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Design and Development of an Information Kiosk with Log Monitoring for Leonor M. Bautista National High School

Bulaclac, Jodell R. [1]*, Peña, Christian B. [2] Manulabnan, Jerome G. [3], Bulacan, Joe-Mar F. [4], Dularte, Joven F. [5]

[1] *College of Information and Communication Technology Nueva Ecija University of Science and Technology, Sumacab, Cabanatuan City, Philippines, 3100*
[2] *Nueva Ecija University of Science and Technology Papaya Off-Campus, Concepcion, Gen. Tinio, Nueva Ecija, Philippines, 3104*
[3] *Nueva Ecija University of Science and Technology Papaya Off-Campus, Concepcion, Gen. Tinio, Nueva Ecija, Philippines, 3104*
[4] *Nueva Ecija University of Science and Technology Papaya Off-Campus, Concepcion, Gen. Tinio, Nueva Ecija, Philippines, 3104*
[5] *Nueva Ecija University of Science and Technology Papaya Off-Campus, Concepcion, Gen. Tinio, Nueva Ecija, Philippines, 3104*

*Corresponding author's email: skylar04yue@gmail.com; mangulabnan.jgm@gmail.com

Abstract. People were advised to avoid physical contact due to the pandemic. Although it is encouraged for parents to obtain their children's learning modules, the Leonor M. Bautista National High School (LMBNHS) cannot avoid interactions with other visitors who are there for school-related purposes. Visitors can fill out information sheets for the log records while adhering to strict health protocols. Due to the school's limited communication options, such as bulletin board postings, it was also difficult to provide and disseminate important information. The dissemination of information is slowed as a result, and the news is frequently outdated. Receiving false information is likely given the dearth of first-hand knowledge.

As a public institution, LMBNHS must provide relevant and up-to-date information to its organization, and stakeholders. With the advancement of technology, it is possible to have this virtual assistant. With this reality, the team's primary goal is to provide accurate and relevant information and collect data from students and visitors of LMBNHS. This is possible through the employment of Information Kiosk that serves as Automated Information Assistant to everyone.The developed system was evaluated by the beneficiary and graded Excellent for overall satisfaction rating and Very Satisfactory in Client satisfaction category.

Keywords: COVID-19; Digital Solution; Information Kiosk; Log Monitoring

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1. Introduction

Provide In 2020, education was hampered by COVID-19, a global pandemic that forced education to be shifted in a flexible learning manner. Flexible learning refers to the combination of different methods of teaching, including the use of online platforms and digital or printed modules (Rojas, 2021). Bulaclac, et. al (2020) suggests that the LMS tools must be economical, efficient, and tailor-fitted to the needs of the students, teachers, and school administrators of a university.

Under this new system, universities and colleges will be adopting a mix of different learning and teaching methods based on their specific situations. More prepared universities will move ahead with all the online classes, while others may allow some of their students to come back at different times and "do more synchronous versus asynchronous learning."

Furthermore, because of the restrictions and health protocols that have been implemented, alternative learning modality for the new normal is Modular Distance Learning (MDL). According to Malaya (2020), MDL features individualized instruction that allows learners to use self-learning modules (SLMs) in print or digital format/electronic copy, whichever is applicable to the learner. Learners under Modular Distance Learning can also use other resources such as Learner's Materials, textbooks, activity sheets, study guides, and other study materials.

In the said setting, usually, teachers will have to deliver appropriate learning materials. However, students can also access these materials by downloading electronic copies through their computer, tablet PC, or smartphone. But whatever the medium of getting the copies of modules the submission of these in order for the teacher to grade the accomplished module became a challenge. Most schools require students to go submit the hardcopies in the school for certain period and will be collected by teacher in order to check them. This scenario has no difference in what is happening on the Leonor M. Bautista National High School (LMBNHS) that's why the threat for the COVID-19 remains. With this, there is a necessity for excellent monitoring and tracking system for whoever came to the school premise.

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In order to facilitate this requirement, this study employed a developmental research method to develop an "Information Assistant with Log Monitoring for Leonor M. Bautista National High School". Thus, person to person transaction will be lessen since the system also stands as virtual assistant.

1.1. System Purpose and Description

The primary objective of developing an information kiosk system is to provide automated and user-friendly kiosks for students and visitors to access school-related information. It also includes an automated attendance feature that records the presence of all faculty, staff, students, and visitors. Unlike conventional attendance practices, this allows for more efficient monitoring and management of attendance. In addition, the system offers a Wayfinder or location finder for the convenience of visitors and newcomers.

The team considers the registrar's tasks, such as addressing basic information and answering inquiries, to be too repetitive, time-consuming, and inefficient, as they could prevent the registrar or other school personnel from performing their assigned tasks. In addition, the information kiosk's capability to provide visitors and transfer students with campus-specific information has the potential to alleviate their concerns. This study will empower the campus's people to provide essential information. In addition, the kiosk serves as a centralized information hub/platform for all school-related activities

1.2. Scope and Limitations

The primary goals of the LMBNHS information kiosk with logs monitoring will be to provide accurate and relevant information and collect data from students and visitors. The Location Insight/ Wayfinder serves as a navigational tool for accurate and pertinent information providers, providing room/ facility locations to users. It will be advantageous so that visitors and new students will have a much easier time locating and familiarizing rooms and facilities without interrupting school personnel and adhering to the new standard procedure.

The Check-In, Check-Out Monitoring (Student and School Personnel's) feature will serve as a school-record keeper regarding students' arrival and departure times and visitors to collect data. This Check-in, Check-out monitoring is intended to secure log records and references to prevent students and staff members from citing personal reasons for absences. Moreover, the system provides additional features that are useful and dependable.

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Students can use this system to view their grades once uploaded by integrating Grades Viewer via QR-Scanner. Additionally, the system can be utilized as a Safe and Secure Visitor Access. This serves as the school guard's automated logbook. To ensure the safety and security of school personnel, visitors are required to provide their name, address, phone number, and reason for their visit.

The feedback Option is an additional feature. This allows users to submit feedback or suggestions. A satisfaction survey is conducted to measure user satisfaction and enhance the Information Kiosk System's content and services. Upon submission, users can only submit these comments and suggestions using their unique QR identification to prevent malicious or inappropriate use. Management can disseminate news, announcements, details, etc., within the system while maintaining accuracy and credibility. Students can view their most recent teacher-provided grades and various school-related information and activities.

However, in compliance with the Family Education Rights and Privacy Act (FERPA), a school may not disclose a student's grades to another student without the prior written consent of the parent or eligible student. The researchers find a way by incorporating QR codes/ password features per student in access to make sure that authorized users are the ones that can only view the said confidential data.

2. Methodology

2.1. Research Design

The researchers used developmental research design by adopting Agile methodology in this study. The developmental research is the systematic study of generating, implementing, and assessing instructional programs, methods, and products that must meet criteria of internal consistency and effectiveness, as opposed to basic instructional development (Richey, 1994).

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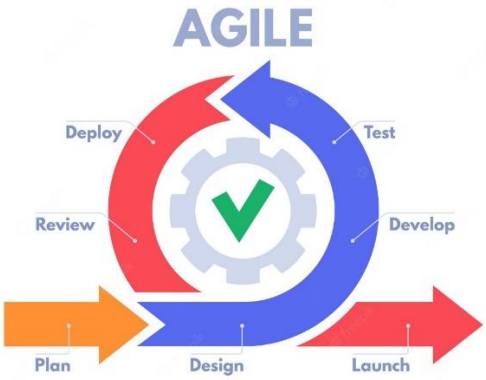

Figure 1. Research Design

According to "The Agile Coach" (2022), Agile is an iterative approach to project management and software development that helps teams deliver value to their customers faster and with fewer headaches. Instead of betting everything on a "big bang" launch, an agile team delivers work in small, but consumable, increments. Requirements, plans, and results will be evaluated continuously so teams have a natural mechanism for responding to change quickly

2.2. Locale of the Study

The study was conducted at Leonor M. Bautista National High School located at Brgy. Pias, Gen. Tinio, Nueva Ecija. A public high school that caters junior and senior high school program.

Figure 2.a. Front View of the Research Locale

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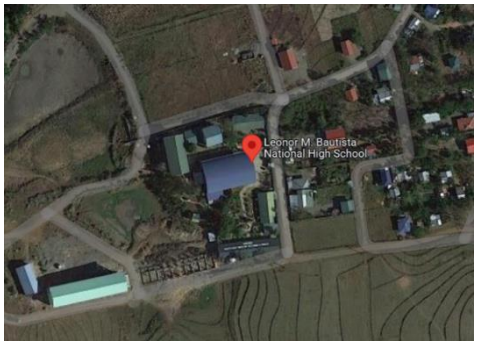

Figure 2.a. Google Map View of the Research Locale

2.3. Technical Background

2.3.1 Current System

Information dissemination at Leonor M. Bautista National High School is still conducted conventionally. The institution has never owned a computer system comparable to the proposed system.

Typically, information and news are disseminated during the flag ceremony. Any additional announcements and upcoming events are discussed following the school's flag ceremony. Some are even posted on the bulletin board in the school. The most accessible source of information for students is their teachers; however, the team group finds the tasks to be overly repetitive and stressful. We cannot ignore that teachers are already engaged in additional responsibilities. Teaching is a demanding profession, and giving them additional responsibilities can indeed cause them to burn out.

When it comes to locating a specific destination, visitors and new students may experience difficulty. This has become one of the school's issues and can cause people anxiety. The school also wants us to reduce student stress on campus and in the surrounding community.

2.3.1 Proposed System

The Leonor M. Bautista National High School-Information Kiosk has many useful features that offer clients and users many conveniences. The system administrator/facilitator can use a regular computer (desktop and laptop) to manage the system. However, we highly recommend investing in the following hardware and component to maximize the system thoroughly for the users' view.

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Figure 3. Kiosk Touch Display Monitor

The proponents recommend using a digital display or small structure to provide information or offer self-service options, often incorporating an interactive display screen for optimal capability.

The system also uses QR code features to use some of its functionality. The good thing about the team's system is that we use the built-in camera of the display unit as the QR scanner itself. We recommend including a separate plug-in camera if there is no built-in camera.

Figure 4. Plug-in Kiosk Camera

3. Results and Discussion

3.1. Requirements Analysis and Documentation

The team successfully requested a comprehensive list of faculty and staff with their job descriptions and titles to be displayed in the kiosk as part of the school's organization. They also requested that the school calendar corresponds with the system's features. The information kiosk utilizes data with the consent of all faculty and staff members. It also generates restricted information for authorized users, while the system's added precautionary measures safeguard information distribution.

During the initial visit, the team introduced the system to Leonor M. Bautista National High School, the recipient of the project. Dr. Evelyn D.R. Reyes,

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the school's principal, was presented with a proposal for the project during the first visit in the first week of March 2021. The second visit discussed the school's administration regarding the system's features and operations. Then, subsequent visits marked the beginning of data collection, follow-ups, consultations, and revision of system features; finally, the results were presented.

The information kiosk displays official photographs supplied by the recipient institution. The proponents take photographs to enhance the content of the display. As additional features, the kiosk will display news and articles from the local school newspaper, "The Plum," according to Mrs. Christy Grace M. Pagaduan, adviser to the school newspaper.

The photos below show the discussions and arrangements between the team project representatives and the school recipient personnel. This includes the system proposal, system updates, gatherings of data, and required features agreed upon by both proponents and system beneficiary.

Figure 5. Meeting with the Beneficiary

3.2. System Designs

Soon after the proponents analysed the data and had been approved by the beneficiary, they developed and prepared system designs of the work packages and system functionalities that will be the features of the system. The system designs that were developed are the Gantt chart for project progress scheduling, USE Case Diagram, Context Diagram, Data flow Diagram. Though designs might require modifications during several iterations, it is important to construct these system designs in the first iteration, for they serve as a guide of the development team to develop each deliverable stated in the work breakdown structure. The following are the developed diagrams and tables:

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Table 1 Prototyping to Development

Task Name	March				April				May				June				July			
Week No.	1	2	3	4	1	2	3	4	1	2	3	4								
Initial Analysis																				
Meeting with the client																				
Discussions with the clients																				
Gather data																				
Document the current system state																				
DESIGN																				
Design Database																				
Software Design																				
Interface Design																				
Initial - SYSTEM DEVELOPMENT																				
Initial-Develop System Modules																				
Integrate System Modules																				
Perform Initial Testing																				
Initial – TESTING																				
Perform System Testing & Setup																				
Document Error Found																				
Address Error Found																				
ANALYSIS																				
Meeting with the client																				
Discussions with the clients																				
Gather added data																				
Document the current system state																				
Final – DEVELOPMENT																				
Develop System Modules																				

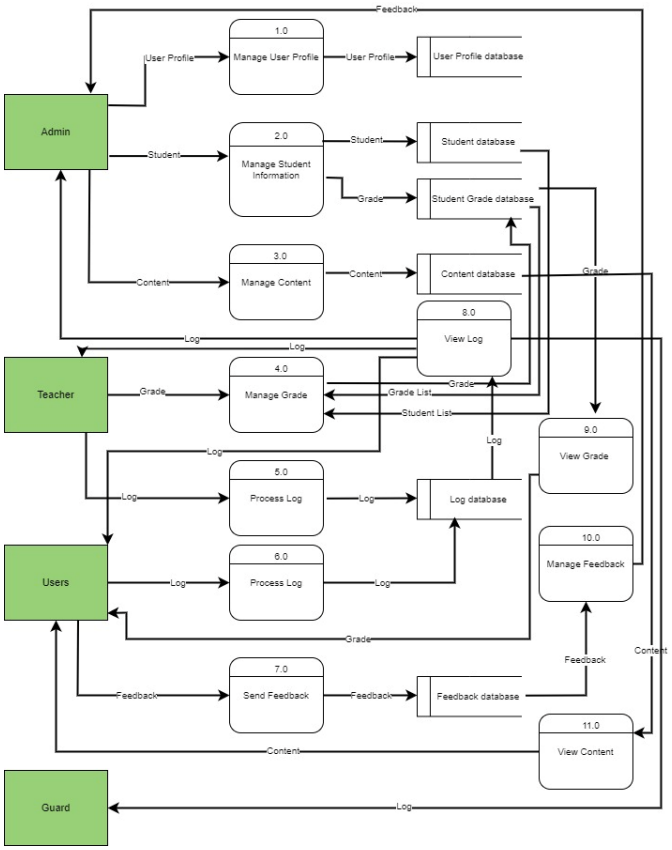

Figure 6. Data Flowing Diagram

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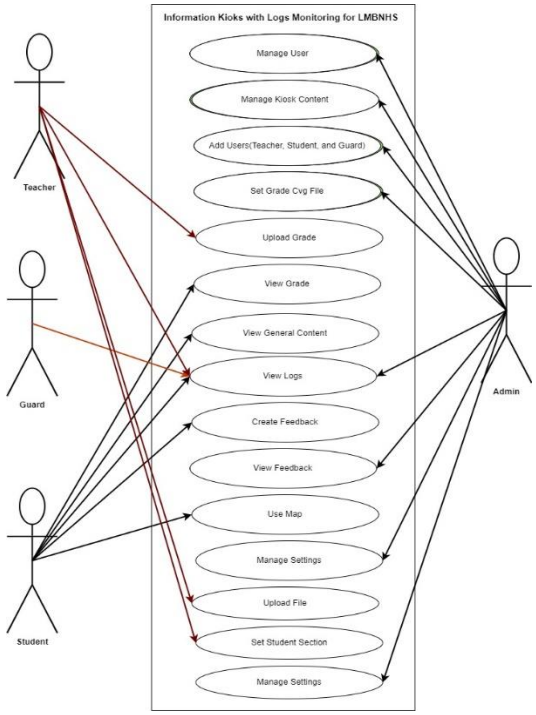

Figure 7. Use Case Diagram

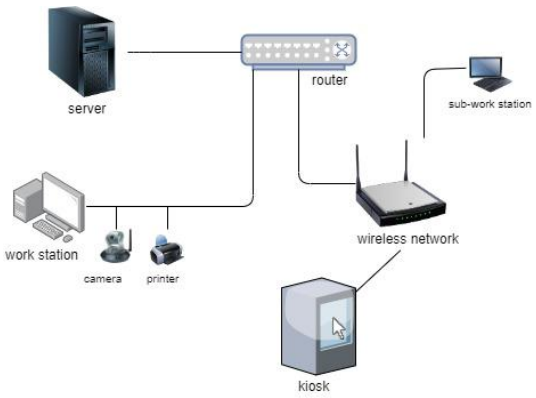

Figure 8. Physical Network Design

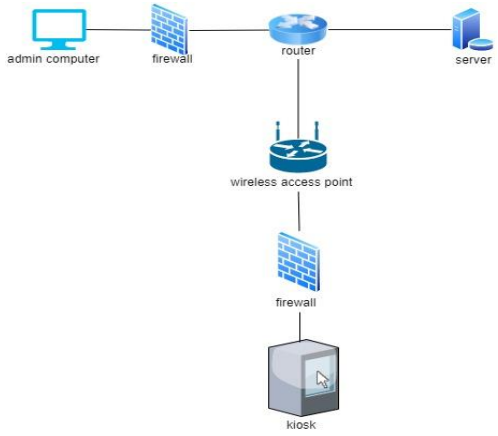

Figure 9. Logical Network Design

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The Information Kiosk with Logs Monitoring for LEONOR M. BAUTISTA NATIONAL HIGH is also equipped with a crucial check-in/check-out log monitoring feature. Log monitoring evaluates recorded log events. A school needs to have log monitoring to check the conduct of students/visitors and to increase student participation in school activities.

To implement this function, the proponents employ QR codes. Depending to (Stein, 2020), A quick response code, or QR Code, is a Code that is quickly readable by a mobile device (hence the inclusion of the word "quick" in its name). Using a combination of spacing as a type of Matrix Barcode (a 2-D Barcode), a QR Code transmits much information when scanned. QR Codes have numerous applications in all industries, including retail, marketing, and logistics.

The researchers scoured the Internet for the most pertinent information regarding existing related systems to the study. According to the findings, the same innovations are still accessible and utilized by numerous schools and universities in the Philippines and abroad. St. Anthony Center of Science and Technology Inc. – General Tinio, Nueva Ecija; Midway Colleges – Cabanatuan, Nueva Ecija; and Iloilo Science and Technology University – La Paz, Iloilo City are the schools and universities in the Philippines that use kiosks with check-in/check-out (CICO) functionalities. Universities and colleges in other countries, such as Sathyabama Institute of Science and Technology in Tamil Nadu, India, have also incorporated Information kiosks into their facilities. There are also applications that use way finding and check-in check-out technology, such as Indoor – Google Map and OneTap Check-In, which demonstrates the usefulness and feasibility of these features.

3.3. Development Stage

During the development as well in modification phase, the proponents used Sublime Text as text editor for the readability of the programming syntax. The team used different scripting languages such as PHP and JavaScript for the frontend and back-end of the system. For the data storing, Structured Query Language (SQL) was used.

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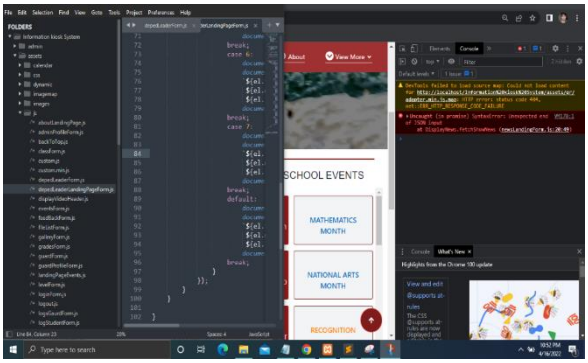

Figure 9. Sublime Text Editor Environment

3.4. Quality Assurance Stage

Every iteration, the Quality Assurance team was in charge of conducting quality assurance on the created work packages. The team carefully examines the system's or modules' feasibility. Most of the time, the Quality Assurance Head involves some CICT faculty members to test the system when new feature is added and have to test before the release for user-acceptance. If some bugs or error have been encountered or in case that some modules are not working, the QA team list down and immediately told it to the researcher in order to fix it immediately. Afterwards, testing and checking were done to ensure its worth.

3.5. Quality Assurance Stage

After the certification given by the Quality Assurance team that the Project Information Kiosk with Log Monitoring for LMBNHS met its goals and objective and adequate for the usage of the students, guards, teachers and admin of Leonor M. Bautista National High School, users' training and testing events was done for the familiarization of the LMBNHS stakeholders. The researchers served as the Lead Trainer on the said event.

3.6. Releasing Stage

The endorsed work packages of the system had been installed in the server machine of Leonor M. Bautista National High School. On February 18, 2020, the Project Information Kiosk with Log Monitoring for LMBNHS was utilized and serves as one of the assets of the school. In some way the, system use as a tool to avoid face to face contact during the COVID-19 pandemic.

The beneficiary assessed the developed system and gave it an "Excellent" rating for overall satisfaction. They gave it a "Very Satisfactory" rating even though it fell into the same client satisfaction category.

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4. Conclusions

Careful data analyzation and cooperation with the target users of the system through interviews and researches helped the developers to decide the best features that should be included in the systems or projects. The team also proved that "Agile Software Development Methodology" is very effective when working with the team or group.

The implementation of Information Kiosk with Log Monitoring for LMBNHS is very helpful to the research locale especially to the teachers and students. It also became a tool for the school to avoid the spread of COVID-19. Moreover, the implementation of the system can be an instrument for the further expansion of the research locale.

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Dr. Evelyn D.R. Reyes, the principal of the school, and the entire family of Leonor M. Bautista National High School have earned the researchers' deepest gratitude for their unwavering support and assistance in responding to their questions and for enabling them to gather all the data required to complete this study.

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