



HEALTH INFORMATION MANAGEMENT SYSTEM WITH A MEDICAL EMERGENCY RESPONSE FEATURE FOR AEMILIANUM COLLEGE INC.

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Abstract. Any entity, including a school, could experience organizational conflict and discord as a result of poorly managed information. Education depends heavily on information and effective counseling depends on the provision of accurate, complete, and timely information, implementing appropriate information management practice is crucial in all educational settings.

An institution's Health Services Unit (HSU) plays a crucial role in attending to and keeping track of the health needs and general well-being of the student body. Its responsibilities include upholding a healthy environment, providing health services, and disseminating information about health.

The Health Service Unit of Aemilianum College Inc. continues to collect and use the time-consuming paper-based method for all health information on students and staff. Written physical health forms and other medical files that are submitted and preserved in physical storage are where all students' and employees' information is collected. Keeping track of and managing all student and staff records in the simplest and quickest manner presents a significant challenge for ACI's Health Services Unit.

With the aforementioned factors presented, the developer saw the necessity of creating an online health management system that could satisfy the requirements of the health services unit of Aemilianum College Inc.

The developed system's goals were to automate the submission, monitoring, and processing of health records; to provide a user-friendly interface to its users; to keep and monitor all health information about students and staff in a centralized database; to generate

reports for the health services unit; and to evaluate the system using ISO 25010, an industry-accepted quality standard.

The researcher decided on the system and specified that it satisfied the ISO 25010 level of acceptance based on the system evaluation. The produced system's usability, reliability, performance, efficiency, interoperability, security, maintainability, and portability were all evaluated. The developer received positive feedback regarding the evaluation of the system. It is therefore ready to cater to the needs of the health services unit of the college. Also, the system may be changed to accommodate the college's future development.

Key Words: *Emergency Response, Health, Health Information System, Health Services, Medical Clinic, Medical Response*

INTRODUCTION

The rapid advancement of Information Technology over the years particularly in healthcare presents a number of different forms of electronic healthcare that have been developed and implemented which provide people opportunities to reflect on what part of enhanced health information systems in the future utilizing the technology present. Technology is simply defined as the knowledge and utilization of tools that create, manage, and exchange information for the purpose of solving problems or simplifying human life.

Information technology which is deployed effectively can respond to difficulties in transactions and can replace old challenges in providing healthcare services, not only in the health sector but also in institutions such as colleges and universities. Effective management of information in any organization is vital for the optimal maintenance and growth of the organization.

Poorly managed information in school or any institution could ultimately result in organizational disharmony and conflict. The adoption of good information management is very essential in any school as stated that education thrives mostly on information in the same way that counseling effectiveness hinges on good, sufficient, and timely information dissemination.

Information plays a vital role in school governance as it is a primary tool for policy planning and development. This requires patience and perseverance. One has to record in the proper place for easy access. A document has to be placed in a folder properly labeled based on the content. In most cases, folders or record books are alphabetically arranged on shelves. This manner of record keeping has been practiced for decades, it has been the manner done in a record section of an office.

The Health Services Unit (HSU) is an important part of an institution as it is responsible for attending to and monitoring the health needs and well-being of the school community. Its role is to maintain a healthy environment, carry out health services, and provide health information. It provides evaluation and assistance corresponding to the health status and concerns of the students, teaching, and non-teaching personnel of an institution. Aside from the healthcare services the unit provides, it also manages the health information records of students and personnel.

The medical record serves a variety of purposes and it is important to have a proper functioning management system. The medical record is a key instrument used in planning, evaluating, and coordinating health care. Health records may include personal information, medical history, details about lifestyle and family medical history, laboratory test results, and life or accidental insurance with private insurers or government programs.

Managing all students' and personnel's health information starting from their admission/attendance at the institution poses a lot of difficulties. Maintaining a large amount of information on paper, especially if there is no backup for information, access to information can prove difficult and time-consuming if it has to be searched for. Accuracy is needed in the recording of vital information, and health services unit personnel cannot oversee all that is written on a vast amount of paper. Aside from current problems identified in health information documentation, privacy, and confidentiality issues must be addressed, and quality control measures. It is therefore vital for an institution to have an automated medical record information management system.

According to the United Nations Development Program, a health information management system (HIMS) is broadly defined as a system that integrates data collection, processing, reporting, and use of the information necessary for improving health service effectiveness and efficiency through better management at all levels of health services. The main goal of HIMS is to streamline the flow of information across the institution toward effective decision-making for patient care, in an optimized and efficient manner.¹

Bello and Adegboye (2021) state that the management of health records is very crucial to the operations of health services. Effective management of health records facilitates easy retrieval of the records when required without wasting the time of either the health service provider or the patient. Studies have proven that availability of medical records enhances treatment and it enables the health service provider to render quality services.

The Aemilianum College Inc. (ACI) is an institution of professionals exemplifying service through education. The Health Service Unit of Aemilianum College Inc. is still implementing the cumbersome paper-based system in getting and implementing all the health information of students and personnel. The information of every student and personnel is acquired from the written physical health forms and other medical files submitted and kept in a physical store. The Health Services Unit of ACI is facing a great challenge in keeping, tracking, and managing all the records of the students and personnel in the easiest and fastest way.

A paperless environment will come with the introduction of an electronic health record management system and eliminate many of the problems in maintaining paper records. The reasons for wanting to change to an electronic system are important and a lot of people expect to move from paper to a paperless environment.

A Health Information Management System is a solution to these challenges existing in the ACI Health Services Unit. A system that allows health data to be recorded, stored and monitored with efficiency. An interface that allows the creation of individual records, and ability to view, add, and review medical history. The proposed system emphasizes creating a user-friendly system, as most healthcare workers are not familiar with computerized systems.

Furthermore, this study has an additional feature that provides medical emergency response to students, teaching, and non-teaching personnel. This allows personnel to contact

the health services unit for needed medical assistance. This essential challenge is observed by the researcher and with the additional restrictions, protocols, and guidelines to be observed, the Health Information Management System with Medical Emergency Response feature is the solution to the challenges existing in the field of health service. This challenge was observed by the researcher and this study is a significant initiative in aiming to move to an electronic system to improve the accuracy and quality of medical records and provide a medical response.

A Health Information Management System with Medical Emergency Response Feature for Aemilianum College Inc. is a system whereby health data are recorded, stored, and retrieved and directly ensures an organized system of processing, analyzing, maintaining, and safekeeping of all students and personnel medical and dental records. Also, providing medical emergency response through a communication module enables personnel to use an application to contact the nurse to respond to a medical emergency. The goal of this system is to provide systematic assistance to the institution in managing the medical and dental records of students and personnel to Aemilianum College Inc. in an effective and cost-efficient manner.

The Health Information Management System with a Medical Emergency Response feature for Aemilianum College Inc. will keep track of the medical and dental information and history of the Students, Teaching, and Non-teaching Personnel of ACI. Included in the information are the updated health issues that are kept and managed by the system. This system also enables ACI health service providers to easily get information about the student's and personnel's medical records.

The main purpose of this system is to enhance the manual submission, keeping, and monitoring of Aemilianum College Inc. Students' and Personnel's health information. The system will be a great help in achieving fast and efficient outcomes within the health services unit. With these findings, the system will definitely improve and lessen the workloads of the health services unit which can benefit the students and personnel in terms of medical assistance.

Specific Objectives

Specifically, this study aimed to meet the following:

1. Design and develop a Health Information Management System for Aemilianum College Inc., an online system that will keep and monitor all health information of Aemilianum College Inc. students, teaching and non-teaching personnel with the following features:
 - 1.1 Develop a user-friendly interface for the following users:
 - 1.1.1. Administrator
 - 1.1.2. Students
 - 1.1.3 Teaching Personnel
 - 1.1.4. Non-teaching Personnel
 - 1.1.5. Nurse
 - 1.1.6. Physician
 - 1.1.7. Dentist
 - 1.2. Develop a secured module that automates the submission, monitoring and processing of the following student, teaching and non-teaching health records:
 - 1.2.1. Personal information
 - 1.2.2. Medical records

- 1.2.3. Dental records
- 1.2.4. Consultation records
- 1.3. Develop a module that can generate all health service unit reports.
- 2. Develop a Medical Emergency Assistance application with the following features:
 - 2.1. User Login
 - 2.2. User List
 - 2.3. Calling feature
- 3. Evaluate the developed system using the industry software quality model - the ISO 20510 evaluation tool in terms of:
 - 3.1 functionality
 - 3.2 performance efficiency
 - 3.3 compatibility
 - 3.4 usability
 - 3.5 reliability
 - 3.6 security
 - 3.7 maintainability
 - 3.8 portability

Inception

In this phase, the Researcher made an interview and data gathering with the nurse to discuss the existing process of ACI health services. She observed that the processes in the health services unit are still in manual process in terms of collecting, processing, and storing students' and personnel's medical information. After some exchange of ideas, the researchers stated her idea on how to convert the manual processes into a system. The end user visualized what would be the output of the proposed system. They were positive that it could really help them in the operations and could help them generate reports, especially during. Thus, the researchers determined if the project was worth pursuing and what resources were needed.

Elaboration

In this phase, the project's architecture was further evaluated. Illustrations and diagrams were presented and discussed below:

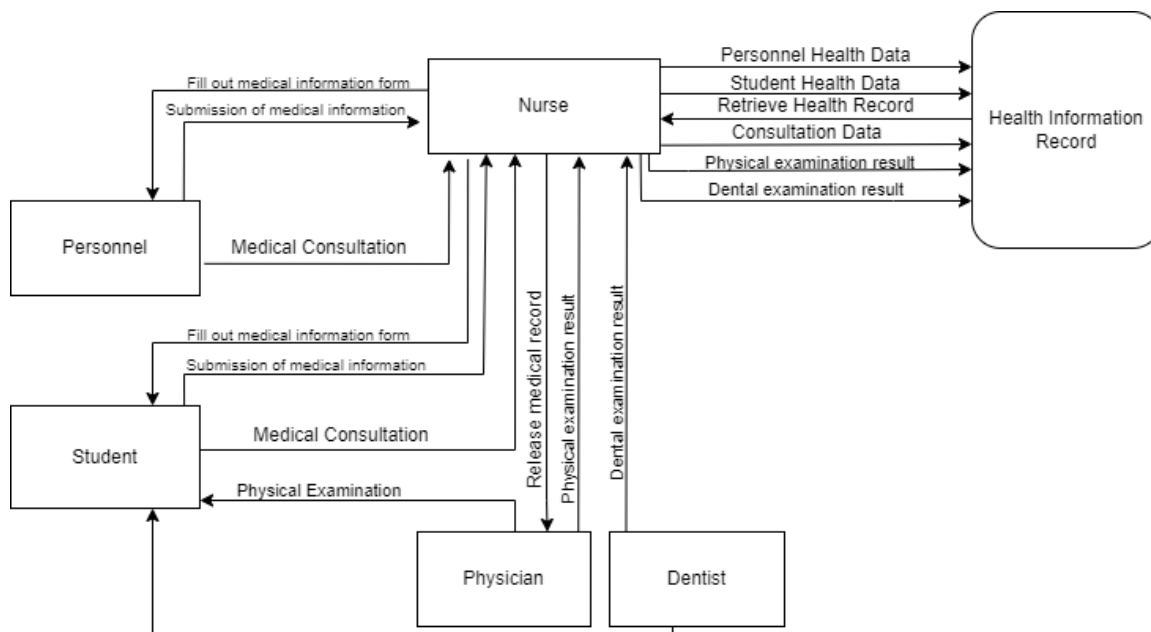


Figure 1 - Data flow of the Existing System

Figure 1 displayed the data flow diagram of the existing system on the newly developed system was based on. The researcher conceptualizes the system design to upgrade the system.

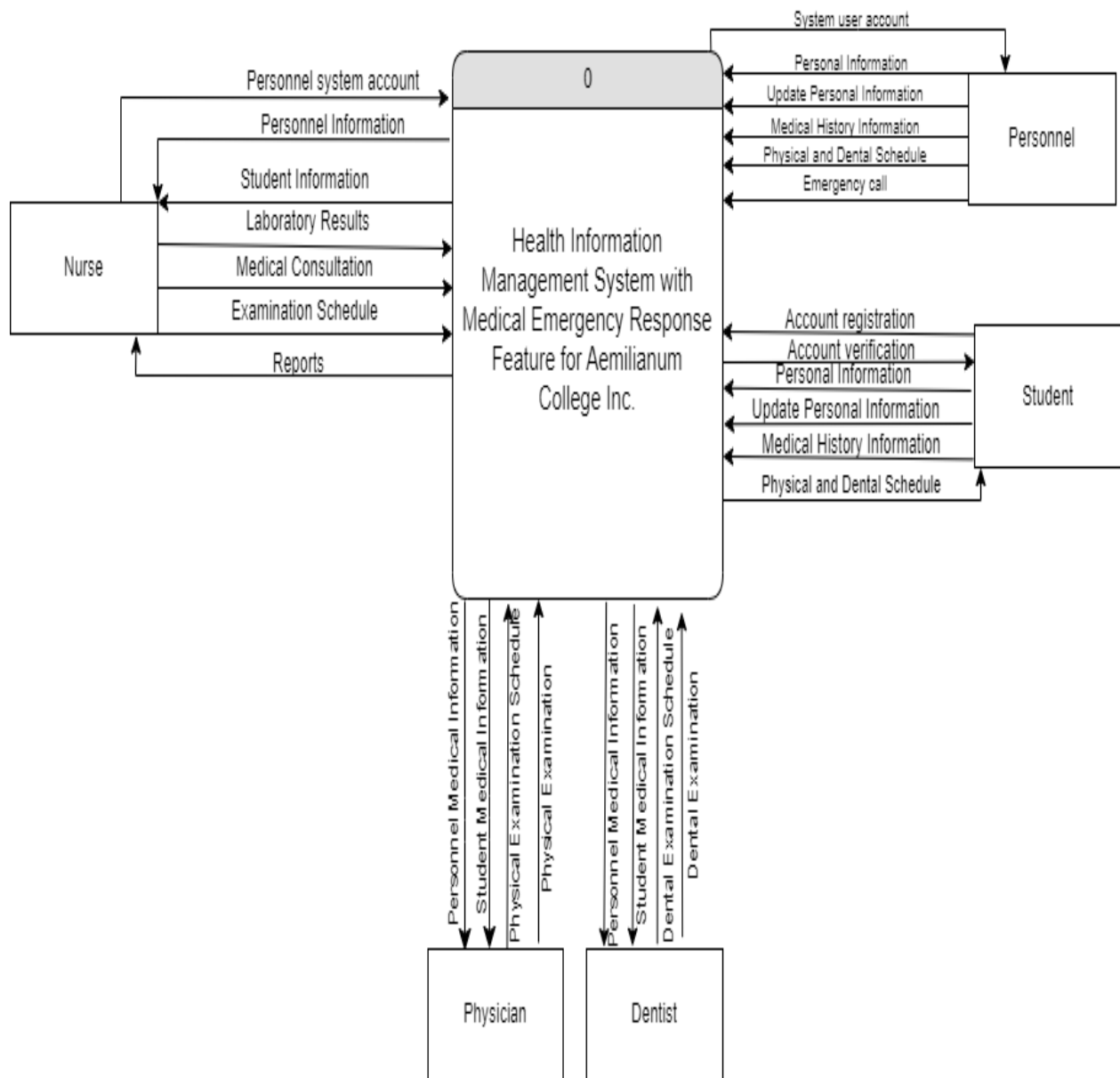


Figure 2 - Context Flow Diagram of the Developed System

Figure 2 showed the data flow diagram of the developed system. Different modules were presented to understand per transaction by the system's features.

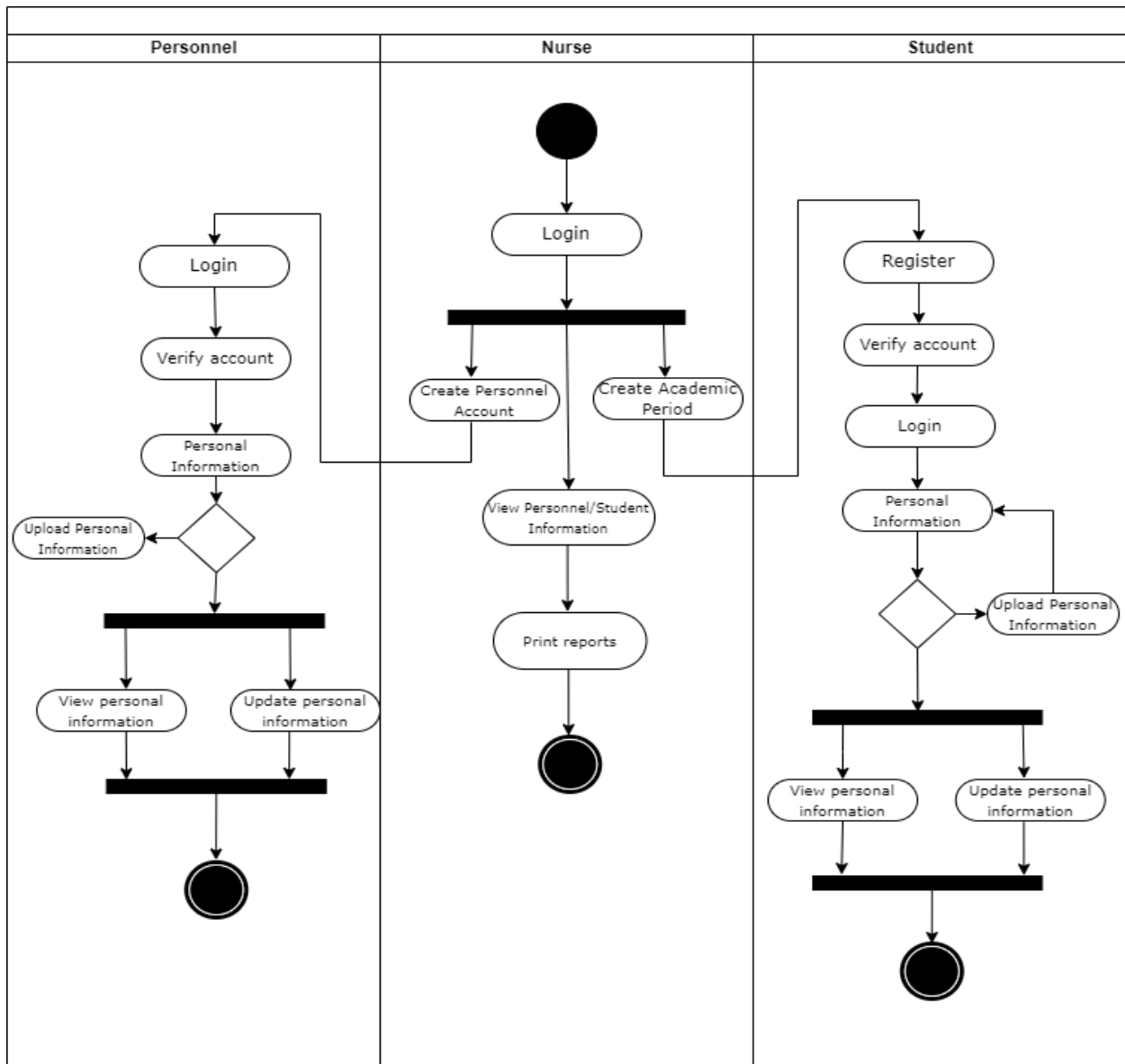


Figure 3 - Activity Diagram of Personal Information Module

Figure 3 showed the activity diagram of the personal information module. This show that the nurse needs to create a system account for the personnel and creation of a period to open the registration of a student at their specific level. After logging in to the developed system check and secure that the account is verified to proceed. For the first-time user of the system, they are required to input their basic personal and medical information. In the system, they can also view and update their personal information.

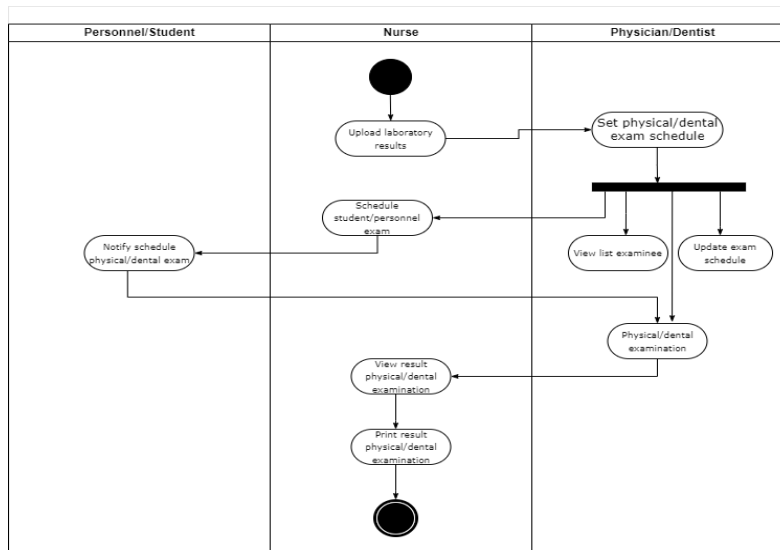


Figure 4 - Activity Diagram of Physical and Dental Examination Schedule

Figure 4 showed the activity diagram of the scheduling of physical and dental examinations. Health nurse upload the submitted laboratory results of the personnel/student in the system before they can be scheduled for a physical and dental examination. Creation of physical and dental examinations are made by the Physician and Dentist, respectively.

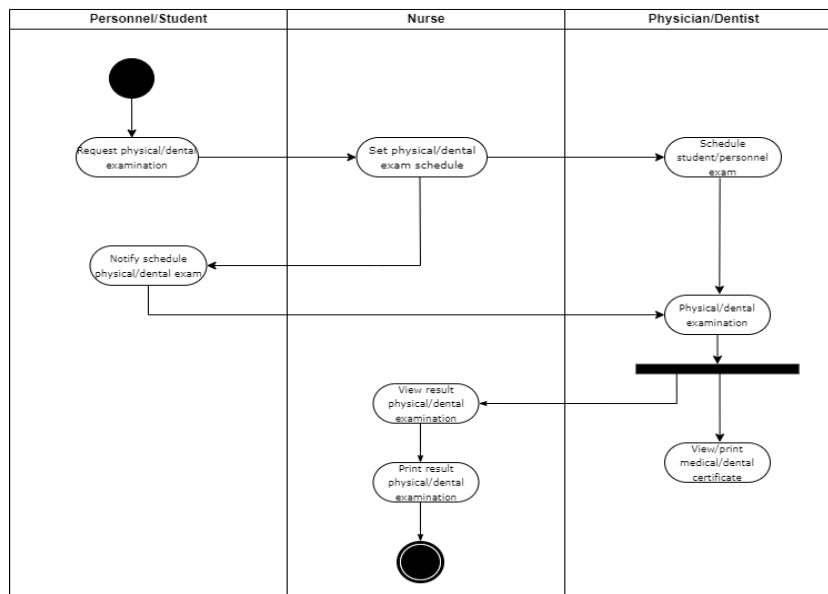


Figure 5 Activity Diagram of Requesting for Physical and Dental Examination

Figure 5 showed the activity diagram for requesting physical and dental examinations. The developed system allows the student to request a physical and dental examination. Requests will be scheduled by the Health to with the availability of the Physician and Dentist. Physicians and Dentists will be notified of their appointments.

Transition

In this last stage of the system development, final adjustment and updates were made based on the feedback from the evaluators. The researchers see to it that the developed system passed the evaluation activities conducted. Suggestions and recommendations were done in this phase before the installation and turn-over of the system to the beneficiaries were made.

Summary of Findings

During the development and after testing and evaluation of the developed system the following findings have been established:

1. The developed system was found functional and performed what we're being expected as the system provided a user-friendly interface to intended users and secured that each module automates the submission, monitoring, and processing of personal information, medical, dental, and consultation records and generated reports efficiently.
2. The developed medical emergency response application provided the communication module that enables to use in an emergency to call the health services unit or any personnel of ACI. Features of the application were user login, personnel list, and calling feature.
3. Based on the system evaluation, the researcher determines the system and specifies that it satisfies the ISO 25010 level of acceptability. The functionality, performance, efficiency, compatibility, usability, reliability, security, maintainability, and portability of the developed system were all assessed. It was evaluated by ten (10) IT experts with an overall mean of 4.29.

Conclusion

Based on the findings of this study the following conclusions are formulated:

1. The current process of the college health services unit will be improved by the Health Information Management System providing services to the end-users with reliable information generated with speed, and accuracy and catering to the automation of the generation of reports.
2. The developed emergency response application provides a significant platform intended for any emergency that enables the health services and personnel of ACI to use as a response.

3. The developed system met and passed the criteria using the industry software quality model - the ISO 20510 evaluation tool in terms of the system's performance, reliability, security, accessibility, maintainability, and portability.

Recommendations

The conclusion drawn from the findings were the following:

1. The future developer can add additional features in the personal information, health records, and consultation module that enable the additional generation of reports of the health services unit.
2. The researcher recommends that the future developer can add an additional calling feature for the student and personnel emergency contact and other external agency in relation to emergency response.
3. The researcher recommends that future developers add flexibility to the mobile application to be compatible with IOS phones.
4. The future developer can add additional features to the maintenance of the system.

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