of the Philippines administration system.

**Personal Information:**

CSN Number:	2022-CSN-000-01
Intake Date:	Thu Dec 01 2022
Full Name:	CRUZ JUAN DELA
Gender:	Male
Date of Birth:	Wed Jan 07 2015
Age:	10

**Contact Information:**

District:	district_2
Barangay:	Sto. Niño
Complete Address:	#23 APPLE STREET PUROK 1
Contact Number:	09876456874
Email Address:	gastrinegastrine@gmail.com

**Family Information:**

Father's Name:	PEDRO DELA CRUZ
Mother's Name:	MARIA DELA CRUZ
Father's Job:	DRIVER

**School and Therapy Information:**

Number of Family Members:	4
Benefits:	SSS, PAG-IBIG, GSIS
School Name:	STO NINO ELEMENTARY SCHOOL
Grade Level:	4-6
School Schedule:	Morning
School Days:	Monday, Tuesday, Wednesday, Thursday, Friday
Therapy Schedule:	Afternoon
Diagnosis:	ADHD, Autism Spectrum Disorder
Other Conditions:	N/A

**Assessment and Documentation:**

Assessment Date:	Mon Jan 06 2025
Reassessment Date:	N/A
Testing Center:	PGH
PWD ID No.:	15123412
Date Issued:	Fri Jan 24 2025
Validity:	Fri Jan 31 2025 00:00:00 GMT+0000 (Coordinated Universal Time)

[Back to Students List](#)

The interface shows the details of a student in “Masterlist” for Admin User.



## POLYTECHNIC UNIVERSITY OF THE PHILIPPINES

**Figure 46. Add New User in User Management Page**

A screenshot of a web browser showing the 'Add New Teacher' form. The left sidebar has a 'User Management' section with 'Add New User' selected. The main form has fields for Date Hired (01/23/2025), Last Name, First Name, Middle Name, Suffix, Cellphone Number, Email Address, and Default Password (csn.Pque001). A blue 'Add Teacher' button is at the bottom.

The interface shows the information of adding teacher in “User Management” for Admin User.

**Figure 47. Manage Users in User Management Page**

A screenshot of a web browser showing the 'Manage Users' table. The left sidebar has a 'User Management' section with 'Manage User' selected. The table has columns for User ID, Name, Email Address, Status, Date Hired, and Action. One row is shown: CSN001, ALEX LOPEZ, thirteenthdum77@gmail.com, Active, January 23, 2025, with 'View' and 'Deactivate' buttons in the Action column.

The interface shows the information of managing teacher in “User Management” for Admin User. Admin User can view and deactivate teacher.



## POLYTECHNIC UNIVERSITY OF THE PHILIPPINES

**Figure 48. Teacher Details in User Management Page**

A screenshot of a web-based user management system. The title bar shows the URL: "cin-paranaque-center.onrender.com/admin/teacher-profile/6792b1181f30d21646a0e081". The main content area is titled "Teacher Profile of ALEX". It is divided into three columns: "Personal Information", "Employment Information", and "Government IDs".

Personal Information	Employment Information	Government IDs
Full Name: ALEX SANTOS LOPEZ	Position Title: Administration Officer	GSIS No.: 5632523
Employee ID: CSN001	Plan Tilla Item No.: 5	PhilHealth No.: 3252
Date Hired: January 23, 2025	Salary Grade: 9	Pag-IBIG No.: 5235325
Email: thirteenthdum777@gmail.com	Monthly Salary: 30000	SSS No.: 3542
Phone Number: 09987264782		TIN No.: 6266623
Address:		Precinct No.: 425325235
		Voter ID: 623623626

A circular profile picture of the teacher is displayed on the left. At the bottom right of the page is a teal-colored "Back" button.

The interface shows the information of a teacher in “User Management” for Admin User.

**Figure 49. Generate Student Masterlist Report in Generate Report Page**

A screenshot of a web-based administrative interface. The URL in the address bar is "cin-paranaque-center.onrender.com/admin/genMasterlistReport". The top navigation bar includes the Paranaque Center for Children with Special Needs logo and the user name "jetrobin pobleto superAdmin".

The left sidebar contains the following navigation items:

- Dashboard
- Student Appointment >
- Student Management >
- User Management >
- Generate Report >
- Students Masterlist
- Individual Students
- Settings >

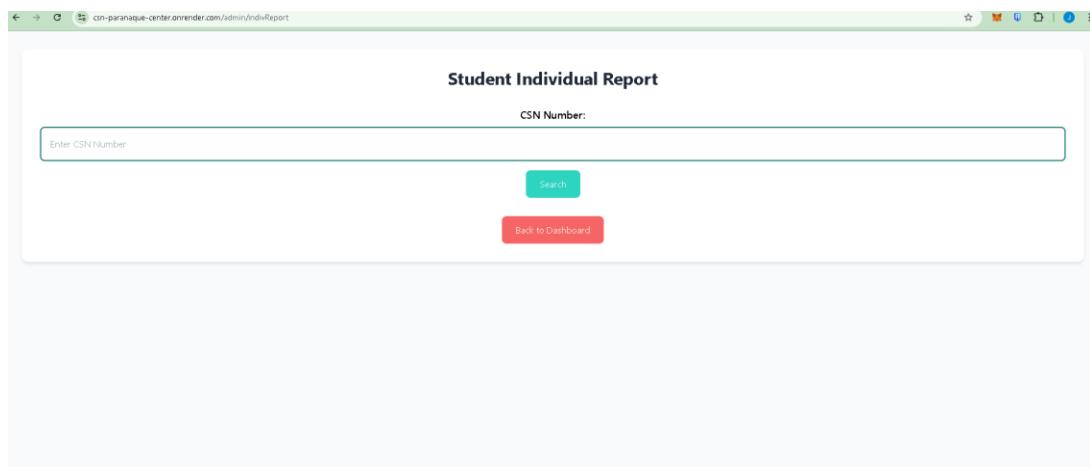
The main content area is titled "Generate Student Masterlist Report". It features three input fields: "From Date" (mm/dd/yyyy), "To Date" (mm/dd/yyyy), and "Gender" (a dropdown menu with "All" selected). Below these fields is a teal-colored "Generate Report" button.



## POLYTECHNIC UNIVERSITY OF THE PHILIPPINES

The interface shows the brief information of students to be generated into a printable pdf form in “User Management” for Admin User.

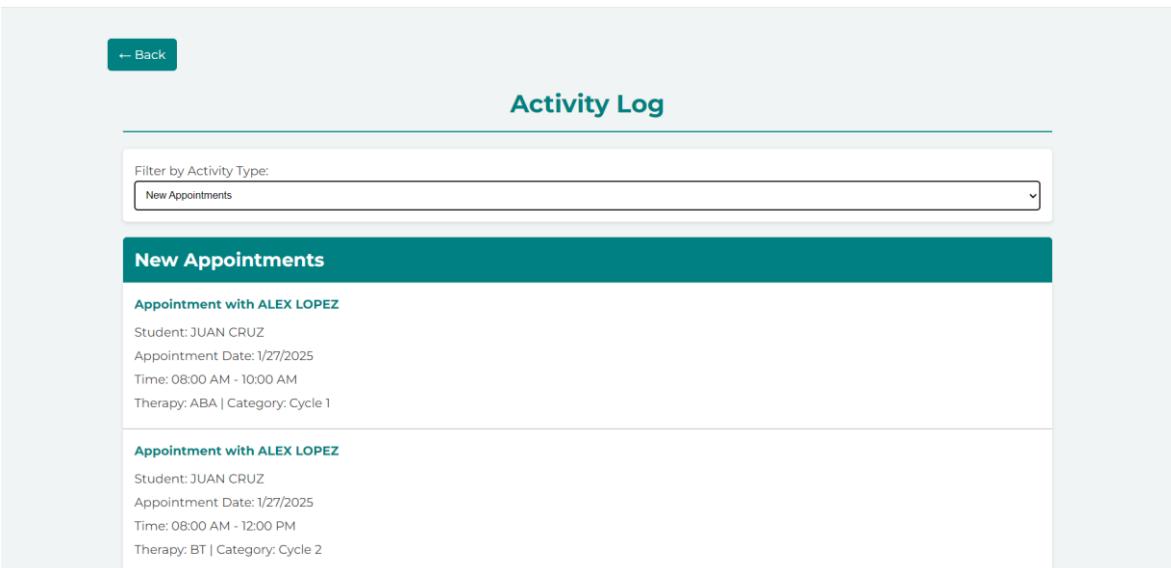
**Figure 50. Individual Student Report in Generate Report Page**



A screenshot of a web browser showing the "Student Individual Report" page. The URL in the address bar is "cn-paranaque-center.onrender.com/admin/indiReport". The page has a header "Student Individual Report" and a sub-header "CSN Number:". Below these are two input fields: one for "Enter CSN Number" and a "Search" button. At the bottom right is a "Back to Dashboard" button.

The interface shows the information of individual student in “Generate Report” for Admin User.

**Figure 51. Activity log in Setting Page**



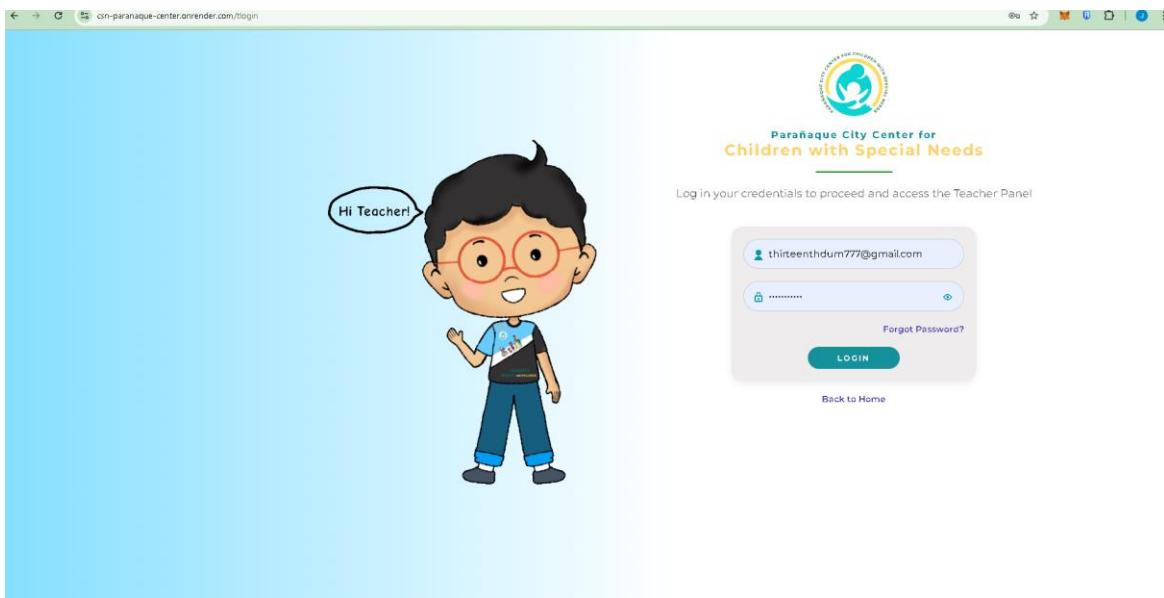
A screenshot of a web browser showing the "Activity Log" page. The title "Activity Log" is at the top. A "Back" button is on the left. A dropdown menu "Filter by Activity Type:" is set to "New Appointments". The main area shows two sections: "New Appointments" and "Appointment with ALEX LOPEZ". The "New Appointments" section contains one item: "Appointment with ALEX LOPEZ" for Student JUAN CRUZ on 1/27/2025 from 08:00 AM to 10:00 AM, Therapy ABA, Category Cycle 1. The "Appointment with ALEX LOPEZ" section contains one item: "Appointment with ALEX LOPEZ" for Student JUAN CRUZ on 1/27/2025 from 08:00 AM to 12:00 PM, Therapy BT, Category Cycle 2.

The interface shows the Activity Log in “Settings” for Admin User. Activity Log records Calendar of Activities, New Appointment, and Rescheduling Appointments.



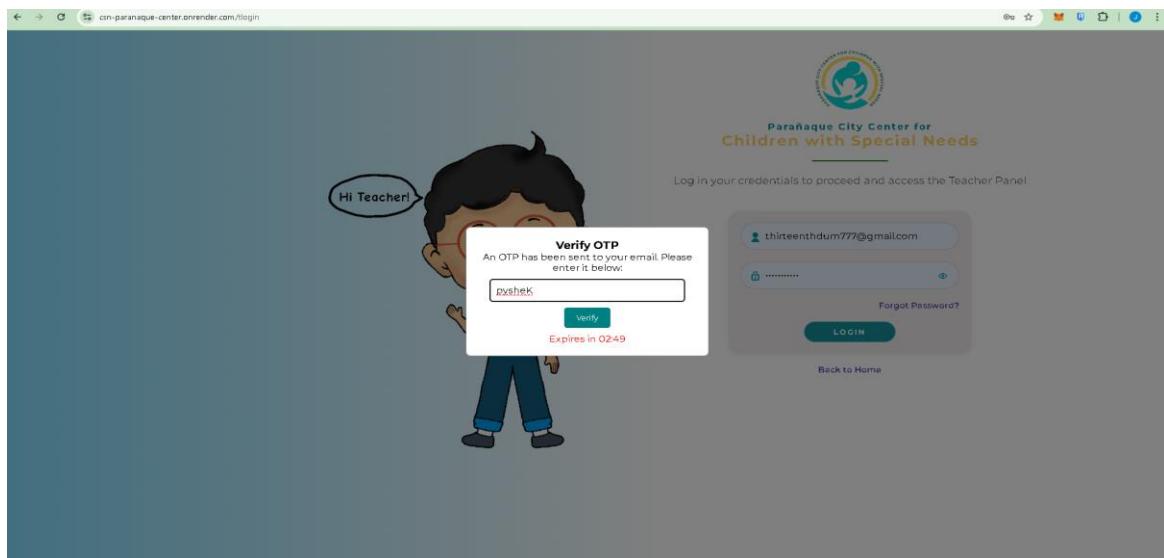
## POLYTECHNIC UNIVERSITY OF THE PHILIPPINES

**Figure 52. Teacher Login Page**



The interface shows the “Admin Login” page to be accessed by Admin User.

**Figure 53. One-time Password for Teacher Login Page**



The interface shows the “OTP Modal” page to be filled by Teacher User’s email sent via Gmail. Two-factor Authentication was implemented to improve security of the system.



## POLYTECHNIC UNIVERSITY OF THE PHILIPPINES

**Figure 54. Teacher Dashboard Page**

A screenshot of a web-based dashboard for a teacher. The top navigation bar includes links for "Dashboard", "Student Appointment", "Student Management", and "Profile". On the right, a user profile for "ALEX LOPEZ" (Teacher) is shown. The main content area is titled "New Students" and displays a table with two rows of student information:

CSN No.	Student Name	Age	Diagnosis
2024-CSN-000-01	JUANA GOLEZ	3	Cerebral Palsy, Down Syndrome
2022-CSN-000-01	JUAN CRUZ	10	ADHD, Autism Spectrum Disorder

The interface shows the “Dashboard” for Teacher User. Schedule, Student List, Student Progress, and New Students added are all displayed in the Admin User’s dashboard.

**Figure 55. Schedule Page**

A screenshot of the "Teacher Schedule" page. The top navigation bar and user profile are identical to the dashboard. The main content area is titled "Teacher Schedule" and specifies the week from "Monday, January 20, 2025 - Friday, January 24, 2025". A message "No appointment schedule" is centered on the page. Navigation buttons for "Previous Week" and "Next Week" are located at the bottom of the schedule area.

The interface shows the “Schedule” page to be accessed by Teacher User. Teacher can view assigned students to them specifically.



## POLYTECHNIC UNIVERSITY OF THE PHILIPPINES

**Figure 56. Student Page**

A screenshot of a web-based application interface titled "Paranaque Center for Children with Special Needs". The top navigation bar includes links for "Dashboard", "Student Appointment", "Student Management", and "Profile". On the right, a user profile for "ALEX LOPEZ" (Teacher) is visible. The main content area shows a table titled "Student List as of Thursday, January 23, 2025". The table has columns for "CSN No", "Name", "Time", and "Status". A message indicates "No appointments found for this date." Below the table are buttons for "Previous Day" and "Next Day".

CSN No	Name	Time	Status	Action
				No appointments found for this date.

The interface shows the “Schedule” page to be accessed by Teacher User. Teacher can declare a student as Present or Absent and record it in the data.

**Figure 57. Student Progress Page**

A screenshot of a web-based application interface titled "Student Progress". The top navigation bar includes a search bar labeled "Search students..". The main content area shows a table titled "Student Progress". The table has columns for "CSN ID", "Name", "Age", "Gender", "Diagnosis", and "Action". Two rows of data are listed:

CSN ID	Name	Age	Gender	Diagnosis	Action
2022-CSN-000-01	CRUZ JUAN DELA	10 yrs old	Male	ADHD;Autism Spectrum Disorder	<a href="#">View Details</a>
2024-CSN-000-01	GOLEZ JUANA SANTOS	3 yrs old	Female	Cerebral Palsy;Down Syndrome	<a href="#">View Details</a>

A red "Back to Dashboard" button is located at the bottom right of the table.

The interface shows the “Student Progress” for Teacher User. Searchable and viewable information of the student is available.



## POLYTECHNIC UNIVERSITY OF THE PHILIPPINES

**Figure 58. Details in Student Progress Page**

A screenshot of a web browser displaying the "Student Progress" page. The title bar shows the URL: csn-paranaque-center.onrender.com/teacher/studentsProgress/6792aa926291ab77af2722d. The main content area is titled "Progress Details for CRUZ JUAN DELA". It displays two sections: "ABA" and "BT". Each section includes a teacher name (ALEX LOPEZ), category (Cycle 1 or Cycle 2), and a table with columns for Date, Time, and Status. Both entries show a date of 1/30/2025 or 1/27/2025, time from 08:00 AM to 10:00 AM or 12:00 PM, and status as "Pending". A "Back to Student List" button is at the bottom.

The interface shows the details of student in “Student Progress” for Admin User.

**Figure 59. Make Appointment in Student Appointment Page**

A screenshot of a web browser displaying the "Student Appointment" page. The title bar shows the URL: csn-paranaque-center.onrender.com/teacher/t\_make\_an\_appointment. The left sidebar shows navigation links: Dashboard, Student Appointment (selected), Add New Appointment, Manage Appointment, Student Management, and Profile. The main content area is titled "Student Appointment" and includes a search bar. A table lists two students: CRUZ JUAN DELA (CSN NO. 2022-CSN-000-01) and GOLEZ JUANA SANTOS (CSN NO. 2024-CSN-000-01). Each student row has a "Make an Appointment" button. The top right corner shows the teacher's profile: ALEX LOPEZ, Teacher.

The interface shows the information on making an appointment in “Student Appointment” for Teacher User. Making an appointment for students that is scheduled for therapy session.



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**Figure 60. Schedule Appointment in Student Appointment Page**

The screenshot shows the 'Add Appointment' form for a student. The left sidebar has a 'Paranaque Center for Children with Special Needs' logo and navigation links: Dashboard, Student Appointment, Student Management, and Profile. The main area is titled 'Add Appointment' under 'PERSONAL INFORMATION'. It includes fields for CSN Number (2022-CSN-000-01), Last Name (CRUZ), First Name (JUAN), Middle Name (DELA), Gender (Male), and Email Address (gastrinegastrine@gmail.com). Below this is the 'APPOINTMENT DETAILS' section with a Date of Appointment field (mm/dd/yyyy) and a Time of Appointment dropdown set from 08:00 AM to 08:00 AM. Other fields include Therapy Session (Select Therapy Session), Category (Select Category), and Teacher (Select a Teacher). A large green 'Add Appointment' button is at the bottom.

This screenshot shows the same 'Add Appointment' form but with more fields visible. The 'APPOINTMENT DETAILS' section includes a 'Time of Appointment' dropdown with a range from 08:00 AM to 08:00 AM. Below it are dropdowns for 'Therapy Session', 'Category', and 'Teacher'. The 'Add Appointment' button is at the bottom.

The interface shows the information of scheduling an appointment in "Student Appointment" for Teacher User. Making an appointment of students scheduled for therapy session.



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**Figure 61. Manage Appointment in Student Appointment Page**

A screenshot of a web application interface titled "Manage Appointments". The left sidebar shows navigation links: Dashboard, Student Appointment, Student Management, and Profile. The main content area displays a table with two rows of appointment data. Each row includes columns for CSN No., Name, Date of Appointment, Time of Appointment, and Actions (with a "Reschedule" button). A search bar at the top right says "Search by student name or CSN Nr." and a message at the bottom right says "Showing 1 to 2 of 2 entries".

CSN No.	Name	Date of Appointment	Time of Appointment	Actions
2022-CSN-000-01	CRUZ JUAN	January 27, 2025	08:00 AM	<button>Reschedule</button>
2022-CSN-000-01	CRUZ JUAN	January 30, 2025	08:00 AM	<button>Reschedule</button>

The interface shows the information of rescheduling appointment in “Student Appointment” for Teacher User. Managing an appointment for students that scheduled for therapy session. Rescheduling is an option.

**Figure 62. Reschedule Modal on Manage Appointment in Student Appointment Page**

A screenshot of a modal window titled "Reschedule Appointment" overlaid on the "Manage Appointments" page. The modal contains fields for "CSN No.", "Student Name" (set to CRUZ JUAN), and "Previous Appointment Date" (set to 2025-01-27). It also lists "Previous Appointment Time" (08:00 AM - 12:00 PM), "Therapy Type" (BT), "Category" (Cycle 2), and "New Appointment Date" (01/27/2025). A "Reason for Rescheduling" text area is present. At the bottom are "Cancel" and "Confirm" buttons. The background shows the same table from Figure 61 with two entries, and a message at the bottom right says "Showing 1 to 2 of 2 entries".

Time of Appointment	Actions
08:00 AM	<button>Reschedule</button>
08:00 AM	<button>Reschedule</button>

The interface shows the modal for Rescheduling appointments in “Student Appointment” for Teacher User. Rescheduling an existing appointment informs the client.



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**Figure 63. Add New Student in Student Management Page**

The screenshot shows the 'Add New Student' form. On the left sidebar, under 'Student Management', 'Add New Student' is selected. The main form has sections for 'Child Information' and 'Family Information'. In 'Child Information', fields include 'In-take Date' (mm/dd/yyyy), 'Last Name', 'First Name', 'Middle Name', 'Suffix', 'Gender' (Select Gender), 'Date of Birth' (mm/dd/yyyy), 'Age', 'Choose a District' (Select District), 'Choose a Barangay' (Select Barangay), 'Complete Address', 'Contact Number', and 'Email Address'. In 'Family Information', fields include 'Pangalan ng Tatay' (Tiabaho ng Tatay), 'Pangalan ng Nanay' (Trabaho ng Nanay), 'Working Status' (Select Working Status), 'Income Bracket' (Select Income Bracket), and 'Ilan ang Miyembro ng Pamilya (Nanay, Tatay, Mga Anak)'. At the bottom, there are checkboxes for 'Benefits/Memberships': SSS, 4Ps, PAG-IBIG, GSIS, PWD, Senior Citizen, Solo Parent, and Other.

The screenshot shows the 'Add New Student' form with a focus on 'Health Information'. The sidebar remains the same. The 'Health Information' section includes fields for 'Oras ng Pasok sa School' (Select), 'Araw ng Pasok sa School' (Monday through Sunday, N/A), 'Preferred Schedule of Therapy' (Select), 'Diagnosis' (checkboxes for ADHD, Autism Spectrum Disorder, Cerebral Palsy, Down Syndrome, Epilepsy, Global Developmental Delay, Hearing Loss, Hydrocephalus, Intellectual Disability, Language Disorder, Learning Disability, Speech Delay, Other (Specify Below)), 'Other Conditions (Specify)' (text input), 'Date of Assessment' (mm/dd/yyyy), 'Date of Re-Assessment' (mm/dd/yyyy), 'Testing Center' (text input), 'PWD ID No.' (text input), 'Date Issued' (mm/dd/yyyy), 'Validity (Expiration Date)' (mm/dd/yyyy), 'Upload Photo' (Choose File, No file chosen), 'Allow CSN Consent for taking Photos and Videos' (checkboxes for Yes and No), and a large teal 'Add Student' button at the bottom.

The interface shows the information of adding a student in "Student Management" for Teacher User. Requirements are based on the Client and contact person in the CSN Center.



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**Figure 64. Edit Profile in Profile Page**

A screenshot of a web-based application interface. At the top right, there is a user profile for "ALEX LOPEZ" (Teacher). On the left, a sidebar menu includes "Dashboard", "Student Appointment", "Student Management", and "Profile" (selected), with sub-options "My Profile" and "Logout". The main content area has two sections: "Basic Information" and "Job Information".

**Basic Information**

Name: ALEX SANTOS LOPEZ  
Employee Id: CSN001  
Date Hired: January 23, 2025  
Email: thirteenthdum777@gmail.com  
Phone Number: 09987264782  
Address:

**Job Information**

Position Title: Administration Officer  
Plantilla Item No.: 5  
Salary Grade (SG): 9  
Monthly Salary: 30000  
GSIS No: 5632523  
PhilHealth No: 3252  
Pag-IBIG No: 5235326  
SSS No: 5542  
TIN No: 626623  
Precinct No: 425325235  
Voter ID: 625623626

[Edit Profile](#)

The interface shows profile of a teacher for in “Profile” for Teacher User. Editing Profile updates the information of the teacher.

**Figure 65. Edit Profile in Profile Page**

A screenshot of the "Edit Profile" page. The left sidebar is identical to Figure 64. The main area contains a title "Edit Profile" and several input fields:

**Profile Picture:**  
 Choose File No file chosen  
Current Picture:

**Employee Id:**  
CSN001

**Last Name:**  
LOPEZ

**First Name:**  
ALEX

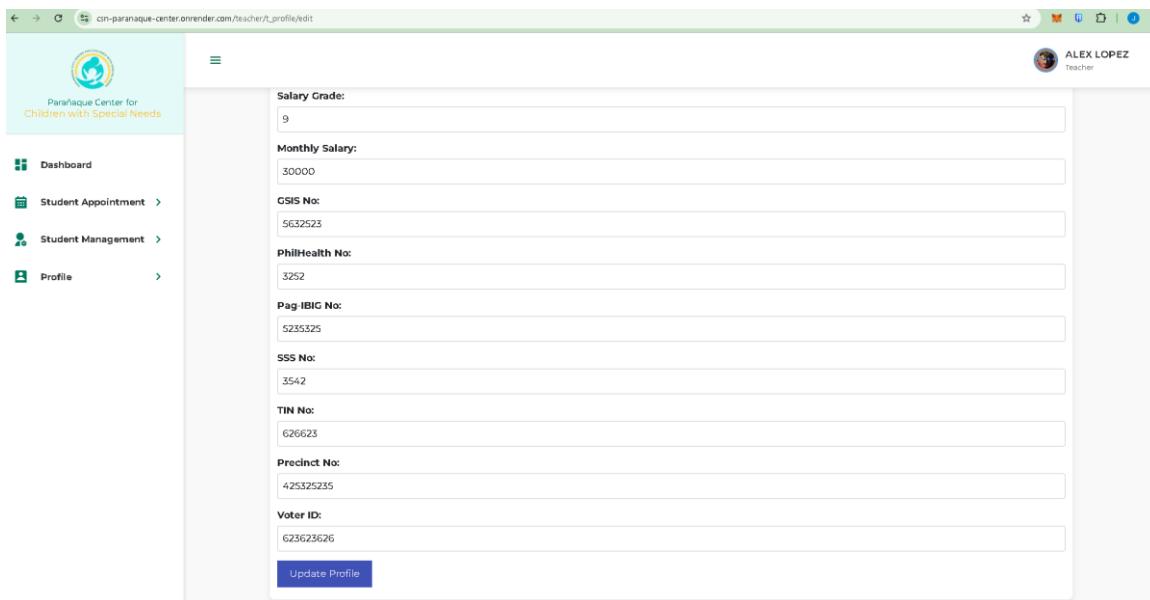
**Middle Name:**  
SANTOS

**Suffix:**  
[empty input field]

**Email Address:**  
thirteenthdum777@gmail.com



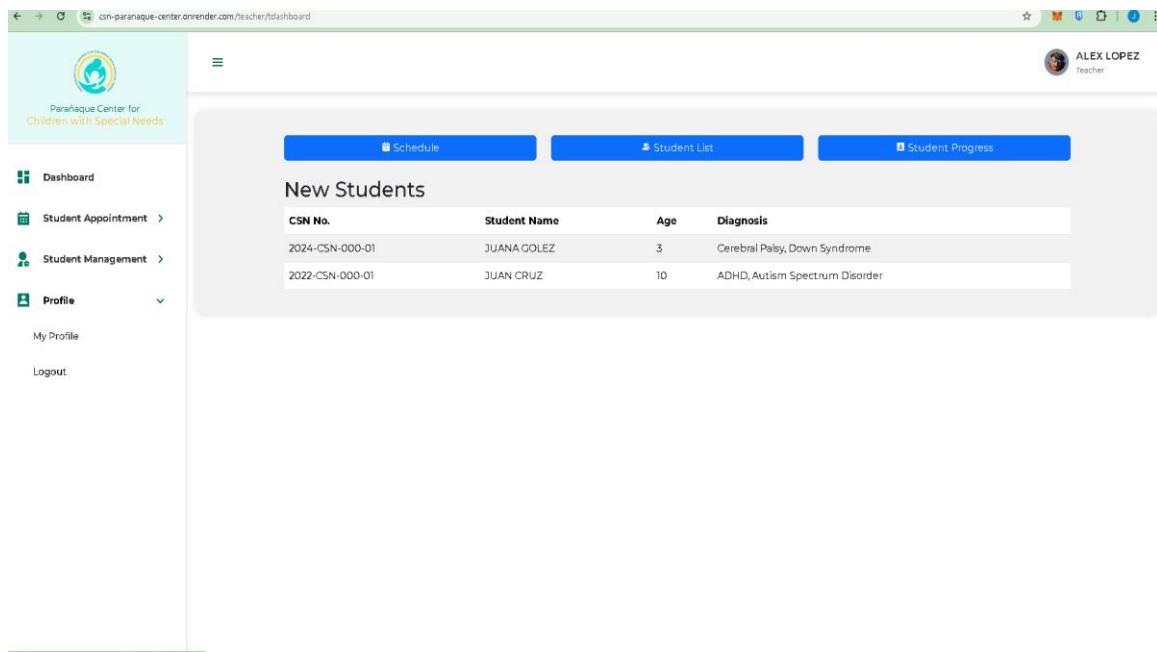
## POLYTECHNIC UNIVERSITY OF THE PHILIPPINES



A screenshot of a web application interface for a teacher profile. The left sidebar shows navigation links: Dashboard, Student Appointment, Student Management, and Profile. The Profile section is currently selected and expanded, showing sub-links: My Profile and Logout. The main content area is titled "Profile" and contains fields for updating personal information: Salary Grade (9), Monthly Salary (30000), GSIS No. (5632523), PhilHealth No. (3252), Pag IBIG No. (5235325), SSS No. (3542), TIN No. (626623), Precinct No. (425325235), and Voter ID (G23623626). A blue "Update Profile" button is at the bottom.

The interface shows the editable information of a teacher for in “Profile” for Teacher User.

**Figure 66. Logout in Profile Page**



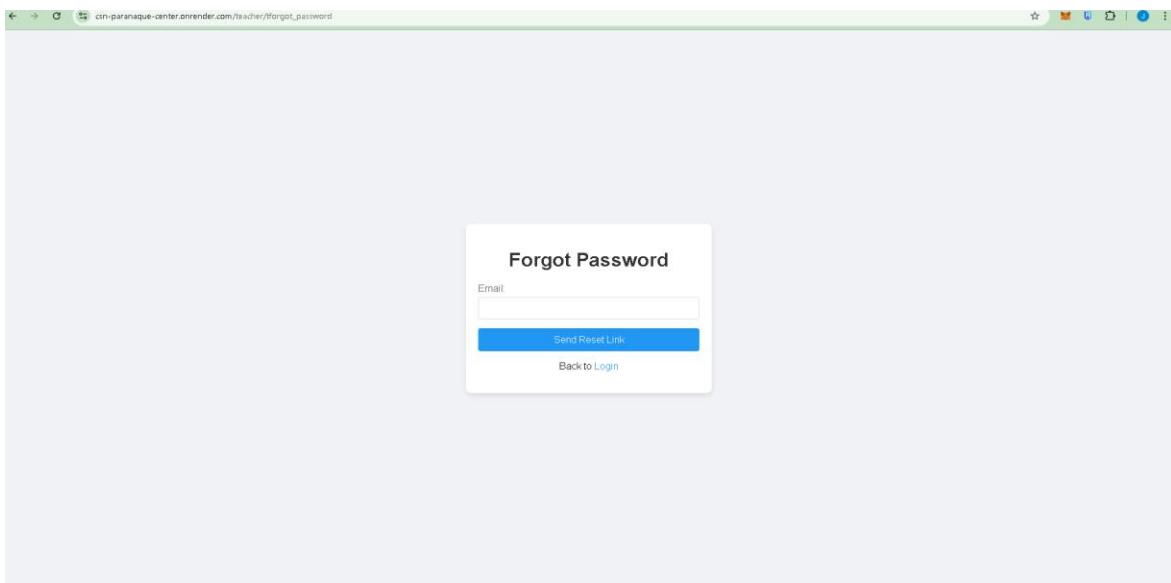
A screenshot of the teacher dashboard after logging out. The left sidebar shows the same navigation links as before. The main content area now displays three tabs: Schedule, Student List, and Student Progress. The "Student List" tab is active, showing a table titled "New Students". The table has columns: CSN No., Student Name, Age, and Diagnosis. It lists two students: JUANA COLEZ (CSN 2024-CSN-000-01, 3 years old, Cerebral Palsy, Down Syndrome) and JUAN CRUZ (CSN 2022-CSN-000-01, 10 years old, ADHD, Autism Spectrum Disorder).

The interface shows the information on Logging out in “Profile” for Teacher User.



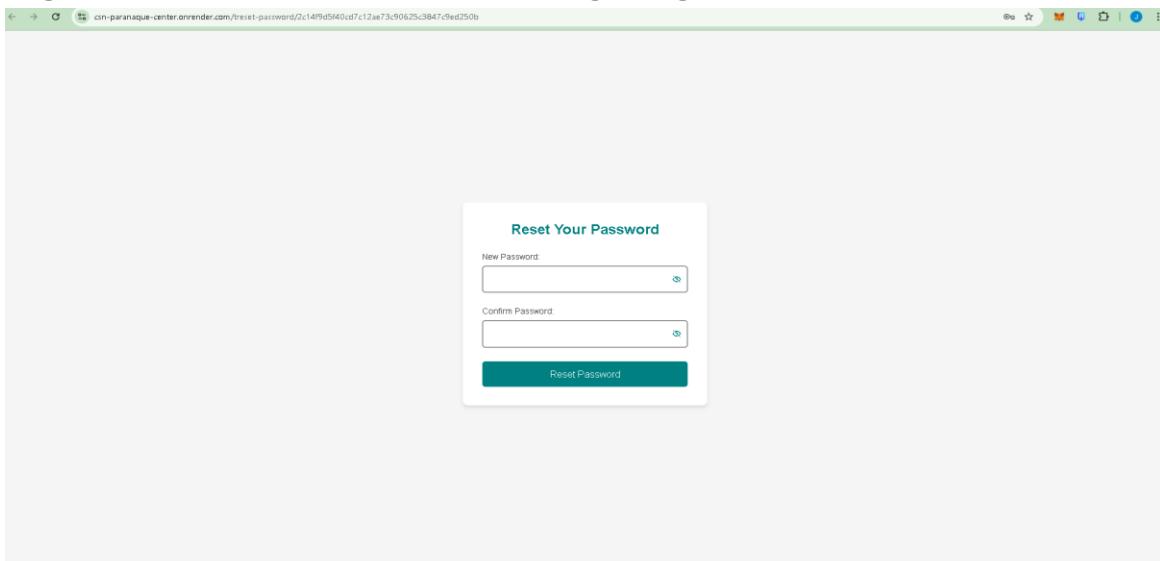
## POLYTECHNIC UNIVERSITY OF THE PHILIPPINES

**Figure 67. Forgot Password in Teacher Login Page**



The interface shows the information on the process of resetting the password of Teacher User and a link sent via email into the Gmail of Teacher.

**Figure 68. Reset Password in Teacher Login Page**

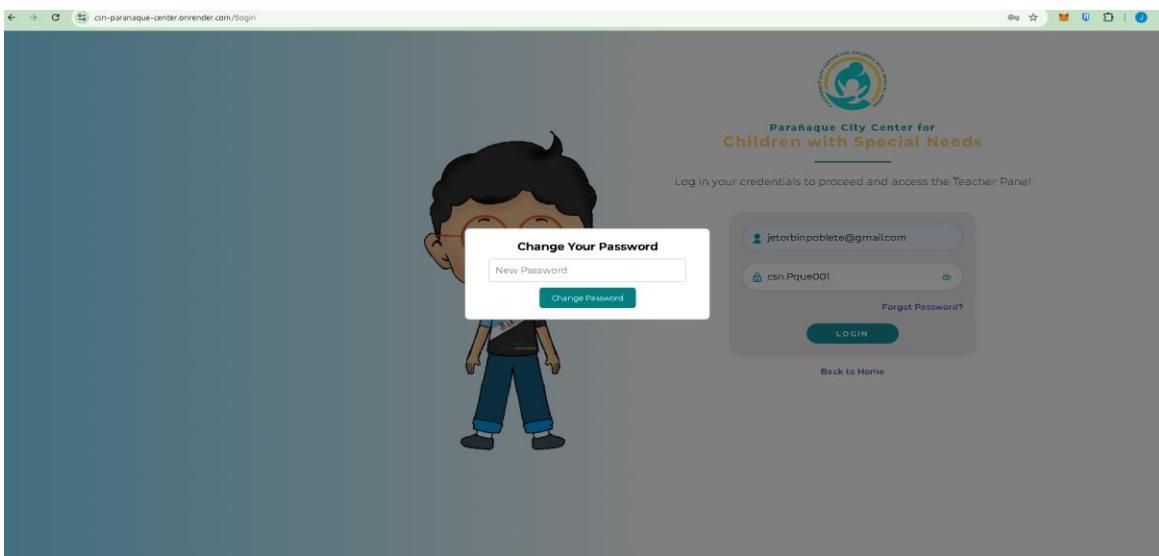


The interface shows the information on the process of resetting the password of the teacher. Typing the new password updates the current password of the Teacher User.



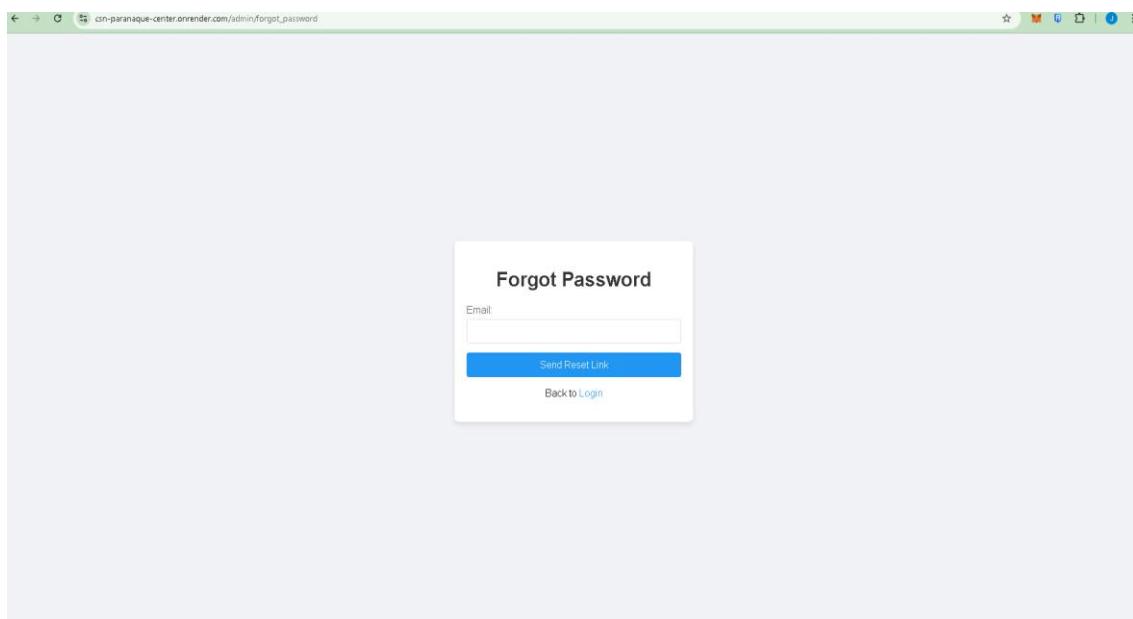
## POLYTECHNIC UNIVERSITY OF THE PHILIPPINES

**Figure 69. New Account in Teacher Login Page**



The interface shows that newly added account for teacher added by Admin User needs to update their password since the system gives the newly added teacher a default password.

**Figure 70. Forgot Password in Admin Login Page**

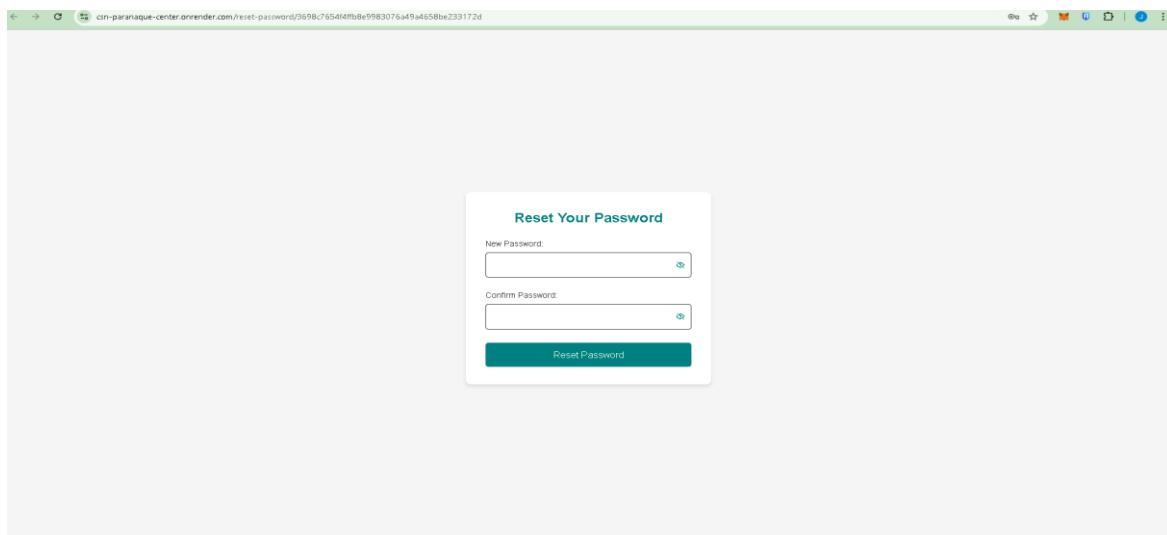


The interface shows the information on the process of resetting the password of Admin User and a link sent via email into the Gmail of Admin.



## POLYTECHNIC UNIVERSITY OF THE PHILIPPINES

**Figure 71. Reset Password in Admin Login Page**



The interface shows the information on the process of resetting the password of the admin. Typing the new password updates the current password of the Admin User.



## POLYTECHNIC UNIVERSITY OF THE PHILIPPINES

### Chapter 4

### RESULTS AND DISCUSSION

The system creation process and an analysis of the system performance based on user evaluation and feedback are all covered in this chapter along with the results and discussion.

### Design and Development of the Proposed System

**Table 18: Project Charter**

<b>Appointment and Monitoring System in Children with Special Needs Center Parañaque City</b>	
<b>PROJECT CHARTER</b>	
<b>PROJECT NAME</b>	A Comprehensive Appointment and Monitoring System in Children with Special Needs Center Parañaque City
<b>PROJECT LEADER</b>	Prof. Jefferson A. Costales
<b>PROJECT MANAGER</b>	Jetrobin T. Poblete
<b>CLIENT</b>	CSN Center Parañaque
<b>PROJECT SPONSOR</b>	Not Applicable
<b>START DATE</b>	August 2024
<b>COMPLETION DATE</b>	January 2025
<b>PROJECT DETAILS</b>	
<b>EXECUTIVE SUMMARY</b>	
<b>OBJECTIVE</b>	To design, develop, and implement a web-based appointment and monitoring system for CSN Center Parañaque
<b>EXPECTED BENEFITS</b>	<ul style="list-style-type: none"><li>The system streamlines the appointment and monitoring system allowing filtering, retrieving,</li></ul>



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	<p>storing, updating, and managing information in the CSN Center Parañaque.</p> <ul style="list-style-type: none"><li>• It provides accurate and comprehensive data and enhanced security for the protection of sensitive information system.</li><li>• The system can be access from any location as long as it have internet connection as it aims to be scalable and flexible.</li></ul>
--	---

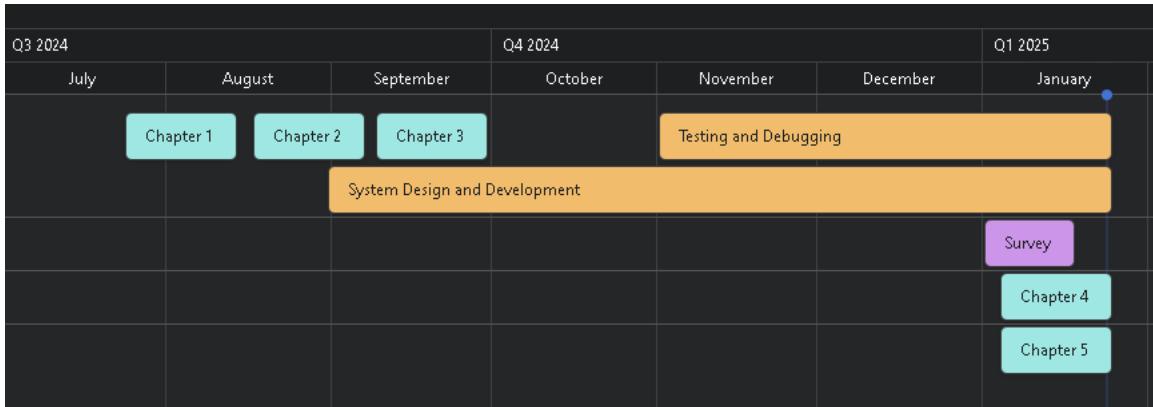
### STAKEHOLDERS AND THEIR RESPONSIBILITIES

Stakeholders	Role	Responsibility
Jetrobin T. Poblete	Project Manager/Backend and Frontend Developer, Researcher	Planning, Development, Resources, System Design, Executing Project, System Functionality, Team Coordination
Mart R. Peña	Quality Assurance, Backend and Frontend Developer, UI Design, Researcher	Documentation, Resources, Team Coordination, System Functionality, Development, System Design
Lester V. Camino	Backend and Frontend Developer, Researcher	Resources, Development, System Design, System Functionality, Documentation
Prof. Erwin E. Acorda	Research Adviser	Checking, Monitoring
Nessie Baculo	Administrator of CSN - Client	Approval, Feedback, Requirement Specification, Communication, Monitoring



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**Figure 72. Project Timeline: Gantt Chart**



In Figure 72, it illustrates a comprehensive system development and research timeline spanning from July 2024 to January 2025. In July 2024, the project's basic research was documented in Chapter 1, which was followed by Chapters 2 and 3 in August and September, respectively. Parallel execution of theoretical and practical work was demonstrated by a significant System Design & Development phase that spanned the whole project period in addition to these chapter advancements. While system development proceeded, testing and debugging work started in November 2024. The team began making changes to Chapters 1-3 as the project moved forward into December 2024, taking into the account lessons learned throughout the development phase. The completion of Chapters 4 and 5 as well as a final Survey phase were part of the final stages in January 2025. This timeline illustrates a methodical strategy in which system development and academic documentation advanced concurrently, with suitable testing and refinement stages planned prior to project conclusion.



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### Results

#### Evaluation of the Proposed System from End-User (CSN administrator and teachers)

The assessment of the proposed system for CSN was carried out using the ISO 25010 quality model. To gather feedback, a survey questionnaire was created that focused on important quality characteristics such as Functional Suitability, Usability, and Performance Efficiency. Participants, including administrators and selected teachers, rated various statements on a 5-point Likert scale to share their insights.

**Table 19. Functional Suitability (ISO STANDARD 25010)**

Functional Suitability	5	4	3	2	1	Mean	Verbal Interpretation
<i>Completeness: The set of functions covers all the specified tasks and user objectives.</i>	0	9	0	0	0	4.00	Agree
<i>Correctness: The function provides the correct results with the needed degree of precision.</i>	0	9	0	0	0	4.00	Agree
<i>Appropriateness: The functions aid in achieving designated tasks and goals.</i>	1	8	0	0	0	4.11	Agree
Average Mean					4.04	Agree	

The weighted average of 4.04 demonstrates a high level of effectiveness in addressing the Statement of Problem's objective to enhance functional suitability.



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Table 20. Usability (ISO STANDARD 25010)

Usability	5	4	3	2	1	Mean	Verbal Interpretation
<i>Appropriateness Recognizability: Users can recognize whether a product or system is appropriate for their needs.</i>	0	9	0	0	0	4.00	Agree
<i>Operability: A product or system is easy to operate, control and appropriate to use.</i>	2	7	0	0	0	4.22	Agree
<i>User Error Protection: A product or system protects users against making errors.</i>	0	3	6	0	0	3.56	Neutral
<i>User interface aesthetics: A user interface enables pleasing and satisfying interactions for the user.</i>	0	8	1	0	0	3.89	Neutral
<i>Accessibility: A product or system can be used by people with the widest range of characteristics and capabilities to achieve a specified goal in a specified context of use.</i>	0	9	0	0	0	4.00	Agree
Average Mean					3.93	Neutral	

The weighted average of 3.93 demonstrates a medium level of effectiveness in addressing the Statement of Problem's objective to enhance usability.



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**Table 21. Performance Efficiency (ISO STANDARD 25010)**

Performance Efficiency	5	4	3	2	1	Mean	Verbal Interpretation
<i>Time-behavior: The response and processing times and throughput rates of a product or system, when performing its functions, meet requirements.</i>	1	5	3	0	0	3.89	Neutral
<i>Resource utilization: The amounts and types of resources used by a product or system, when performing its functions, meet requirements.</i>	1	6	2	0	0	3.86	Neutral
<i>Capacity: The maximum limits of the product or system parameters meet requirements.</i>	0	7	2	0	0	3.89	Agree
Average Mean				3.88	Neutral		

The weighted average of 3.88 demonstrates a medium level of effectiveness in addressing the Statement of Problem's objective to enhance performance efficiency.

**Table 22. Data Summary Overview**

Item Category	Mean Score	Descriptive Equivalent
Functional Suitability	4.04	Agree
Usability	3.93	Neutral
Performance Efficiency	3.88	Neutral
TOTAL	3.95	Agree



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### Evaluation of the Proposed System from IT Expert/Professional

The ISO Standardized Questionnaire was used to assess the suggested system from the perspective of an IT expert or professional. Four areas were used to categorize the survey: security, performance efficiency, usability, and functional suitability. A 5-point Likert scale was used by participants to score statements from each category. A total of 11 responses were collected from IT Expert/Professional respondents.

**Table 23. Functional Suitability (ISO STANDARD 25010)**

Functional Suitability	5	4	3	2	1	Mean	Verbal Interpretation
<i>The set of functions covers all the specified tasks and user objectives.</i>	3	8	0	0	0	4.27	Strongly Agree
<i>The function provides the accurate results with the required level of precision.</i>	6	4	1	0	0	4.45	Strongly Agree
<i>The functions aid in achieving designated tasks and goals.</i>	6	5	0	0	0	4.54	Strongly Agree
Average Mean				4.42	Strongly Agree		

The results indicate that the system's functional suitability is highly effective, as all evaluated aspects received a "Strongly Agree" rating with an average mean of 4.42. This suggests that the system successfully meets user objectives, provides accurate results, and facilitates task completion efficiently.



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**Table 24. Usability (ISO STANDARD 25010)**

Usability	5	4	3	2	1	Mean	Verbal Interpretation
<i>Users can recognize whether a product or system is appropriate for their needs.</i>	6	5	0	0	0	4.54	Strongly Agree
<i>A product or system is easy to operate, control and appropriate to use.</i>	7	3	1	0	0	4.54	Strongly Agree
<i>A product or system protects users against making errors.</i>	3	5	2	1	0	3.9	Agree
<i>A user interface enables pleasing and satisfying interactions for the user.</i>	4	7	0	0	0	4.36	Strongly Agree
<i>A product or system can be used by people with the widest range of characteristics and capabilities to achieve a specified goal in a specified context of use.</i>	6	3	2	0	0	4.36	Strongly Agree
Average Mean					4.34	Strongly Agree	

The table shows that the system's interaction capability is highly rated, with an average mean of 4.34, indicating a "Strongly Agree" interpretation. Users find the system easy to operate, appropriate for their needs, and capable of providing satisfying user experience.



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**Table 25. Performance Efficiency (ISO STANDARD 25010)**

Performance Efficiency	5	4	3	2	1	Mean	Verbal Interpretation
<i>The response and processing times and throughput rates of a product or system, when performing its functions, meet requirements.</i>	4	4	3	0	0	4.09	Agree
<i>The amounts and types of resources used by a product or system, when performing its functions, meet requirements.</i>	5	6	0	0	0	4.45	Strongly Agree
<i>The maximum limits of the product or system parameters meet requirements.</i>	3	6	2	0	0	4.09	Agree
Average Mean				4.21	Strongly Agree		

The table indicates that the system's performance efficiency is generally strong, with an average mean of 4.21, interpreted as "Strongly Agree." While resource usage is highly rated, there is slight room for improvement in response times and system limits to better meet user expectations.



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Table 26. Security (ISO STANDARD 25010)

Security	5	4	3	2	1	Mean	Verbal Interpretation
<i>The extent to which a product or system guarantees that data is accessible only to authorized individuals.</i>	8	3	0	0	0	4.73	Strongly Agree
<i>The extent to which a system, product, or component protects against unauthorized access to or alteration of computer programs or data.</i>	7	4	0	0	0	4.64	Strongly Agree
<i>The extent to which the activities of an entity can be uniquely attributed to that entity.</i>	4	2	5	0	0	3.91	Agree
Average Mean					4.07	Agree	

The system's security received an overall rating of 4.07, interpreted as "Agree."

While data protection and unauthorized access prevention were rated highly at 4.73 and 4.64, respectively, traceability scored lower at 3.91. This suggests that while security is strong, improvements in tracking user actions could enhance its effectiveness.

Table 27. Data Summary Overview

Item Category	Mean Score	Descriptive Equivalent
Functional Suitability	4.42	Strongly Agree
Usability	4.34	Strongly Agree
Performance Efficiency	4.21	Strongly Agree
Security	4.07	Agree
TOTAL	4.26	Strongly Agree



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### Chapter 5

#### SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

This section provides an overview of the findings, conclusions drawn from the data collected, and suggestions for further research on the topic of "A Comprehensive Appointment and Monitoring System in Children with Special Needs Center Parañaque City."

#### Summary of Findings

The purpose of the study was to address inefficiencies in CSN Center appointment and monitoring. by creating an automated web-based system at Niño, Parañaque City. The ISO/IEC 25010 quality model was used to evaluate the system, with an emphasis on features including security, dependability, usability, and usefulness.

1. Overall System Effectiveness: Teachers, Administration Officer, and IT specialists gave the system a weighted average of 4.15 (Agree), indicating good effectiveness and user satisfaction. This indicates notable advancements in the accuracy and efficiency of appointment and monitoring.
2. Performance and Functionality: The system received great marks for important features including resource usage and task completion. The outcomes demonstrate the system's capacity to manage workload and preserve operational effectiveness.
3. Usability and Accessibility: Elements like learnability and the aesthetics of the user interface showed that the system is easy to use and suitable for a wide range of users.
4. Impact on Teachers and Administration Officer: Real-time notifications, monitoring, appointment, and status tracking were highly favored by teachers and administration officer, who also observed enhanced communication and transparency.



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### **Addressing the Statement of the Problem**

The study successfully resolved the challenges identified in the statement of the problem:

1. Inaccurate and inefficient management of therapy sessions.

The system eliminated delays and inaccuracies by automating the appointment and monitoring process, enabling teachers to manage schedule with ease. This streamlined issue resolution and reduced processing time.

2. Functionalities and features tailored to the specific needs of CSN Center.

The system provided features and process specifically requested by the administrator.

3. Ineffective use of non-automated processes.

The system made use of technology to automate the process on scheduling appointment, monitoring, and generating information used by teachers and administration officer.

### **Meeting the Objectives**

The study fulfilled its general and specific objectives as follows:

1. Improved Accurate and Efficient Management of Therapy Sessions

The automated system eliminated delays and inaccuracies, enabling teachers to efficiently manage schedules, reduce processing time, and improve session management.

2. Tailored Functionalities for CSN Center

The system was customized to meet the CSN Center's specific needs, providing features such as automated scheduling and real-time updates, which improved operational efficiency.



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### 3. Enhanced Effectiveness Use of Automated Processes

The system automated appointment scheduling, monitoring, and data generation, reducing human error and streamlining administrative tasks, allowing teachers and administrators to focus on core responsibilities.

## Conclusion

The implementation of the "Optimized Therapy Session Management System" at the CSN Center successfully addressed the challenges associated with manual session management. The following conclusions were drawn:

### 1. Efficiency and Responsiveness:

The system significantly reduced delays and errors in managing therapy sessions, streamlining the scheduling process and improving overall administrative workflows.

### 2. User Satisfaction:

The high overall weighted average from all respondent groups highlights the system's effectiveness in meeting the needs of both teachers and administrators at the CSN Center.

### 3. Compliance with Standards:

The system's alignment with industry standards ensures its technical reliability and robustness, providing a dependable solution for managing therapy sessions.

### 4. Enhanced Governance:

By automating appointment scheduling, monitoring, and data generation, the system fostered better governance, enhanced accountability, and promoted greater engagement among teachers and administrators at the CSN Center.



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### Recommendations

Based on the findings, the following suggestions are made for the CSN Center's "Optimized Therapy Session Management System":

1. System Optimization: It is essential to implement ongoing monitoring and regular updates to keep the system efficient, user-friendly, and adaptable to changing needs. Prioritizing improvements in system stability and fault tolerance will help reduce downtime.
2. Scalability: The system should be expanded to include additional features such as real-time analytics, integration with other educational or healthcare systems, and multilingual support to cater to a wider audience and improve accessibility.
3. Training Programs: Regular training sessions for teachers and administrative staff should be organized to ensure effective utilization of the system. This ensures that all users are proficient in managing therapy sessions and using the system to its full potential.
4. Future Integration: Future studies should explore the integration of artificial intelligence (AI) to optimize session scheduling, predict therapy needs, and improve decision-making for both teachers and administrators.
5. User Feedback: Establishing a structured feedback mechanism allows for continuous improvement of the system based on the needs and suggestions of users, ensuring that the system remains relevant and effective in the long term.



## POLYTECHNIC UNIVERSITY OF THE PHILIPPINES

### References:

- Aida-Zade, K., Ismibayli, R., & Rzayeva, S. (2024). *Automated Schedule System for Universities under the Bologna Education Process. Cybernetics and Computer Technologies*, 1, 75–90. <https://doi.org/10.34229/2707-451x.24.1.6>
- Ani~Non, N. J. D., Flores, N. K. K., Otadoy, N. C. S. K., Rodas, N. J. P., Tabaco, N. J. F., Campa~Nera, N. J. D., & Macapagal, N. a. J. (2020). *Classroom Attendance Monitoring System Using Radio Frequency Identification with Web Application. Research Briefs on Information and Communication Technology Evolution*, 6, 108–128. <https://doi.org/10.56801/rebicte.v6i.110>
- Bagheri, F., Behnam, F., Galavi, Z., & Ahmadian, L. (2022). *The use of various appointment systems among patients visiting academic outpatient centers in Kerman and the evaluation of patients' perspective and satisfaction. BMC Health Services Research*, 22(1). <https://doi.org/10.1186/s12913-022-08635-6>
- Batoon, J. A., & Piad, K. C. (2023). *Optimizing Vaccine Access: A Web-Based Scheduling System with Geo-Tagging Integration and Decision Support for Local Health Centers. Open Journal of Applied Sciences*, 13(05), 720–730. <https://doi.org/10.4236/ojapps.2023.135057>
- Batoon, J., Benitez, A., Cajucom, K., Dalusung, J., Faustino, J., Nicole, I., Galvez, D., & Lowell, J. (2022). *Public Health Record Management System: An Up-Close Monitoring System. International Journal of Advanced Trends in Computer Science and Engineering*, 11(3), 96–100. <https://doi.org/10.30534/ijatcse/2022/041132022>



## POLYTECHNIC UNIVERSITY OF THE PHILIPPINES

Beredjiklian, P., Kasper, A. A., Kachooei, A., Plusch, K. J., & D'Amore, T. (2022). *The Effect of Outpatient Web-Based Online Self Scheduling vs. Traditionally Staff Scheduling Systems on Progression to Surgery and No-Show Rates (Preprint)*. <https://doi.org/10.2196/preprints.42974>

Cabaro, B., Paz, G. a. D., Dotingco, J., Almirol, B. J., Borlongan, G., Cebreros, R. O., Diangco, P., Quijalvo, K. P., Tan, J. P., & Tonato, R. R. (2023). *Establishing a national indicator-based surveillance system for hospital bed utilization by COVID-19 patients in the Philippines. Western Pacific Surveillance Response Journal*, 14(5), 33–39. <https://doi.org/10.5365/wpsar.2023.14.5.1038>

Dari, S., Jandra, M., Huda, M., & Maseleno, A. (2020b). *Inequalities in Access of Learning in Primary School: Voices from Children with Special Needs*. *International Journal of Psychosocial Rehabilitation*, 24(1), 356–365. <https://doi.org/10.37200/ijpr/v24i1/pr200138>

De Guzman, M. R. Q., Ordoñez, J. L. N., Somoc Sierra, R. O., & Fuentes, G. S. (2021). *Online Scheduling System for Doctors and Patients in a Hospital. In Proceedings of the International Conference on Industrial Engineering and Operations Management*.

ERRATA. (2006c). *PEDIATRICS*, 118(4), 1808–1809. <https://doi.org/10.1542/peds.2006-2405>

Fadzil, F., Idris, I. B., Nor, N. K., Ismail, J., Tamil, A. M., Noh, K. M., Khamis, N., Ahmad, N. A., Othman, S., & Ismail, R. (2021). *Missed Appointments at a Child Development Centre and Barriers to Access Special Needs Services for Children*



## POLYTECHNIC UNIVERSITY OF THE PHILIPPINES

*in Klang Valley, Malaysia: A Mixed Methods Study. International Journal of Environmental Research and Public Health, 19(1), 325.*  
<https://doi.org/10.3390/ijerph19010325>

Gashumba, U. V., & Wilson, M. (2024). *Developing a System on the Dynamics and Implications of Parental and School Tracking of Children's Activities and Academic Progress. International Journal of Innovative Science and Research Technology (IJISRT), 1533–1541.* <https://doi.org/10.38124/ijisrt/ijisrt24may626>

Köse, B. Z., Çakıcı, A., Coskun, V., Kaymakçı, T., İşlek, L., & Alsadi, M. (2021). A SCHEDULING SYSTEM FOR ENHANCING AND MONITORING WORK PERFORMANCE OF FIELD EMPLOYEES. *Beykent ÜNiversitesi Fen Ve MüHendislik Bilimleri Dergisi, 14(1), 6–14.* <https://doi.org/10.20854/bujse.985510>

Madrid, C. J., & Cagadas, D. O. (2023). DEVELOPMENT OF IN-PATIENT DIGITAL HEALTHCARE SYSTEM: A HEALTH MONITORING DEVICE FOR PATIENT USING IoT. *Sci.Int.(Lahore), 35(4), 417-420.*  
[https://www.researchgate.net/publication/377221240\\_DEVELOPMENT\\_OF\\_IN-PATIENT\\_DIGITAL\\_HEALTHCARE\\_SYSTEM\\_A\\_HEALTH\\_MONITORING\\_DEVICE\\_FOR\\_PATIENT\\_USING\\_IoT](https://www.researchgate.net/publication/377221240_DEVELOPMENT_OF_IN-PATIENT_DIGITAL_HEALTHCARE_SYSTEM_A_HEALTH_MONITORING_DEVICE_FOR_PATIENT_USING_IoT)

Niu, T., Lei, B., Guo, L., Fang, S., Li, Q., Gao, B., Yang, L., & Gao, K. (2023). A Review of Optimization Studies for System Appointment Scheduling. *Axioms, 13(1), 16.*  
<https://doi.org/10.3390/axioms13010016>



## POLYTECHNIC UNIVERSITY OF THE PHILIPPINES

Pakpahan, A. F. (2024). *Rapid Application Development of Group Attendance System for Higher Education Using Laravel and VueJS*. *TelKa Jurnal Teknologi Informasi Dan Komunikasi*, 14(1), 39–51. <https://doi.org/10.36342/teika.v14i1.3388>

Reyes, M., & Caras, J. E. N. (2023). *Designing Of Web-Based Attendance and Class Scheduling System using RFID and Raspberry Pi*. ResearchGate. [https://www.researchgate.net/publication/377146620\\_Designing\\_Of\\_Web-Based\\_Attendance\\_and\\_Class\\_Scheduling\\_System\\_using\\_RFID\\_and\\_Raspberry\\_Pi/references](https://www.researchgate.net/publication/377146620_Designing_Of_Web-Based_Attendance_and_Class_Scheduling_System_using_RFID_and_Raspberry_Pi/references)

Sanchez, M. Z., Dela Cruz, P. A., Tagle, G., Bautista Jr, R., & Panes, R. A. (2022). *Clinicord: A Web and Mobile Scheduling System for Medical Clinics in Olongapo City Using Progressive Web App Frameworks*. COMPUTING RESEARCH JOURNAL, 4(1), 30. <https://gordoncollege.edu.ph/w3/wp-content/uploads/2024/04/CCS-Research-Journal-2019-2021.pdf#page=30>

Serhani, M. A., Kassabi, H. T. E., Ismail, H., & Navaz, A. N. (2020). *ECG Monitoring Systems: Review, Architecture, Processes, and Key Challenges*. Sensors, 20(6), 1796. <https://doi.org/10.3390/s20061796>

Sison, T. M., Anunciacion, J. a. G., Lopez, S. L., Ocampo, J. G., & Yap, D. S. (2023). *Recapp: A Web-Based Client's Healthcare Record and Appointment Management System*. In Proceedings of the 4th South American Conference on Industrial Engineering and Operations Management. IEOM Society International.

Sustainable Development Goals (SDGs) and Disability | United Nations Enable. (n.d.). <https://www.un.org/development/desa/disabilities/about->



## POLYTECHNIC UNIVERSITY OF THE PHILIPPINES

*us/sustainable.development-goals-sdgs-and  
disability.html?fbclid=IwY2xjawEvwP9leHRuA2FlbQlxMAABHV\_-  
mxi8Bi67DyLhhYn0oxD3UMPYjkZL9tT4Cj7-  
uYt4A3kUAqaB98vaYA\_aem\_k8WqY\_ecsxVX3FhJSTZwcA*

Thanawala, N. (2023). *455 Delivery of health appointments to special schools*.  
<https://doi.org/10.1136/archdischild-2023-rcpch.97>

Tolentino, L., Navarro, J., De Pedro, C., Salvacion, L., Icamina, J., Sobrevilla, G., Villanueva, A., Amado, T., Padilla, M., ... Madrigal, G. (2024). *Development of an IoT-based intensive aquaculture Monitoring system with Automatic Water Correction*. Scribd. [https://www.scribd.com/document/753971126/Development-of-an-IoT-Based-Intensive-Aq?fbclid=IwY2xjawEvwqZleHRuA2FlbQlxMAABHV\\_-mxi8Bi67DyLhhYn0oxD3UMPYjkZL9tT4Cj7-uYt4A3kUAqaB98vaYA\\_aem\\_k8WqY\\_ecsxVX3FhJSTZwcA](https://www.scribd.com/document/753971126/Development-of-an-IoT-Based-Intensive-Aq?fbclid=IwY2xjawEvwqZleHRuA2FlbQlxMAABHV_-mxi8Bi67DyLhhYn0oxD3UMPYjkZL9tT4Cj7-uYt4A3kUAqaB98vaYA_aem_k8WqY_ecsxVX3FhJSTZwcA)

Zhang, M., Wu, Z., Li, J., & Zhu, J. (2021, February 26). *The promotion Effect of Artificial Intelligence Guidance System on the Optimization of Stomatological Hospital Appointment Registration in China*. [https://ieeexplore.ieee.org/abstract/document/9361948?fbclid=IwY2xjawEvuWVlHRuA2FlbQlxMAABHegc7IC7xDTgWhuQL6nB5lfmiDV4y8TGz1HDOVHq7TiXBeVhG6E61CTxrg\\_aem\\_YCACCMNIp6Y1h9gtFjqpLw](https://ieeexplore.ieee.org/abstract/document/9361948?fbclid=IwY2xjawEvuWVlHRuA2FlbQlxMAABHegc7IC7xDTgWhuQL6nB5lfmiDV4y8TGz1HDOVHq7TiXBeVhG6E61CTxrg_aem_YCACCMNIp6Y1h9gtFjqpLw)