COLEGIO DE MONTALBAN

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B.S. INFORMATION TECHNOLOGY

"A DIGITAL LEARNING PLATFORM AND COLLABORATION TOOL FOR COLEGIO DE MONTALBAN"

An Undergraduate Thesis Presented to the
Institute of Computer Studies
Colegio de Montalban
Rodriguez, Rizal

In partial fulfillment of the
requirements for the degree
Bachelor of Science in
Information Technology

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2024 - 2025

B.S. INFORMATION TECHNOLOGY

I. Introduction

In today's rapidly changing educational environment, technology integration has become crucial in creating effective learning experiences and facilitating intuitive collaboration between students and educators. As traditional classroom settings give way to hybrid and online models, educational institutions must adapt by leveraging digital platforms to increase engagement, promote collaboration, and improve learning outcomes.

To establish a robust legal basis for a digital learning platform in the Philippines, it is crucial to align with existing laws while proposing targeted regulations that address the specific needs of digital education and collaborative technologies. The 1987 Philippine Constitution provides a foundational mandate for quality education, which can be extended to support the integration of digital learning platforms as a means to enhance educational delivery and accessibility. **Republic Act No. 10533** (Enhanced Basic Education Act of 2013) reforms and enhances the basic education system and can be extended to include digital learning methodologies, reflecting the need for modernizing educational practices through technology. Additionally, Republic Act No. 8293 (Intellectual Property Code of the Philippines) plays a critical role in protecting intellectual property rights, ensuring that digital content and tools used in e-learning are legally safeguarded. The Data Privacy Act of 2012 (Republic Act No. 10173) provides a framework for protecting personal information, which is essential for maintaining the security and confidentiality of student and educator data within digital learning platforms.

This platform aims to benefit both educators and students by offering an effective digital learning platform that can be customized to their specific needs. For educators, it simplifies academic management, improves instructional delivery, and facilitates interactions with students by centralizing material organization, interactive lesson creation, and progress assessment. Additional features, such as virtual study groups and peer review systems, encourage collaboration and timely feedback. Using data analytics, educators can tailor instruction to individual student needs. For students, the platform provides a dynamic,

interactive learning environment that encourages engagement, collaboration, and personalized learning. Advanced digital tools enable students to explore concepts, develop critical thinking skills, and actively participate in class activities, ultimately leading to academic excellence.

In addition to improving the academic experience, the platform emphasizes overall growth through the use of gamification and discussion forums. Gamified challenges, rewards, and progress tracking encourage students to actively engage with course materials and strive for academic success, while discussion forums encourage students to ask questions and share ideas that fit their organizations.

In an era of digital transformation and educational innovation, Colegio De Montalban's innovative initiatives demonstrate the power of technology to transform teaching and learning. By leveraging the power of digital platforms to promote collaboration, creativity, and lifelong learning, we can prepare the next generation of students to thrive in an increasingly complex and interconnected world.

REVIEW OF RELATED LITERATURES AND STUDIES

This chapter discusses current research from the perspective of ongoing related research. These pragmatic research studies cited articles and systems are based on the proponents' research and design to meet the user's needs and requirements.

FOREIGN LITERATURES

Developing a fully functional system is not only a difficult task but also requires extensive knowledge in database design and programming languages. I proposed a general model for E-learning that can help instructors design courses more effectively, detect anomalies, inspire and direct further research, and help students use resources more efficiently. Our long- term objective is to create a full featured learning system targeted for academic environment. Implementing this system will help the institution become more resourceful and avoid any inconvenience that is caused due to some misguided information that passes through to all students and teachers.

Ojowa, A. B. (2022). DESIGN AND IMPLEMENTATION OF SCHOOL MANAGEMENTSYSTEM.https://www.academia.edu/115422497/DESIGN_AND_IMPLEMENTATION_OF_SCHOOL_MANAGEMENT_SYSTEM

Since distance learning is becoming increasingly in demand, various studies are being conducted on this topic. One such study, conducted in 2015, focused on attitudes towards the Moodle distance learning system. To assess marketing students' perceptions of Moodle, a web survey was administered. Data were collected using a convenient sampling method through questionnaires distributed among marketing students. According to the results of the study, the most important aspect of a distance learning system is the control that it gives students over their academic performance. Depending on how this is implemented by the instructor, the learning platform offers students the flexibility to choose the time and amount of work they perform. Students can also see their progress online. Such flexibility can help students who might otherwise feel that they are dependent on the teacher or department schedule. The point for instructors is that they must set up the system so that students can better control their progress. The schedule, including assignments and lectures, should be built into the platform as much as possible so that students know in advance the pace of work and how much they need to complete in order to move further in the course.

Liu, Z.Y., Lomovtseva, N. & Korobeynikova, E. (2020). Online Learning Platforms: Reconstructing Modern Higher Education. International Journal of Emerging Technologies in Learning (iJET), 15(13), 4-21. Kassel, Germany: International Journal of Emerging Technology in Learning.

The continuation of this project will be based on a prototype system of the GeoGebra Classroom tool, including the features described above, where we will conduct further research focusing on the use of the new features in a classroom setting and analyzing how this tool affects mathematics teaching. We are particularly interested in how teachers will use this new tool and how they and subsequently their students will benefit from using it in the classroom. Furthermore, we will test it for several reasons as it should be easy and pleasant to use for teachers and as well for students. Moreover, we will create or adapt tasks, that have an

additional benefit for students when they are working with this prototype. Finally, we want to find out how and to what extent the prototype, and subsequently the tool, can support teachers and how it can offer them new opportunities in teaching.

Johanna Zöchbauer, Markus Hohenwarter. Developing a collaboration tool to give every student a voice in a classroom discussion. Seventh ERME Topic Conference on Language in the Mathematics Classroom, Feb 2020, Montpellier, France. ffhal-02970629f

LOCAL LITERATURES

Students and teachers were willing to embrace the E-Learning system, there is still a need of access other E-Learning resources, and ICT platforms. As depicted in the result of the study, since the computed values of all variables did not exceed the tabular value, the null hypotheses are hereby accepted. This implies that there is no significant difference between the assessments of nondisabled students and students with disabilities with regards to the E-Learning System. Internet connectivity should be a priority to be established to benefit all the delivery models such as face-to-face, self-paced, and individualized learning along with virtual interactions. Integrating mobile learning may help overcome the concerns with connectivity and convenience to a great extent. Leveraging on the utilization of mobile phones, there should be regular capacity-building activities and skills enhancements on E-Learning System and other related software and tools among the professors, and students. E-learning designers may consider the existence of the users with hearing and speaking disabilities to develop an e-learning environment that may be effective to all users generally.

Caraig, G.A., Iyo, G. N., Kelechi, E. S. & Caraig, M. E. (2021). Integration of e-learning system through mobile technology. International Journal of Computing Sciences Research, 5(1), 459-474. doi:10.25147/ijcsr.2017.001.1.52

The School Management System was designed and developed based on the needs of the school, particularly for its major transactions: admission, enrollment, accounting, student information system, grading, and report generation. Based on the findings of the study, the respondents agreed that the developed e-school system was functional and improved the

transaction process of the school. The faculty and staff have benefited from using the system. The overall quality and performance of the system were rated very good in terms of functionality, usability, and reliability.

It is recommended that future developments include integrating smartphone- and tablet-based attendance monitoring. A kiosk for viewing grades and schedules should be placed inside the campus and connected to the database server. Additionally, online student information systems should be developed to benefit students and parents by making it easier to monitor school-related activities and requirements.

Grepon, B. G. S., Baran, N. T., Gumonan, K. M. V. C., Martinez, A. L. M., & Lacsa, M. L. E. (2021). Designing and Implementing e-School Systems: An Information Systems Approach to School Management of a Community College in Northern Mindanao, Philippines. arXiv preprint arXiv:2109.00198.

Based on the findings of this study, the researchers propose the following: (1) Academic institutions may begin to provide training on how to use a Learning Management System in their institution, as an alternative method of teaching, this is extremely beneficial in the teaching-learning process especially in mathematics, (2) faculty members, teachers, or instructors may not only use traditional methods of teaching mathematics, but they may also use a learning management system to provide the students with the learning activities they require, (3) use of NEO-LMS as a learning management system will be an aid in teaching mathematics because it is very accessible and user-friendly. Furthermore, LMS platform has the potential for group work, rapid communications, and material sharing; and (4) researchers may conduct similar research but from a different perspective, but not limited to using LMS in other mathematics subjects aside from Analytic Geometry.

Garcia, R. E., Abaratigue, A. M., & Alcantara, N. V. (2021). Integration of learning management system as an aid in teaching: An assessment. European Journal of Educational Research, 10(4), 1907-1918.

RESEARCH SIMULARCUM

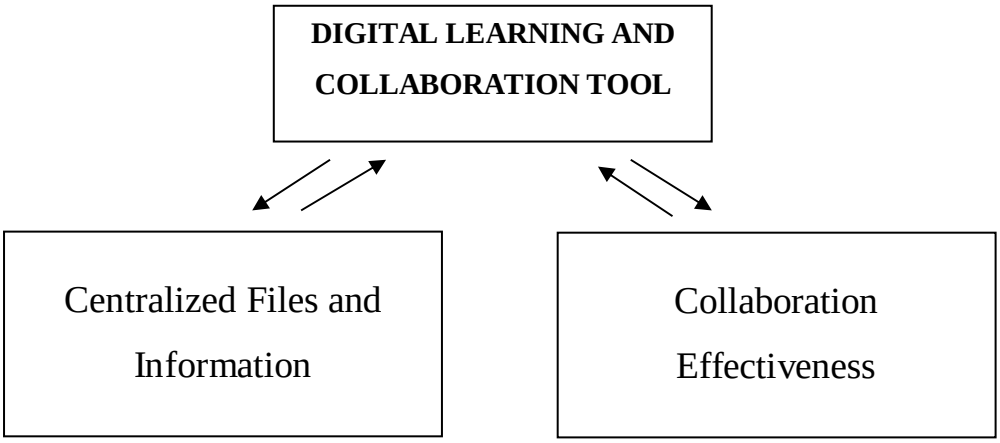


Figure 1: Research Simularcum

Figure 1 represents the relationship between three key variables: Digital Learning Tool, Collaboration Effectiveness, and Centralized Information within Colegio De Montalban. The arrows depict how these elements influence each other:

1. **Digital Learning and Collaboration Tool:** Directly impacts both collaboration effectiveness and the centralization of information.

2. **Collaboration Effectiveness:** Influences how well students, teachers, and parents communicate and collaborate, improving the use of the digital learning platform.

3. **Centralized Files and Information:** Facilitates the seamless distribution of school-related data (e.g., assignments, announcements, grades) and enhances collaboration and the learning experience across the platform.

STATEMENT OF THE PROBLEM

We discovered a common issue, a lack of student information, after examining a few school management systems (SMS) and e-learning management systems (LMS). In order to

effectively handle this and incorporate e-learning, we suggest daily activities that increase capacity and system capability enhancement. Furthermore, it is essential to include tools that allow students and teachers to collaborate and monitor timetables and grades. Lastly, the platform has to be more engaging in order to address student participation. Consider using a more complete LMS to increase student engagement and information access. Features like goal-tracking, and progress tracking for students should be available in this new system. For improved organization and transparency, incorporate grade management and reports as well. Investigate tools like discussion boards, group projects, and real-time chat options to promote cooperation. Finally, enhance the platform with interactive elements, gamification, and discussion forums to keep students engaged and motivated. This combined approach can transform your e-learning experience into a valuable tool for both educators and students. To keep students interested and motivated, add interactive features and gamifications. This combination strategy can turn your online education into a useful resource for teachers and learners alike.

SPECIFIC PROBLEM

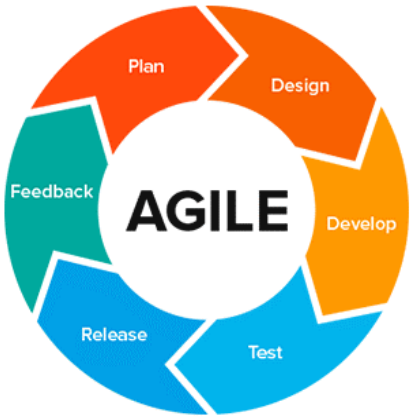
1. How can real-time collaboration tools be effectively integrated into digital learning platforms to enhance student engagement and facilitate interactive learning experiences?

2. What are the potential challenges in implementing a centralized learning management system in schools, and how can these challenges be addressed to ensure effective collaboration?

3. How can digital learning platforms incorporate elements that promote students' complete growth, such as gamification, to improve their overall well-being and motivation?

4. How can the centralization of communication and collaboration tools in a digital learning platform improve interaction between students, teachers, and parents, and enhance overall school management and coordination?

OPERATIONAL FRAMEWORK



. **Figure 2**. Agile Methodology Process

Agile is defined as an iterative software development approach where value is provided to users in small increments rather than through a single large launch. Agile teams evaluate requirements and results continuously, which leads to the efficient implementation of change. This article covers the meaning, life cycle, methodology, and examples of Agile. (*Ashtari, 2022*)

Agile is a type of software development methodology that anticipates the need for flexibility and applies a level of pragmatism to the delivery of the finished product. Agile software development requires a cultural shift in many companies because it focuses on the clean delivery of individual pieces or parts of the software and not on the entire application. (*Kate Brush and Valerie Silverthorne, 2019*)

The researchers chose the Agile Methodology for the development of the system due to its flexibility and responsiveness to change. This approach facilitated continuous feedback, adaptation, and improvement throughout the project lifecycle. This iterative approach ensured that each component of the project was thoroughly tested and refined before moving on to the next phase. Figure 1 shows the illustration of the process in Agile Methodology.

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Phase 1. In the **planning phase**, the project team defined the project scope, objectives, and deliverables. This phase involved identifying user requirements through surveys and interviews with potential users, including students, parents, and educators. The team prioritized features based on user needs and technical feasibility, creating a detailed project roadmap and timeline for each sprint.

Phase 2. During the **design phase**, the team focused on creating detailed designs for software components of the system. This included developing wireframes and prototypes of the user interface. User feedback was incorporated into the design process to ensure that the final product would be user-friendly and meet the needs of the target audience.

Phase 3. The **development phase** involved coding and assembling the hardware and software components of the system. The software development team implemented the user interface and other software components. The agile approach allowed for iterative development, with each sprint focusing on completing specific tasks and features.

Phase 4. In the **testing phase**, the team conducted extensive testing to ensure the functionality and reliability of the system. This included unit testing of individual software modules, integration testing of combined hardware and software systems, and user acceptance testing (UAT) with selected participants. Bugs and issues identified during testing were documented and addressed in subsequent sprints.

Phase 5. The **release phase** involved deploying system for real-world use. The team provided participants with detailed instructions and support to ensure proper usage. This phase allowed the researchers to gather data on the system's performance and user interactions in a natural setting, providing valuable insights into its effectiveness and usability.

Phase 6. The **feedback phase** was crucial for continuous improvement. Participants provided feedback through surveys and interviews, highlighting their experiences, challenges, and suggestions. This feedback was analyzed and used to inform future iterations of the system. The agile methodology facilitated rapid incorporation of user feedback, ensuring that the final product met the needs and expectations of its users.

II. Methods

This chapter presents the research methodology, detailing the data sources, methods employed in the study, data analysis tools, and data collection instruments.

RESEARCH DESIGN

The study used a quantitative survey research design to assess the usability, effectiveness, and overall impact of the proposed digital learning platform for Colegio de Montalban. This design enabled the systematic collection and analysis of numerical data from a diverse group of participants, resulting in measurable insights into the platform's impact on student engagement, learning outcomes, and user satisfaction.

Survey Administration: Surveys were the primary data collection method. They were created to evaluate critical factors such as usability, ease of use, student engagement, learning efficacy, and overall platform satisfaction. The survey's closed-ended questions with Likert scales allowed for precise, quantifiable responses that could be statistically analyzed.

Data Analysis: In this quantitative survey research, data collected through structured surveys were analyzed using statistical methods to evaluate the digital learning platform's effectiveness and usability at Colegio De Montalban.

RESEARCH LOCALE

The research was conducted in both face-to-face and online classroom settings at Colegio De Montalban to replicate real-world conditions accurately. These settings ensured that the digital learning platform was tested in an appropriate and natural educational environment. By allowing participants to engage with the platform within their daily academic routines, the study gathered authentic data on user experiences and habits, providing a realistic framework for evaluating the platform's usability and efficacy.

POPULATION AND SAMPLING

A purposive sampling strategy was used to select participants for user testing.

Participants: A total of 10 students and 10 instructors for each institute, and 10 parents of the students from Colegio De Montalban were recruited.

The sample included participants from different grade levels and subject areas to ensure that the evaluation covered a wide range of educational contexts.

This diverse group provided rich and varied feedback, allowing for a comprehensive assessment of the platform's functionality and user experience.

RESEARCH ETHICS

The research for the development of the digital learning platform for Colegio De Montalban follows the following ethical principles to ensure all participants' safety, privacy, and rights.

1. **Inform Consent -** Participants, including students, teachers, and parents, will be fully informed about the purpose, methods, and intended use of the research data. The following steps will be taken to ensure informed consent:
    - Written consent forms will be provided, detailing the research objectives, procedures, and the voluntary nature of participation.
    - Participants will be informed that they can withdraw from the study at any time without any negative consequences.

2. **Confidentiality and Privacy -** The privacy and confidentiality of all participants will be respected throughout the research process. This will be achieved by:

- Ensuring that all data collected, whether through surveys, interviews, or system usage analytics, is anonymized and stored securely.
- Data will only be accessible to the research team and authorized personnel, and all findings will be presented in aggregate form.

3. **Transparency and Honesty -** The research will be conducted with full transparency, and any conflicts of interest will be disclosed. Researchers will:
    - Be open and honest about the objectives of the study and how the data will be used.

DATA COLLECTION INSTRUMENTS AND PROCEDURES

Survey Questionnaire. A survey questionnaire is an essential component of research. A questionnaire usually consists of one or more questions that are answered by multiple people. A survey is used to ask respondents relevant questions about the study. The proponents presented the system to the respondents and provided a survey questionnaire that will test the system's capability in terms of completeness, accuracy, reliability, timeliness, and security.

DATA ANALYSIS

The data analysis for this research will be conducted using a quantitative survey research approach, focused on evaluating the usability, effectiveness, and user satisfaction with the digital learning platform. The analysis will incorporate statistical methods to identify trends, patterns, and relationships in the collected data.

1. **Data Collection Overview**
    - 10 students and 10 instructors for each institute
    - 10 parents of the students from Colegio De Montalban.

These measurements enabled us to quantify subjective experiences and conduct statistical analyses to identify trends and patterns. Participants responded to structured

questions regarding the platform's usability, effectiveness, and overall satisfaction, focusing on key features like communication, collaboration, and learning engagement.

2. **Data Analysis Software: Google Forms and Google Sheets**
    - Google Forms automatically collected and organized survey responses into a Google Sheet for data processing and analysis.
    - Google Sheets was used to perform initial data cleaning, basic descriptive statistics, and graphical representation of responses (e.g., bar charts, pie charts, and histograms).

3. **Data Preparation**
    - Data cleaning was conducted in Google Sheets, where missing or incomplete responses were identified and handled by either excluding them or filling them based on logical inference.
    - All responses were categorized into participant groups: students, instructors, and parents, for subgroup analysis.

4. **Descriptive Statistics**
    - Frequencies and percentages for categorical responses.
    - Standard deviation and variance to understand the variability in participant responses.

5. **Graphical Analysis**
    - Bar charts and pie charts generated in Google Forms were used to visualize the distribution of responses (e.g., percentage of students, instructors, and parents who were satisfied with the platform).

6. **Comparative Analysis**
    - Google Sheets was used to compare responses between different participant groups (students, instructors, and parents).

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