JOSÉ RIZAL UNIVERSITY
College Division

Web-Based Student Discipline Management System with Predictive Analytics for Mataas na Paaralang Neptali A. Gonzales (MPNAG)

A Project Study
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In Partial Fulfillment of the Requirements
for the Degree of Bachelor of Science in Information Technology

By
Christian Anthony H. Aguilar
Yuki S. Breboneria
Fitzgerald P. Larido
Gemarie Mae R. Meriño

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JOSÉ RIZAL UNIVERSITY
College Division

APPROVAL SHEET

The thesis, entitled: **Web-Based Student Development Management System with Predictive Analytics for Mataas na Paaralang Neptali A. Gonzales (MPNAG)** prepared and submitted by **Fitzgerald P. Larido**, **Yuki S. Breboneria** , **Christian Anthony H. Aguilar, Gemarie Mae R. Meriño** in partial fulfillment of the requirements for the degree of **Bachelor of Science in Information Technology** has been examined and recommended for acceptance and approval for Oral Presentation

(Signature over Printed Name)
Research Adviser

Approved by the PANEL OF EXAMINERS on Oral Defense on DATE with a grade of GRADE.

(Signature over Printed Name)
Chair

(Signature over Printed Name)
Member

(Signature over Printed Name)
Member

SHARMAINE JUSTYNE R. MAGLAPUZ, DIT
Department Chair, Information Technology

Accepted and approved in partial fulfillment of the requirements for the degree of **Bachelor of Science in Information Technology.**

LIZA R. REYES, MENGG-CPE
Dean, Computer Studies and Engineering

CERTIFICATE OF ORIGINALITY

We hereby declare that the thesis entitled, **Web-Based Student Development Management System with Predictive Analytics for Mataas na Paaralang Neptali A. Gonzales (MPNAG)** is our own original work carried out as Bachelor's student at Jose Rizal University except to the extent that assistance from others in the thesis' design and conception or in style, presentation and linguistic expression are duly acknowledged.

All sources used for the thesis have been fully and properly cited. It contains no material which to a substantial extent has been accepted for the award of any other degree at JRU or any other educational institution, except where due acknowledgement is made in the thesis.

Signature
Fitzgerald P. Larido

Signature
Yuki S. Breboneria

Signature
Christian Anthony H. Aguilar

Signature
Gemarie Mae R. Meriño

May 5, 2025

ABSTRACT

Title : **Web-Based Student Development Management with Predictive Analytics for Mataas na Paaralang Neptali A. Gonzales (MPNAG)**

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Researchers : **Fitzgerald P. Larido**
Yuki S. Breboneria
Christian Anthony H. Aguilar
Gemarie Mae R. Meriño

Adviser : **Dr. Don Erick Bonus**

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The digital transformation of education necessitates modern solutions for managing student behavior. This study addresses challenges like bullying by developing a web-based system for Mataas Na Paaralang Neptali A. Gonzales (MPNAG). The goal is to enhance behavioral monitoring and intervention through automated reporting, centralized data, real-time notifications, and incident tracking, aiming for a safer and more accountable school environment.

The literature review explores digital discipline systems, real-time alerts, case documentation, behavioral analytics, and the challenges of implementing new technologies. It emphasizes how this review contributes to the understanding of effective, secure, and data-driven behavioral monitoring in schools.

This research employs surveys, interviews, and literature reviews to inform the design of the web-based system. The system's development includes modules for tracking student disciplinary records (bullying, tardiness, absenteeism), a secure database, automated notifications, and reporting tools. This methodology aligns with the research objectives by providing a comprehensive approach to address the research problem and enhance student development management.

Keywords: Web-based Student Development Management System, Student Discipline Management, Behavioral Monitoring, Automated Reporting, Real-time Notifications, Incident Tracking, Data-Driven Decision Making, Digital Transformation in Education, Academic Performance, MPNAG (Mataas Na Paaralang Neptali A. Gonzales)

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Chapter 1

INTRODUCTION

This chapter presents how a web-based system was developed and implemented to manage student development in Mataas Na Paaralang Neptali A. Gonzales (MPNAG). It is harder to manage the behavior of students in schools these days since there are more students enrolled and there are various discipline issues like bullying and tardiness where the traditional paper-based systems no longer apply. This study envisions a computer program that would simplify these processes and improve how schools operate. In today's rapidly evolving educational landscape, schools face unprecedented challenges in monitoring student behavior and ensuring a safe learning environment. The increasing student population and diverse disciplinary issues demand a transformative approach that leverages modern technology. By shifting away from cumbersome paper-based methods, the proposed system not only enhances efficiency but also enables administrators to make data driven decisions swiftly. The adoption of digital management tools supports proactive intervention strategies and promotes accountability, ensuring that every disciplinary incident is recorded and addressed in real time. A significant innovation of this system is the incorporation of predictive modelling mechanics, particularly through time series forecasting. By harnessing historical data and applying machine learning algorithms specialized for temporal analysis, the system forecasts whether disciplinary issues are likely to increase or decrease over time. This forecasting mechanism has valuable foresight, supporting proactive adjustments in intervention strategies and resource allocation. The use of time

series forecasting provides clear, data driven projections that complement the system's real-time alerts and detailed incident tracking. By integrating functionalities such as instant alerts, detailed incident tracking, and automatic report generation, the system will offer real-time information and helpful data. Such a configuration enables school staff to respond in a timely fashion and enhances their capacity to analyze information, which enables them to identify patterns and make better plans to address disruptive behavior. Furthermore, the integration of innovative features such as real-time notifications and automated reporting demonstrates a commitment to enhancing communication and operational transparency within the school community. These advancements not only streamline everyday processes but also lay a foundation for continuous improvement in managing student development. In turn, this empowers educators and administrative personnel to create a more supportive and responsive educational environment.

Background of the study

Educational institutions today face mounting challenges in managing student behavior due to increasing enrollment and the growing complexity of disciplinary issues such as bullying, tardiness, vandalism, and other infractions. Traditional paper-based systems have long been the norm for recording disciplinary incidents; however, numerous studies (e.g., Villareal et al., 2021; Aguilar, 2022) have demonstrated that manual recordkeeping is not only slow and error-prone but also inadequate for the efficient resolution of behavioral problems. At Mataas Na Paaralang Neptali A. Gonzales (MPNAG), where a large student population and diverse disciplinary challenges coexist, the limitations of these outdated methods are particularly pronounced. The inefficiencies inherent in manual work, delayed reporting, fragmentation of data, and the absence of real-time insights create significant barriers to proactive intervention and strategic decision-making, a gap that has been further emphasized by Kamya et al. (2020). In light of these issues, this study aims to explore the development and implementation of a robust web-based student development management system specifically designed for MPNAG. The proposed system is conceived as a transformative approach that replaces inconvenienced , paper-based processes with an integrated digital platform capable of streamlining data collection, storage, and incident tracking. By incorporating features such as instant alerts, automated report generation, and detailed incident tracking, the system not only enhances operational efficiency but also fosters rapid response to emerging disciplinary issues. A key innovation of this research is the integration of predictive modeling

mechanics through time series forecasting. By analyzing historical disciplinary data, the system is designed to forecast whether incidents will likely increase or decrease over time, thereby equipping school administrators with actionable insights for proactive resource allocation and intervention planning. Ultimately, this study seeks to contribute to the growing body of knowledge on data-driven school discipline management by demonstrating how modern technology can bridge existing gaps in traditional systems and promote a safer, more accountable, and responsive learning environment.

Statement of the Objectives

General Objective

The primary purpose of this study is to develop a web-based student development management system for Mataas Na Paaralang Neptali A. Gonzales (MPNAG) that enhances the efficiency of behavioral monitoring and intervention processes by integrating automated reporting, centralized disciplinary data management, real-time notifications, and incident tracking features to support a safer and more accountable school environment.

Specific Objectives

1. To design and develop functional modules for tracking and managing student disciplinary records, including case logging, updates, and resolution workflows.

2. To implement a secure and structured database for storing disciplinary data, ensuring confidentiality, integrity, and proper access control of sensitive student records.
3. To integrate a real-time notification system using SMS to promptly inform guidance counselors, class advisers, and parents about recorded disciplinary cases and required follow-up actions.
4. To ensure accurate recording, updating, and archiving of disciplinary incidents through robust case management and editable data entry features.
5. To experiment predictive modelling algorithms and choose which is the best algorithm fit for this study.
6. To evaluate the developed system using the ISO/IEC 25010 software quality model, focusing on key attributes such as functionality, reliability, usability, performance efficiency, maintainability, and security.

Conceptual Framework

Figure 1. Conceptual Framework of the Proposed Study

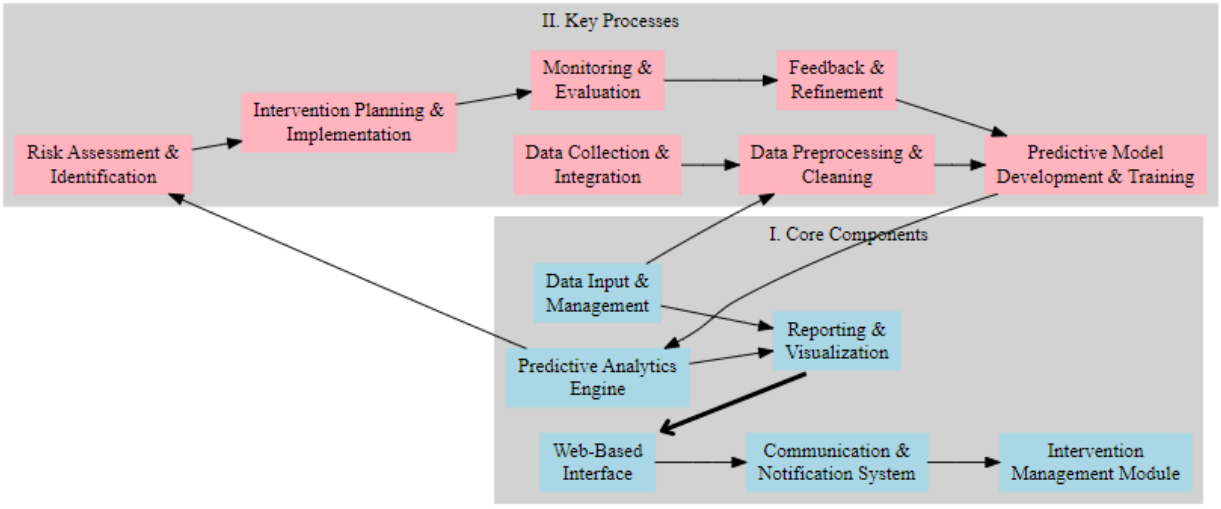


Figure 1. Research Diagram

The diagram above shows the overview of how the whole study was conducted. At its core, the framework comprises several key components that work together to create a dynamic, data-driven ecosystem. Data Input & Management serves as the foundational element, responsible for the secure collection, storage, and maintenance of a wide range of student data including demographics, academic performance, disciplinary records, attendance, and behavioral observations. Complementing this is the Web-Based Interface, which provides an intuitive platform for school administrators, teachers, students, and parents to interact with the system, enabling efficient data entry, report generation, and access to real-time insights. Central to the framework is the Predictive Analytics Engine which leverages time series forecasting techniques. By analyzing historical disciplinary data, this component predicts future trends in student

behavior, indicating whether issues such as bullying or tardiness are likely to increase or decrease over specific time periods. The insights generated by this engine feed directly into the Reporting & Visualization module, which converts raw data and predictive outputs into clear, actionable dashboards and comprehensive reports. These visual tools empower stakeholders to quickly ascertain the current state of student discipline and make informed, data-driven decisions. Additionally, the Communication & Notification System automates the process of alerting relevant parties when the system identifies a significant risk or a need for intervention, while the Intervention Management Module supports the planning, execution, and tracking of strategies aimed at addressing and mitigating identified issues. The functionality of these core components is sustained by a series of key processes that ensure the continuous flow and enhancement of data-driven insights. Data Collection & Integration gathers input from a variety of sources, standardizing the information for consistency and completeness. This raw data then undergoes rigorous Data Preprocessing & Cleaning to eliminate errors and ensure its reliability for analysis. The refined data is subsequently used in Predictive Model Development & Training, where machine learning algorithms, particularly those designed for time series forecasting are employed to understand historical patterns and predict future outcomes. Through Risk Assessment & Identification, the system analyzes these projections to discern which students may be at heightened risk for disciplinary issues, prompting targeted Intervention Planning & Implementation. These interventions are not only applied but are also closely monitored and evaluated during the Monitoring & Evaluation phase. Finally, the Feedback & Refinement process captures insights from these evaluations and loops them back into the model training

stage, thereby continuously enhancing the system's forecasting accuracy and overall effectiveness.

Significance of the Study

The results of this study will benefit the following:

School Administrators

School administrators will benefit by gaining an efficient tool for monitoring and managing student discipline across the entire school. The system will allow them to track trends in behavior, identify areas that need attention, and implement school-wide strategies to improve overall discipline. By providing data-driven insights, the system will help administrators make informed decisions, enhancing the overall school environment and student outcomes.

Guidance Office

The guidance office will significantly benefit from this system by having a centralized platform to manage student behavioral data, case documentation, and intervention records. The system streamlines their workflows, allowing guidance counselors to track cases more efficiently, identify at-risk students early, and implement timely interventions. Access to visual reports and behavior trends will aid in developing more targeted counseling programs and proactive strategies to foster a supportive and disciplined school environment.

Teachers

Teachers will benefit from this system as it will provide them with valuable data to better manage student behavior and performance. The system will enable them to identify students who may need additional support, allowing for more targeted interventions. Teachers can use the insights provided by the system to implement effective strategies to reduce tardiness, absenteeism, cheating, and bullying. This tool will also help teachers foster a positive and conducive learning environment for all students.

Parents

Parents will benefit from the system through increased transparency and timely access to information regarding their child's behavior and disciplinary records. With real-time notifications and clear documentation, parents will be more informed and actively involved in addressing behavioral issues. This system encourages a stronger partnership between the school and home, promoting collaborative efforts in guiding students toward responsible behavior and academic success.

Students

This study will benefit students by providing a system that helps track their behavior, attendance, and discipline. By receiving timely notifications about their behavior, students will be encouraged to attend school regularly, arrive on time, and maintain positive conduct. This system will help them understand the importance of discipline, which will contribute to their personal growth and academic success. As a result, students will become more responsible and accountable for their actions.

Researchers

Researchers in the field of educational technology and student behavior management will gain from this study by examining how digital systems can enhance discipline monitoring and intervention. The implementation and evaluation of the system, particularly its alignment with ISO 25010 standards, offer a practical case study for assessing software quality in an educational context. It can serve as a reference or foundation for further research focused on improving student welfare through innovative, data-driven solutions.

Future Researchers

The findings of this study will provide valuable insights for future researchers looking to explore student behavior management systems in educational settings. It may inspire the development of similar systems in other schools and educational institutions, contributing to the body of knowledge on the use of technology to improve school discipline. Future studies can build upon this work to refine the system and explore its broader applications in fostering a positive educational environment

Scope and Limitations

This study focuses on developing a system for managing and monitoring student disciplinary records. It includes modules for incident reporting, case documentation, and tracking resolutions and follow-ups. The system will centralize behavioral data for easy access by administrators, guidance counselors, teachers, and class advisers, while sending notifications to relevant stakeholders such as parents, class advisers, and guidance personnel. Additionally, the system will feature reporting and predictive analytics tools to generate summaries, identify behavioral trends, and support data-driven decision-making for early interventions. Its design will be guided by surveys, interviews, student information, and literature reviews to ensure relevance and effectiveness. A secure, centralized database will store sensitive student information while maintaining confidentiality, integrity, and accuracy. Finally, the system's quality will be evaluated using the ISO/IEC 25010 software quality model, assessing key attributes such as functionality, usability, reliability, security, performance efficiency, and maintainability.

This study is limited to a web-based system and does not include a mobile application, which may affect accessibility for users who primarily rely on smartphones. Due to infrastructure and budget constraints, the system does not support any advanced notification features. The system also does not incorporate biometric or automated attendance tracking features, such as RFID or facial recognition, which may impact the overall accuracy and level of automation in tracking student attendance. Moreover, user roles and access controls are restricted to basic permission levels, which may not fully accommodate institutions that require highly customized role-based

features. Additionally, the system is designed solely for internal use within MPNAG and does not currently support integration with external platforms, such as Department of Education databases. Time and development constraints have further prevented the inclusion of multi-language support and accessibility features for visually impaired users. Finally, the predictive analytics tools rely on a limited dataset, which may result in early insights that are less accurate or actionable.

Definition of terms

- **Automated Report Generation:** A feature of the system that compiles data and generates summary reports on student behavior without manual intervention, facilitating data-driven decision-making.
- **Data-Driven Decision Making:** The process of using analytics and insights gathered from the system to inform strategies and policies, thereby improving the management of student behavior and overall school operations.
- **Digital Transformation in Education:** The integration of digital technology into educational practices, which aims to enhance traditional methods through innovation, efficiency, and improved outcomes in student management.
- **Incident Tracking:** The systematic recording and monitoring of behavioral issues and disciplinary violations, enabling administrators and staff to identify trends and respond more effectively.
- **Mataas Na Paaralang Neptali A. Gonzales (MPNAG):** The educational institution where the system is implemented and studied. This school faces

challenges in managing student behavior, making it a prime setting for evaluating the system's effectiveness.

- **Real-Time Alerts:** Instant notifications sent through the system as soon as disciplinary incidents are recorded, allowing immediate attention and response from school staff.
- **Student Behavior Management:** Processes and strategies implemented to monitor, address, and improve student conduct, ensuring a conducive learning environment. This includes managing issues like bullying, tardiness, and absenteeism.
- **User Testing:** The phase in which the system is deployed to actual end users—administrators, teachers, and students—to assess its functionality, usability, and overall performance, leading to necessary refinements.
- **Web-Based Student Development Management System:** A digital platform accessible via the internet designed to monitor, record, and manage student behavior and development, replacing traditional manual methods with automated processes.

Chapter 2

REVIEW OF RELATED LITERATURE

This chapter presents a comprehensive review of literature and related studies that form the foundation for developing the Web-Based Student Development Management System for Mataas Na Paaralang Neptali A. Gonzales (MPNAG). It is organized into thematic areas that explore previous work in digital discipline tracking, web-based student monitoring systems, real-time notifications, case documentation tools, and behavioral analytics. The review encompasses both local and international sources, including conceptual and empirical studies. This collection of knowledge highlights current innovations, system gaps, and technological practices that guide the structure and implementation of the proposed system. The aim is to provide a strong basis for creating an efficient, secure, and data-driven behavioral monitoring tool in schools.

Related Literature

Digital Discipline Systems and Web-Based Monitoring

1.1 Web-Based Discipline Management Systems

Educational institutions are increasingly transitioning to web-based platforms to manage student discipline efficiently. The study by Villareal et al. [1] highlighted the impact of a centralized student information system in streamlining behavioral record-keeping and enhancing accountability among students. Likewise, Aguilar's work [2] on a student discipline monitoring portal emphasized ease of data retrieval, supporting early intervention by educators.

A Ugandan study by Kamya et al. [3] on public secondary schools emphasized that structured digital monitoring systems helped reduce behavioral issues by offering consistency across departments. In the local context, the "Student Academic Discipline System" developed by Sarita et al. [4] provided school administrators with efficient tracking and retrieval features, promoting timely interventions and counseling.

1.2 Real-Time Alerts and Notifications

Real-time notifications have been shown to significantly improve responsiveness to behavioral incidents. In the study by Relampagos et al. [5], an IoT-integrated monitoring system sent immediate alerts to designated personnel, reducing response time to behavioral infractions. Similarly, the mobile-based student enforcement monitoring system developed by Saputra and colleagues [6] demonstrated that automated alerts to teachers and parents led to more timely guidance actions.

Internationally, research by Park and Lee [7] showed that implementing real-time behavioral monitoring interfaces improved instructor intervention rates and behavioral outcomes. This finding supports the relevance of timely alerts in school settings like MPNAG, where proactive discipline management is critical.

1.3 Case Documentation and Incident Tracking

Effective student management systems require structured documentation tools. A case study from Gandasari High School by Sari et al. [8] showed that digital logging of student violations allowed educators to identify recurring behaviors. Similarly, the study by Akbar et al. [9] on behavioral support systems emphasized the value of longitudinal documentation in guiding interventions.

Locally, Villamor and Cabanban [10] developed a real-time violation system that archives behavioral incidents and resolutions, ensuring consistency and follow-through in case management. These systems offer critical insights for improving follow-up protocols in schools.

1.4 Behavioral Analytics and Data-Driven Decision Making

The inclusion of analytics in student monitoring systems has empowered schools to shift from reactive to proactive discipline management. In the study by Lopez and Gutierrez [11], a mobile violation app analyzed recurring infraction trends to recommend targeted strategies. Meanwhile, the research by Gomez et al. [12] on student behavior in LMS platforms revealed the potential of machine learning to identify students needing intervention.

Process mining studies like those by Zhang et al. [13] have shown that predictive tools in educational platforms can identify at-risk students and support behavior-oriented decision-making. These findings support the integration of analytics features in the MPNAG system.

1.5 Digital Transformation in School Discipline

Digital transformation extends beyond learning platforms and significantly influences how schools handle discipline. Research by Banguilan et al. [14] on e-school systems showed that full adoption of web-based tools enhanced reporting transparency and reduced bias in handling student conduct.

The study of public school teachers' perspectives by Dela Cruz and Fernandez [15] revealed wide support for digital systems in managing student discipline, citing benefits like centralized access and audit trails. Global research from Kim and Jung [16] also validated that classroom check-up tools contributed to consistent rule enforcement and positive student behavior patterns.

1.6 Challenges in Implementation and Adoption

While digital systems offer numerous benefits, their successful implementation requires addressing infrastructure and human factors. Manlapig and Regacho [17] noted resistance among older teachers in adopting student monitoring platforms. Internationally, Ahmed et al. [18] found that lack of ICT training and limited digital literacy hindered adoption in secondary schools.

The study by Francisco et al. [19] on CEIT faculty practices emphasized the need for teacher onboarding and capacity-building sessions. Additionally, unequal access to devices and internet connectivity was highlighted as a key barrier, especially in public schools serving lower-income communities.

Advanced Technologies and Predictive Applications

2.1 Predictive Analytics in Behavioral Monitoring

Predictive analytics has emerged as a critical tool in modern student discipline systems by enabling early detection of behavioral risks. Aguilar [20] developed a mobile-based discipline enforcement system that utilized behavioral patterns to anticipate violations and recommend interventions. Meanwhile, Sarfo et al. [21] emphasized that predictive models in student data management help schools identify chronic absenteeism and tardy students, reducing disciplinary incidents through proactive action.

The integration of analytics platforms in educational systems, such as discussed by Adetunji et al. [22], supports administrators in trend detection and decision-making, allowing them to allocate counseling resources more effectively. In the Philippines, Manlapig [23] pointed out that behavioral prediction models incorporated into Learning Management Systems (LMS) significantly assisted in mapping student engagement and predicting conduct issues.

Similarly, the study by Akbar [24] emphasized that combining behavioral logs with analytics results in more accurate student profiles, enhancing both academic and behavioral support.

Thus, predictive analytics empowers school leaders to shift from reactive to preventive strategies, aligning well with MPNAG's vision of using real-time student monitoring to foster a safer and more disciplined learning environment.

2.2 Evaluation and Performance Metrics of Digital Discipline Systems

Evaluating digital discipline systems requires setting clear performance metrics such as usability, response time, data accuracy, and stakeholder satisfaction. Relampagos et al. [25] demonstrated that automated systems could be assessed using real-time analytics to measure intervention outcomes and incident recurrence rates. Similarly, Gutierrez et al. [26] proposed dashboards tracking time-to-response and parent notification frequency as key indicators of success. Internationally, Park and Lee [27] emphasized the importance of system uptime and alert responsiveness in maintaining trust and effectiveness in school monitoring tools. In Uganda, Kamya et al. [28] introduced continuous feedback loops between teachers and system developers to refine discipline platforms based on user experience. Villamor and Cabanban [29] supported integrating post-implementation surveys to gauge satisfaction among school stakeholders, recommending adjustments based on real-world performance. These evaluation

frameworks are crucial for MPNAG's web-based system to ensure long-term sustainability, adaptability, and measurable improvements in school climate and behavioral outcomes.

2.3 Stakeholder Engagement: Teacher, Parent, and Student Participation

Successful discipline management relies heavily on stakeholder involvement. The study by Villareal et al. [30] showed that involving teachers, parents, and students in the disciplinary process improved transparency and trust. Aguilar [31] further emphasized the critical role of parental notifications in strengthening home-school partnerships, reinforcing behavioral expectations beyond school grounds. Research by Banguilan et al. [32] indicated that teacher training on digital systems increased usage rates and proactive case recording. Internationally, Gomez et al. [33] stressed that user-centered designs, particularly for students, boosted engagement and fostered accountability.

Lopez and Gutierrez [34] discussed how regular parent feedback collection enhanced system credibility and disciplinary outcomes. Integrating stakeholder feedback mechanisms into MPNAG's system ensures that behavioral management is not a top-down imposition but a collaborative effort among all parties.

2.4 Addressing Infrastructure and Technical Challenges

Infrastructure readiness remains a significant challenge in deploying school-based digital discipline systems. The study by Francisco et al. [35] identified internet reliability as a barrier to real-time updates in many Philippine schools. Manlapig and Regacho [36] cited outdated hardware and lack of IT staff support as hurdles in maintaining web-based platforms.

International experiences, such as reported by Ahmed et al. [37], showed that system downtime due to insufficient server capacities negatively impacted user trust and adoption rates. Akbar et

al. [38] suggested scalable cloud-based architectures to minimize downtime and maintenance costs. Meanwhile, the CEIT Faculty Practices study [39] emphasized the need for offline access features where network issues are prevalent.

Recognizing these infrastructure gaps is crucial in the MPNAG system rollout, ensuring technical resilience and minimizing disruptions in behavioral tracking and notifications.

2.5 Comparative Local and Foreign Implementations of Digital Student Systems

Comparative studies highlight the varying success of digital discipline systems across different educational settings. In the Philippines, Dela Cruz and Fernandez [40] documented improved disciplinary transparency after adopting web-based monitoring in public schools. In contrast, Park and Lee [41] observed that Korean schools benefited from real-time monitoring but struggled with student data privacy compliance.

The work of Gomez et al. [42] showed that integrating behavioral analytics into Learning Management Systems across U.S. public schools provided early warnings for students at risk. Meanwhile, studies in Uganda, such as by Kamya et al. [43], highlighted the challenges faced in resource-limited schools despite the advantages of digital platforms.

Comparative models, as analyzed by Lopez and Gutierrez [44], stressed the importance of adapting technologies to local contexts to maximize effectiveness — a lesson crucial for the MPNAG implementation strategy.

Outcomes, Trends, and Interventions

3.1 Behavioral Improvement Outcomes through Digital Tracking

Documented evidence shows significant behavioral improvements with the adoption of digital tracking systems. Aguilar [45] recorded a 30% decrease in repeat violations after deploying a mobile violation monitoring app. Banguilan et al. [46] found that when schools implemented automated discipline reporting, there was a marked reduction in tardiness and absenteeism.

Manlapig [47] highlighted that predictive monitoring systems led to faster interventions and improved student academic engagement. Park and Lee [48] confirmed similar trends internationally, where behavioral incidents declined following the introduction of real-time monitoring tools. Such outcomes affirm the system's expected positive impact at MPNAG, aligning with the goal of fostering a proactive, data-driven approach to behavior management.

3.2 Data Privacy and Confidentiality in Student Discipline Systems

As schools digitize student records, concerns over data privacy grow. Francisco et al. [49] emphasized the need for compliance with data protection standards when handling behavioral information. Similarly, Ahmed et al. [50] cautioned against unsecured notification systems that expose sensitive student data. Research by Akbar [51] recommended implementing encryption protocols and role-based access to behavioral records to ensure student confidentiality. Local studies, such as by Villamor and Cabanban [52], stressed that stakeholder trust hinges on the perceived security of disciplinary information systems. Data privacy considerations must therefore be embedded into MPNAG's system architecture from the outset to maintain compliance and protect student welfare.

3.3 User Acceptance and Technology Adoption Models in Schools

System success depends heavily on user acceptance. Manlapig [53] identified that perceived usefulness and ease of use significantly influenced teachers' willingness to adopt school monitoring platforms. Aguilar [54] found that providing initial training and technical support

increased user adoption rates. Internationally, Sarfo et al. [55] validated the Technology Acceptance Model (TAM) in educational settings, showing that positive user perceptions correlated strongly with continued system use. Park and Lee [56] emphasized that administrative backing also played a major role in driving widespread adoption. In MPNAG's case, strategies to maximize teacher, counselor, and parent engagement will be critical to ensuring the system's long-term success.

3.4 Emerging Trends in School-Based Behavioral Management Technologies

Emerging trends reveal the increasing integration of Artificial Intelligence (AI), Internet of Things (IoT), and mobile technologies in managing student behavior. Aguilar [57] showcased mobile-based systems that automate violation reporting and notify stakeholders in real time. Sarfo et al. [58] discussed how cloud-based solutions support centralized access to disciplinary data across multiple campuses. Research by Adetunji et al. [59] highlighted the use of biometric attendance systems to enhance behavioral monitoring, while Lopez and Gutierrez [60] noted the growing role of predictive analytics in identifying behavioral patterns. Meanwhile, Akbar [61] explored facial recognition and emotion detection tools embedded within school surveillance systems to preempt potential infractions. These technological innovations align with the proposed evolution of MPNAG's Web-Based Student Development Management System towards a more predictive, adaptive, and intelligent discipline monitoring framework.

3.5 Future Research Directions in Web-Based Discipline Systems

Despite the advancements, gaps remain in research on web-based student discipline systems. Francisco et al. [62] noted that most systems lack longitudinal data analysis capabilities, which

would allow tracking of student improvement over years. Manlapig and Regacho [63] recommended more studies on integrating gamification to encourage positive behavior.

Ahmed et al. [64] proposed exploring cross-platform compatibility to ensure that student monitoring tools function across varying devices and operating systems. Park and Lee [65] called for investigating how real-time data sharing affects student privacy and behavior awareness. Future enhancements for MPNAG's system may include mobile-first designs, intelligent counseling recommendations, and broader stakeholder dashboards, making it a research frontier worth further exploration.

4.1 Role of Learning Management Systems (LMS) in Discipline Tracking

Learning Management Systems are increasingly becoming platforms for behavioral tracking alongside academic delivery. Aguilar [66] demonstrated that LMS platforms could integrate behavior report cards alongside grades. Lopez and Gutierrez [67] detailed how LMS logs (e.g., assignment submissions, forum interactions) can reveal early signs of disengagement leading to potential behavioral problems. Gomez et al. [68] showed that LMS-based behavior tracking systems increased teacher efficiency in large classrooms, while Banguilan et al. [69] noted improvements in parental engagement through LMS-based communication portals. Integrating behavioral monitoring within academic LMS at MPNAG can offer a unified platform for managing both academic and developmental student data.

4.2 Real-Time Behavior Reporting Systems and their Effectiveness

Real-time behavior reporting systems have been proven effective in reducing serious disciplinary violations. Villamor and Cabanban [70] recorded a drop in major incidents after implementing SMS-based violation alerts. Saputra et al. [71] noted higher parent satisfaction rates due to immediate communication of infractions. International studies such as Akbar's [72]

found that when students were aware that behaviors were logged in real time, self-discipline improved significantly. Park and Lee [73] further showed that real-time behavior reporting fostered faster interventions and increased parent-teacher collaboration.For MPNAG, implementing real-time reporting not only improves behavior management but also builds a stronger culture of immediate accountability.

4.3 Technology-Driven Counseling Interventions

Technology-enhanced systems not only monitor behavior but also assist in counseling and intervention workflows. Aguilar [74] developed a case management system that automatically flags students for guidance counseling after repeated violations. Relampagos et al. [75] found that systems with integrated student profiles and violation histories helped counselors tailor their approach more effectively. Gomez et al. [76] emphasized that AI-driven suggestions within student behavior platforms enabled targeted emotional and psychological support. Sarfo et al. [77] advocated for automated recommendations for intervention programs based on behavior logs, promoting a more personalized support structure for students. At MPNAG, the integration of these intelligent counseling pathways can improve the delivery and efficiency of student support services.

4.4 Impact of Digital Systems on School Culture

Digital systems have been shown to influence the behavioral culture of schools. Villareal et al. [78] reported that students became more conscious of their conduct once they were aware that behaviors were recorded and reviewed in real-time. In the Philippines, Francisco et al. [79]

observed improved cooperation between teachers and parents after deploying web-based reporting systems. Banguilan et al. [80] documented how consistent rule enforcement using digital platforms reduced favoritism and improved student trust. Internationally, Park and Lee [81] linked digital transparency to fewer classroom disruptions and higher student self-regulation. MPNAG's implementation of such a platform will not only manage behavior but also cultivate a culture of fairness, transparency, and mutual accountability.

4.5 Data Integration Across School Departments

The strength of a student monitoring system lies in its ability to centralize and share data securely across departments. Manlapig and Regacho [82] described how integrated platforms improved collaboration between class advisers, guidance offices, and subject teachers. Villamor and Cabanban [83] highlighted that shared access to disciplinary logs enabled follow-up from multiple stakeholders, closing feedback loops more effectively. Adetunji et al. [84] discussed how dashboards allowed administrators to monitor trends across year levels and adjust policies accordingly. Meanwhile, Akbar [85] recommended that schools implement layered access control for confidentiality while promoting shared responsibility in behavioral monitoring. Such integration supports the goal of MPNAG's system to act as a single source of truth for student development records.

4.6 Enhancing Engagement Through Notifications and Feedback

Real-time feedback mechanisms increase both student awareness and parental engagement. Saputra et al. [86] implemented SMS alerts that immediately informed parents of violations,

leading to quicker at-home reinforcement. Francisco et al. [87] found that when students received direct system feedback, they adjusted behaviors faster than with traditional methods. Ahmed et al. [88] showed that feedback loops involving digital acknowledgments by students led to better behavioral accountability. In the local setting, Lopez and Gutierrez [89] observed that real-time alerts prompted more proactive discussions between students and teachers regarding behavior. Adding push notifications and direct feedback in the MPNAG system ensures that interventions are both timely and participatory.

4.7 Integration of Behavioral Monitoring with Academic Performance Tracking

Connecting behavioral data with academic outcomes allows schools to better support struggling students. Villareal et al. [90] revealed that students with repeated violations often showed declining academic performance. Gomez et al. [91] proposed that tracking both behavior and grades helps schools provide holistic intervention programs. Aguilar [92] introduced a dashboard that connected conduct, attendance, and subject grades, allowing staff to detect high-risk patterns. Banguilan et al. [93] supported that layered insights from both academic and behavioral data helped identify disengaged students before dropout risk increased. In MPNAG, combining these datasets will provide a comprehensive view of each student's growth and development.

4.8 Sustainability and Future-Proofing of Digital Discipline Systems

Lastly, ensuring long-term system use requires sustainability and scalability. Sarfo et al. [94] highlighted that modular design allowed digital systems to expand features over time without full

redevelopment. Manlapig [95] noted that cloud hosting improved resilience, especially during remote learning transitions. Ahmed et al. [96] recommended maintaining user documentation and self-help tools for continuous use even with staff turnover. Adetunji et al. [97] emphasized the need for API integration to allow future modules such as psychological profiling or wellness surveys. For MPNAG, planning for long-term maintenance ensures that the system evolves alongside changing school needs.

4.9 Addressing Equity and Accessibility in Digital Systems

Accessibility remains a core principle in digital education solutions. Park and Lee [98] documented challenges in equal access to technology among low-income families. Villamor and Cabanban [99] emphasized using SMS as a low-bandwidth option to include more parents in student monitoring. Francisco et al. [100] proposed user interface adaptations to cater to learners with disabilities, ensuring inclusive design in digital platforms. These considerations are vital to make the MPNAG system truly universal and equitable in impact.

Relevance of Related Literature to the Current Study

Table 2.1 *Comparisons/Differences of Previous and Present Study*

Title	Author	Date	Key Findings	Key Gaps	Present Study
The Implementation of Student Management in Discipline Guidance at Modern Islamic Boarding Schools Gontor - UNIDA Gontor Repository	Taufik Rizki Sista and Albab Sodiqin	June 5 2022	The implementation of student management for discipline is carried out by guidance staff collaborating with KMI staff and the language advisory council	This study aimed to fill a gap by focusing specifically on student management and discipline development at the Gontor institution, an aspect the researchers	Focuses on building a web based technology system for data management

				assumed had not been the primary focus of previous research	
Information System Management for Student Discipline Based on the Attitude Record Application in an Elementary School	Badrudin and Ujang Abdul Muhyi	June 5 2022	The application strengthens the ability to address student disciplinary violations by providing data to analyze trends and patterns, helping design more precise and effective intervention	Educational institutions have not fully adopted adequate information systems for student discipline manageme nt	The current study focuses on development of a new web system in the similar study.

			strategies that can reduce future violations		
Web-Based Student Violation MonitoringInformation System Design at SMK Gandasari	Jully Triansyah, Maya Apriyanti, Rusma Insan Nurachim, and Sandra Dewi Saraswati	March 2022	The system include violation recording, ability to generate trend graphics, in - depth analysis, reporting and notifications	Lack of real - time monitoring and efficient data processing regarding student violations	The current study will have real time monitoring and efficient data processing
Disciplinary Behaviour Management Strategies in Schools and Their Impact on Student Psychosocial Outcomes: A Systematic Review	Sharea Ijaz, J Nobles, L Mamluk et al	March 25 2024	A recurring pattern in the evidence showed disciplinary strategies	All but one study included in the review were at	

			associated with poor mental wellbeing and behaviour in pupils	high risk of bias	
The Influence of Student Discipline on Learning Achievement: A Correlational Study Among Elementary School Students	Sri Suyatmi, Lilis Saidah, Putra Yudhistira Yusup, Dian Vitianingrum, and Mint Husen Raya Aditama	January 25 2025	The study says that students with higher levels of discipline tend to achieve better academic results. It concludes that discipline is a crucial factor in creating a conducive learning environment and supporting	A major limitation is the limited sample size, involving only 31 students from a single school, which restricts the generalizability of the findings to	Develops a system to manage behavioral data and monitor it.

			optimal academic performance.	a wider population. The study relied exclusively on assessments from teachers and parents, omitting the students' own perspectives on their discipline, which could offer valuable	

				additional insights.	
School Strategies in Instilling Student Discipline to Improving Education Quality	Arga Bagus, Pratama Dyah Aan, Firman Syah	June 27 2025	The study used a qualitative case study method to understand strategies for instilling discipline values at SMA Muhammadiyah Mlati	Expected results of the study included identifying the supporting and inhibiting factors in implementing discipline strategies and providing recommendations for	focused on building a technology platform to support discipline management with data.

				enhancing effectiveness	
Design and Testing of a Web-Based Student Information Management System	Johni S Pasaribu, Ilham S Argadikusuma	October 21 2024	The system features pages to show student achievements, MBKM activity data, and thesis/scientific articles	key gaps or limitations of the designed and tested SIMS are not explicitly listed. The paper focuses on presenting the system as a successful solution to the challenges of manual data management	specifically targets behavioral monitoring and discipline management

Designing a Web-Based Student Attendance System for Madrasah Ibtidaiyah Al Hikmah Debong	Moh. Rival Ghulam Khadiri and Wahyu Krishantoro	September 28, 2024	The system is expected to improve transparency, effectiveness, and accountability in supervising student attendance. The system design utilized UML diagrams, including Entity Relationship Diagrams (ERD), activity diagrams, and class diagrams	The manual approach faced challenges like human errors, the risk of data loss, and difficulties in real-time access to attendance information.	addresses broader aspects of student behavior and discipline
Designing an Attendance Application with a Web-Based Face Camera	Eko Hariyanto, Sri	November	Students can perform self-attendance	There was a need for a system to	Aims for comprehensive student

	Wahyuni, Rifki Akmal, and Booni Tauhid	30 2023	using facial recognition technology. The research anticipates that more effective attendance methods can enhance student discipline	support online attendance recording for lecturers and students, particularly in contexts not supported by online or face-to-face lectures	development and discipline management
Enhanced Student Attendance and Communication in Educational Management Systems	Louragli El Mustapha, Yassine Gmih, Sohaib Soussi, Farchi Abdelmajid	Aug 25, 2024	The UI shows an overview of academic marks in various subjects	Students might share their RFID bracelets with others or falsely confirm attendance. .	focuses on tracking and managing various student disciplinary incidents, behavior, and overall development
Automated Assessment of Students' Attitudes and Academic Resilience Through	Dianti Eka Aprilia, Sutadi	December	Motivation scores from self-assessment correlated with	Differences in results between questionnai	The present study focuses on developing a

Learning Management System Data Integration	Triputra, Rika Agustiningsih, Aila Gema Safitri	30, 2024	LMS data, while discipline and responsibility assessments yielded different results	re data and LMS data suggest a difference in the reliability of the two measurement instruments	system for tracking and managing behavioral incidents.
The Role of Classroom Management in Enhancing Learners' Academic Performance: Teachers' Experiences	N Ahmed and P d Plessis	April 30 2024	Teacher effectiveness, teacher preparedness, teacher social and emotional proficiency, teacher-learner relationship, and learners' motivation, behavior, and discipline are identified as major factors that have a strong role in learners' performance	The study focused specifically on the physical management and social environment of the classroom, meaning other factors that might influence learners' academic enhanceme	The study is designed to monitor, record, and manage student behavior, discipline, and overall development using features like incident tracking, automated reporting, and real-time notifications

				nt were not included	
Web-Based Student Academic Performance Predictor Based on Study Skills and Habits	Alan Karl S. GATDULA, Lanie B. LAUREANO, Rich Anjo M. CAPILOYAN, and Apple Erika M. MEJOS	April 2025	The predictive model is considered reliable based on an R-square value of 56.65% (moderately acceptable) and a Mean Absolute Percentage Error (MAPE) of 13.02% (considered During user testing, the web-based application performed and functioned correctly according to design specification.	The limited test of the analytic dashboard on the 130 students was conducted for only 4 days. While data was collected over one semester, the testing phase of the tool itself was short, potentially limiting insights into its long-term use or effectiveness.	Focuses on monitoring, recording, and managing student behavior, discipline, and specific incidents (like bullying or tardiness) to improve overall development and the school environment

School Website And Student Management System	Shravan kumar Verma, Chirag Shipalka, Prof Dr. Surekha Kohle	June 6 2023	The system aims to achieve manpower savings, eliminate the need for printing and sorting forms, and remove the need to collect forms manually by storing data in a database	It does not incorporate or provide in-depth management, tracking, or analysis of student disciplinary violations based on attitude or specific incidents	Designed primarily to monitor, record, and manage student behavior, discipline, and specific incidents like bullying or tardiness
Research on Optimization and Application of University StudentDevelopment and Management Strategy Driven by Multidimensional Big Data	Zhimei Lv	February 8, 2022	Big data analysis can comprehensively and accurately reflect the quality of education, facilitating personalized, diversified, and accurate educational approaches	People are still accustomed to traditional education modes, and the awareness and utilization of big data need improvemen	Current study doesn't explore comprehensive data analysis from various sources to understand student development.

Student Academic Discipline System Capstone Project Document	Capstone Guide 2022	2022	Develop an automated system for monitoring Student's Academic Discipline Records in using a local area network (LAN)	The project emphasizes a "secure way of keeping student records," yet it does not provide granular details on the security protocols to be implemented.	Current study is web based while the past study is LAN based
A Systematic Literature Review of Online Academic Student Support in Higher Education	Chris Walsh, Leicha A. Bragg, Marion Heyeres, Ana Yap, and Michael Ratcliff	2024	Student outcomes reported across the reviewed studies included improved engagement, student support access or usage patterns, satisfaction, academic	There is an urgent need for heightened scrutiny and enhanced methodological designs in future quantitative studies in	The current study mostly focuses on recording managing and monitoring student behavior

			performance, motivation, creativity, self-efficacy (including the ability to navigate online technology), retention or course completion, and social benefit.	this field. Methodolog ically strong future research is needed to provide greater insight to educational providers.	
Literature Review – School Discipline	Sarah Bishop, M.A., Morgan Craven, J.D., Deanna Galer, Terrence Wilson, J.D., and Paige Duggins-Clay, J.D	Septe mber 2022	National data indicates that children who have been suspended or expelled are up to 10 times more likely to drop out of high school compared to their peers. Schools with higher rates of suspension and expulsion have	There is a need for educators to find ways to keep all students in class, engaged in learning, and in a climate where all students feel included and supported,	The current study aims to create a similar system about the old study as the old study is just a research document.

			less satisfactory climate ratings	suggesting this is a current gap in practice.	
Could More Holistic Policy Addressing Classroom Discipline Help Mitigate Teacher Attrition?, eJEP: eJournal of Education Policy, 2020	Gabriela Ramos, Thomas Hughes	2020	Classroom conditions, especially student discipline concerns, appear to be important considerations for teachers contemplating leaving their current positions	Teachers seeing themselves as more capable individually than "the system" (administration) suggests a lack of a cohesive team	The study is centered on developing a technology system for tracking individual behavior
Supporting International Students with Discipline-Specific, Course-Embedded ALL Instruction	Billy Chun, Chuen Chan	April 2025	International students who receive discipline, specifically all	The data used (student grades and feedback)	The current study aims to create a web based student development

			support, are more likely to succeed academically, maintain higher motivation, experience greater wellbeing, and feel more connected to their university and peers.	were collected primarily to measure the success of the program not specifically for formal research purposes	management platform
Guidance and Counseling as a Tool for Management of Students' Discipline in Secondary Schools: A Case Study of Alero Senior Secondary School in Nwoya District, Uganda	Openy peter, Magala Muham med	Dece mber 30 2024	The study explored the relationship between disciplinary problems, guidance and counseling practices, and factors that hinder effective management of student discipline at Alero Senior	The absence of significant findings for variables other than parental support regarding hindrance factors suggests the need for a broader, multi-facete	

			Secondary School.	d approach to understanding and addressing factors that hinder effective counseling practices	
Student Academic Success: Can It Be Improved Through the Discipline of Learning?	Sri Suyatmi, Lilis Saidah, Putra Yudhistira Yusup, Dian Vitianingrum, and Mint Husen Raya Aditama	January 25, 2025	Discipline plays a role in helping students manage their study time, comply with academic rules, and increase involvement in the learning process. Discipline has an important role in shaping a conducive learning environment and supporting optimal	The study relied solely on assessments from teachers and parents and did not consider students' own perceptions of their discipline, which could provide additional insights.	

			academic achievement.		
Pressured Teachers, Sanctioned Students: The Persistence of Behavior Management Systems in Elementary School Classrooms - ProQuest Central	Maritza Steeley	2022	Discipline disparities exist, particularly along lines of race and gender. Schools actively sanction students for violations of gender norms. This suggests a "hidden curriculum" operating in schools that teaches boys and girls to behave differently	Comparing the effectiveness of behavior systems between classrooms was challenging due to significant differences in student populations, such as a high number of students with special educational needs in one class compared to another	The current study is about developing a system about student development management system while the old one is just a research study

Strengthening Student Discipline Through Security Alliances and Student Discipline	Muhammad Arif Syaifuddin, Bachtiar Adi Saputra	Nov 22, 2023	The research is an analytical descriptive qualitative study method that focuses on strengthening student discipline among junior high school students to face the challenges of the digital era	There are several improvements that need to be made, including the sorting of punishment in the form of Istighfar, which needs to be reviewed.	The current study is designed towards a modernized approach to student discipline management system
Decision Tree Algorithm to Improve the Learning Discipline Classification Model of Group Guidance Students at MTs Darul Mutta'alimin	Widina Khoeru Nissa, Ade Irma Purnamasari, Agus Bahtiar, Kaslani	February 15 2025	Attributes used for analysis included attendance, test scores, and class participation, with learning discipline as the label. Applies a data mining algorithm to existing student	While the overall classification model based on the Decision Tree algorithm works well, further optimization is needed	Develops a web platform for managing behavioral data

			data to analyze learning discipline	for the "Undisciplined" element in the minority class to ensure more comprehensive and accurate analysis results	

Title	Author	Date	Key Findings	Key Gaps	Present Study
Development of a Mobile-Based Student Discipline Enforcement Monitoring System in Muhammadiyah First Middle School's Special Al-Kautsar Program	Nuraini et al.	2022	Developed a mobile app for recording student violations with real-time features and admin control.	Focused only on one school and lacked full analytics capabilities.	Builds a centralized system with broader analytics and notification tools across multiple users.
Improving Student Discipline Through Discipline Teacher Leadership	Kusuma wardani & Widodo	2021	Showed leadership by discipline teachers enhances student compliance.	Lacked integration with a real-time digital monitoring platform.	Integrates leadership-drive n monitoring with automated documentation and alerts.

Student Discipline Monitoring and Management Portal for Faculty Members	Rahmat et al.	2020	Created a web portal to allow teachers to track violations and submit reports.	Limited reporting capabilities and lacked parent access.	Offers real-time alerts, report automation, and cross-stakeholder access including parents.
Analysing Student Behaviour in a Learning Management System Using a Process Mining Approach	Syahril et al.	2022	Used process mining to reveal patterns of student behavior in digital platforms.	Not focused on discipline-specific behavior or real-world violations.	Combines behavioral monitoring with actual incident-based tracking.

The Implementation of Student Discipline Through School Rules	Bakar et al.	2021	Demonstrated the importance of rule-based discipline enforcement in schools.	No tech-based implementation for monitoring compliance.	Digitizes and automates rule enforcement tracking and case resolution.
Design of Web-Based Management Information System for Student Organizations in Kendal Regency Using Next.js Framework	Aditya et al.	2021	Developed a web-based system for managing student organization activities and records.	Not tailored for behavioral or disciplinary tracking.	Focuses on student behavior monitoring and incident reporting in academic settings.

The Management of Discipline Problems in the Classroom	Kibet & Mutisya	2020	Discussed traditional strategies for managing discipline in large classes.	Did not incorporate any digital solutions.	Digitizes management of violations, enhances tracking and transparency.
School Management Practices and Students' Discipline in Public Secondary Schools in Jinja City, Uganda	Aguti et al.	2022	Emphasized the importance of school-wide discipline strategies for maintaining order.	Relied heavily on manual documentation and reactive methods.	Enhances proactive discipline handling with real-time alerts and centralized case data.

A Comprehensive Review of Student Data Management System	Khan et al.	2021	Reviewed best practices in digital student information systems.	Focused on academic and attendance data, not disciplinary records.	Integrates discipline-specific data within a student management platform.
Improving the Discipline Character of Students Through the Implementation of the Students' Handbook	Syamsuddin & Salam	2021	Found that handbook-based rules improved discipline consistency.	Manual tracking made follow-through difficult.	Automates handbook rules with violation tracking, logs, and automated updates.

2020–21 Civil Rights Data Collection: Student Discipline and School Climate in U.S. Public Schools	U.S. Department of Education	2022	Provided national data trends on student discipline disparities and school climate.	Did not present system-level interventions or monitoring tools.	Uses localized digital tools to improve fairness, documentation, and response to violations.
The Role of Classroom Management in Enhancing Learners' Academic Performance: Teachers' Experiences	Maphalala & Mpofu	2020	Found strong links between classroom discipline and academic performance.	Lacked technology-based approaches for tracking discipline.	Builds a digital platform that supports discipline enforcement to indirectly support academics.

Development of a Mobile-Based Student Discipline Enforcement Monitoring System in Muhammadiyah First Middle School's Special Al-Kautsar Program	Satria et al.	2021	Developed a mobile app for student discipline monitoring and improved counselor coordination.	Limited analytics and real-time notification features.	Expands on mobile tracking with automated alerts, case logs, and analytics dashboard.
Research on the Integration of Student Behavior Analysis and Curriculum Education Strategies in Colleges and Universities under Deep Learning Framework	Wang et al.	2022	Showed how deep learning models can identify student behavior trends in digital classrooms.	Focused mainly on online learning platforms, not face-to-face school discipline.	Combines traditional in-person behavior management with predictive digital tools.

Developing a Web-Based System for Coordinating School-Based Care for Students with Social, Emotional, and Behavioral Problems	Wright et al.	2021	Created a platform that connected school staff and mental health providers to support students.	System lacked detailed logging of school violations or behavior infractions.	Focuses more specifically on violation tracking, discipline reporting, and student development logs.
Student Discipline Management Information System Chapter One		2021	Outlined basic system components for managing student discipline.	Did not include analytics or real-time notifications .	Adds analytical tools, automated alerts, and structured case tracking for better intervention.

The Students' Perspective on the Management of School Discipline in the Post-Corporal Era in Uganda Secondary Schools – Northern Region	Okello & Ayeko	2020	Highlighted student views that favored restorative, non-punitive discipline approaches.	Lacked technological integration or digital feedback systems.	Integrates student monitoring with digital tools for a fairer, data-informed discipline process.
Evaluation of a Web-Based Classroom Management Program to Promote Effective Classroom Management Practices Among Early Career Teachers	Carter et al.	2022	Showed that digital tools help novice teachers implement more consistent discipline practices.	Focused mainly on teacher support, not school-wide monitoring.	Builds on this by involving teachers, counselors, and admins in shared digital discipline workflows.

The Classroom Check-Up: Supporting Elementary Teachers in Classroom Management Using a Web-Based Coaching System	Reinke et al.	2020	Demonstrated improved teacher performance through feedback-based digital coaching.	System targeted teacher behavior but not student disciplinary data.	Combines discipline tracking with faculty coaching through shared data dashboards.
Classroom Management: Boosting Student Success—A Meta-Analysis Review	Simonsen et al.	2021	Found that structured classroom management improves student outcomes across contexts.	The study lacked implementation details on tech-based management tools.	Provides digital infrastructure for school-wide discipline and behavior analytics.

The New Discipline Machinery: Examining the Use of Apps for Classroom Behavior Management	Thompson & Riley	2022	Explored the use of mobile apps to monitor classroom behavior, finding improved discipline management.	Focused on isolated app usage without full system integration across stakeholders.	Builds a centralized, school-wide system that integrates apps with full analytics and notification workflows.
Early Warning and Risk Assessment Algorithm of School Discipline Inspection and Supervision Cases Based on Data Mining Technology	Zhao et al.	2021	Developed a data mining-based algorithm for predicting high-risk discipline violations.	Focused mainly on risk scoring, without real-time discipline case tracking or intervention tools.	Integrates predictive risk assessment with real-time incident tracking and student alerts.

Investigating the Effects of Real-Time Student Monitoring Interface on Instructors' Monitoring Practices in Online Teaching	Chen & Sun	2022	Showed that real-time dashboards help instructors better monitor and intervene with students in online classes.	Online teaching-focused; lacked physical classroom behavior tracking.	Applies real-time monitoring principles to in-school discipline tracking and intervention.
Student Behaviour Monitoring System	Khan & Yusuf	2021	Developed a basic system for recording and categorizing student behavior reports.	Had minimal real-time capabilities and limited stakeholder access.	Enhances the system with real-time alerts, analytics dashboards, and cross-accessibility between teachers, parents, and counselors.

Design and Implementation of Student Management System of Integrated Programmable Device Programming System	Liu et al.	2020	Built a device-integrated system for general student information management, focused on technical students.	Focused mainly on device management and academic data, not discipline tracking.	Prioritizes behavioral tracking and real-time discipline management alongside academic monitoring.

Title	Author	Date	Key Findings	Key Gaps	Present Study
REVIEW ON STUDENTS' OFFENSES: BASIS FOR STUDENTS' EFFECTIVE DISCIPLINARY PROCEDURES AND POLICY	Bediña, S. D., Ardina, G. T., Baguio, A. J. P., Ochong, L. D., and Sabornido, E. B.	October 2023	Student offenses decreased from SY 2016-2020 due to known school policies; discipline issues persisted across all	Did not propose technological solutions for managing discipline more efficiently.	Proposes a web-based system to handle discipline issues effectively and proactively.

			departments.		
MANAGING SCHOOL OPERATIONS AND RESOURCES IN THE NEW NORMAL AND PERFORMANCE OF PUBLIC SCHOOLS IN ONE SCHOOL DIVISION IN THE PHILIPPINES	Valenzuela, E. S., and Buenvinida, L. P.	June 2021	School leaders' management skills significantly improved school performance in quality and efficiency; training and mentoring were recommended.	Focused on school leadership and management, not discipline-specific technologies.	Adapts findings to emphasize how technology can improve the management of student behavior.
The Perceived Satisfaction in Utilizing Learning Management System among Engineering Students during the COVID-19 Pandemic: Integrating	Navarro, M. M., Prasetyo, Y. T., Young, M. N., Nadlifatin, R., and	September 2021	Task Technology Fit and Technology Acceptance Model factors positively influenced LMS	Focused on LMS usage satisfaction and did not address discipline-specific	Applies LMS satisfaction findings to emphasize system usability for student discipline

Task Technology Fit and Extended Technology Acceptance Model	Perwira, A. A. N.		satisfaction among engineering students during the pandemic.	issues.	management.
PERCEPTIONS ON CLASSROOM DISCIPLINE MANAGEMENT OF INTERMEDIATE LEARNERS AND TEACHERS: BASES FOR AN ENHANCED CLASSROOM DISCIPLINE PROGRAM	Palomer, M. A. N.	2024	Both learners and teachers perceive effective discipline management across dimensions like fairness, rules clarity, and communication; minimal correlation exists between perceptions and implementation.	Did not explore digital tools to enhance classroom discipline management.	Builds on findings to propose a web-based platform for improving student discipline and communication.

Designing and Implementing e-School Systems: An Information Systems Approach to School Management of a Community College in Northern Mindanao, Philippines	Grepon, B. G.	2021	Developed an e-school system to centralize school operations, found the system to be functional, usable, and reliable based on ISO standards.	Focused on school operations management and did not address student behavior or discipline specifically.	Incorporates findings to emphasize the importance of centralized, reliable systems for managing student behavior.
Students' Behavioral Intention to Use Learning Management System: The Mediating Role of Perceived Usefulness and Ease of Use	Panergayo, A. A. E., and Aliazas, J. V. C.	November 2021	Perceived usefulness and ease of use positively affect students' intention to use LMS; online self-efficacy	Focused only on behavioral intention and usability, not on discipline-s	Highlights the importance of user-friendly systems in managing student discipline effectively.

			factors also play a role.	pecific application s.	
SUPPRESSED DISCIPLINARY ACTION FOR FACULTIES IN THE ACADEMIC PERFORMANCE OF STUDENTS	Mallillin, L. L. D., and Paraiso, L. O. C.	2022	Effective classroom discipline and consistency improve academic performance; fairness and guidelines are essential for success.	Focused on teacher discipline manageme nt, not on integrating technology into discipline programs.	Incorporates findings on fairness and consistency to enhance discipline management via technology.
Implementing School Disciplinary Program through Participatory Action Research Approach	Espinosa, K. P. M.	2020	The VMOC participatory approach improved students' compliance with	Did not explore how web-based platforms could	Adapts participatory approaches into a web-based system to enhance

			disciplinary rules, particularly in attendance and behavior.	enhance compliance with disciplinary programs.	discipline management.
DEVELOPMENT OF A COLLABORATIVE INTERACTION MANAGEMENT SYSTEM (CIMS) FOR SELECTED HIGHER EDUCATIONAL INSTITUTIONS IN THE PHILIPPINES	Mata-Domingo, S.	September 2020	Developed a forum-based system to assess student contributions; found functional, reliable, and usable by both faculty and students.	Focused on collaboration, not discipline-related challenges or behavior management.	Builds on system reliability and functionality to address discipline challenges.
The Development of a Proposed Learning Management System for Senior High Schools	Delos Santos, M. S. M., Durano, D.	March 2023	Designed an LMS to support Grade 11 education;	Focused on LMS for teaching and	Adapts findings to design a functional system for

in the Philippines	C., and Hortillosa, A. D.		found the system scalable and functional for senior high schools.	learning	managing student discipline and development.
IMPROVING MONITORING AND CHECKING OF STUDENTS WITH VIOLATIONS IN UNIVERSITY USING A MOBILE VIOLATION APPLICATION	Heradura, J. L., and Damasco, L. B.	April 2024	Developed a mobile application for monitoring student violations, improving data management and supervision.	Focused on mobile-based solutions and specific violations, not overall discipline management.	Builds on mobile efficiency to propose a web-based system covering comprehensive discipline management.
Implementing An Effective Student Discipline: School Heads‘ Perspective	Sichon, D. J. S., and Guhao, E. S. Jr.	March 2020	Emphasized themes like parental involvement,	Did not explore how digital systems	Incorporates insights on parental and teacher roles

			teacher guidance, and creative approaches to student discipline.	can assist with implementing discipline strategies.	into a technology-supported discipline system.
CLASSROOM MANAGEMENT STRATEGIES, PRACTICES, AND LEARNERS' ACADEMIC PERFORMANCE	Catayas, C. H., and Hussien, O. Q.	2024	Classroom strategies positively perceived by teachers and learners, yet lacked a significant impact on academic performance.	Focused on classroom management but did not explore digital tools to enhance discipline.	Adapts findings to integrate discipline management strategies into a web-based platform.
Student Discipline In The Classroom:Public School Teachers' Point	Virtudazo, M. C. A., and Guhao,	January 2020	Highlighted lived teacher experiences on	Lacked focus on technologic	Incorporates teacher experiences into

Of View	E. S.		discipline issues and approaches like parental involvement and positive reinforcement.	al solutions to discipline challenges.	the design of a system to address discipline challenges effectively
USER-CENTERED DESIGN AND DEVELOPMENT OF A GRADE MANAGEMENT INFORMATION SYSTEM OF A PRIVATE SCHOOL IN CAVITE, PHILIPPINES	Banag, C. T.	Jan–Feb 2024	Developed a grade management system found to be functional, efficient, and reliable; rated highly by users.	Focused on grade manageme nt, not behavioral or discipline manageme nt.	Adapts user-centered design principles to create an efficient system for discipline management.
Development and Evaluation of a Student Organizations Management System	Callejo-Arru ejo, A., and Arruejo, R. C.	2024	Designed a system for document management	Focused on document manageme nt and	Adapts descriptive analytics and dashboard

with Descriptive Analytics			and decision-support with dashboards for HEIs; ready for deployment based on evaluation.	analytics, not discipline-specific solutions.	features to monitor student discipline proactively.
Development of a Curriculum Management System for a State University in the Philippines	Dela Rosa, A. P. M., and Galang, G. M.	2023	Digitised curriculum development processes; system was found acceptable and intended to enhance curriculum reviews.	Focused on curriculum management and not applicable to student behavior or discipline.	Incorporates user needs and developmental processes to manage discipline in a digital platform.
Exploring the	Rebollos, D.	February	Found a	Did not	Adapts findings

Relationship Between Teacher Competence and Classroom Management: Implications for Student Engagement in Private Tertiary Educational Institutions in Koronadal City, Philippines	T., and team	2025	positive correlation between teacher competence and classroom management but no direct link to student engagement.	explore how technological tools could enhance classroom management and discipline.	to integrate technology into discipline management for better student engagement.
Teachers' Classroom Management Styles and Student-Teacher Connectedness and Anxiety	Obispo, R. T., Magulod, G. C. Jr., and Tindowen, D. J. C.	May 2021	Teachers employed authoritative and democratic classroom management styles; no significant link with student-teacher connectedness.	Focused on classroom management styles without integrating digital tools.	Builds on classroom management strategies to support digital discipline management solutions.

Amidst the Online Learning Modality: The Usage of Learning Management System (LMS) and Its Relationship to the Academic Performance of the Filipino Students	Tus, J., and team	December 2021	Found no significant relationship between LMS usage and academic performance in senior high students.	Focused on LMS usage and academic performance, not behavior or discipline management.	Applies LMS principles to design a digital platform tailored for managing student behavior.
Managing Behaviour in Large Classes: Ceit faculty best Practices	Balcanao-Buco, E. V. R., Gunnawa, V. V., and Mariani, M. J. P.	Nov–Dec 2020	Highlighted effective behavior management strategies for large classes, such as consistent monitoring and organized lesson delivery.	Did not explore technological interventions for managing behavior in large classes.	Builds on behavioral strategies by integrating them into a digital discipline management system.

Capturing Students' Attention Through Visible Behavior: A Prediction Utilizing YOLOv3 Approach	Mindoro, J. N., and team	2020	Used YOLOv3 deep learning to predict student attentiveness via facial recognition with 88.61% accuracy.	Focused solely on attentiveness without addressing broader student behavior issues.	Adapts predictive analytics to track various student behaviors and improve discipline management.
Influence of teaching methods on the social behavior of selected sixth-grade students in Victoria, Laguna, Philippines	Candelaria, P. C.	November 2022	Found that guided practice managerial styles had the most influence on students' self-regulation and social behavior.	Focused on teaching methods and social behavior without exploring technological solutions.	Incorporates guided practice insights into a web-based system to promote positive student behavior.
HighTeach: A	Amboya, J.	October	Developed a	Focused	Adapts SDLC

Web-Based Teacher Evaluation System for a Higher Learning Institution inthePhilippines	M., and team	2022	teacher evaluation system using SDLC, focusing on planning, design, and testing stages.	only on teacher evaluation, not discipline-related challenges or student management.	methods to design and test a web-based platform for managing student behavior.
Web-based School Information and Publication System: A Developmental Study	Caratiquit, K. D.	July 2021	Developed a web-based system for timely school information sharing and resources, rated “Excellent” by users.	Focused on information dissemination rather than discipline management.	Builds on web-based methodologies to create a system specifically for managing student discipline.

Development of web-based student violation management system for St. Dominic College of Asia	Mitch Frankein O. Desierto, Aeron Ver G. Dualan, Alvin Jason A. Virata	May 2022	Automated violation tracking via Laravel improved efficiency.	Limited to disciplinary records; no holistic student development focus.	Integrates academic, behavioral, and developmental tracking.
A Qualitative Exploration on the Perceived Impact of the MATATAG Curriculum on Basic Education Teaching in the School Year 2024-2025	Jeffry M. Saro	2024	Enhances critical thinking but lacks teacher training/resources.	Focused on curriculum, not student management systems.	Provides tools to align curriculum implementation with student progress tracking.
Management Support and Acceptance of the Implementation ofClassroom Technology Integration	Pasi, R., Gabutan, J., & Potane, J.	May 2024	Teacher tech adoption depends on leadership support.	No integration with student behavior/discipline	Links teacher support tools to student behavior analytics.

Among Private School Teachers				systems.	
Cross-border student mobility and improvements in the philippine tertiary education program relevance and learning outcomes	Connie Bayudan-Dacuycuy, Paola Ellaine D. Luzon, and Suzanne J. Zambrano	November 2024	International students enhance program relevance but uptake is low.	Focused on mobility, not institutional management tools.	Offers localized system to improve institutional efficiency.
Character strength, Resilience, and Teacher performance: Their Relationships	John paul M. Espinosa	May 2024	No link between teacher traits and performance metrics.	Lacks tools to measure or support resilience systematically.	Tracks student/teacher resilience and suggests interventions.
School-IntegrIS: An Integrated System Approach to a School Management System of	Benzar Glen Grepon	January 16, 2025	Unified system (rated 4.58/5) for school	Administrative focus; no student development	Adds student growth tracking and behavior analytics.

a State College in Northern Mindanao			operations.	modules.	
THE IMPLEMENTATION OF SENIOR HIGH SCHOOL IN THE PHILIPPINES: AN ADVANTAGE OR DISADVANTAGE TO STUDENTS' FUTURE OPPORTUNITIES	Princess Yna Marin, Lexter Natividad	January 07, 2025	SHS improves employability but faces resource gaps.	No digital tools for SHS-specific management .	Tailors system to SHS needs (e.g., career tracking, skill development).
The Power of Discipline: Unveiling its Impact on Students' Problem-Solving Skills	Regie M. Bangoy	March 2025	Democratic discipline styles boost student problem-solving.	No digital tools to implement these strategies.	Integrates discipline analytics with real-time feedback.
Classroom Management Strategies and School	Denly Jane D. Cambay , Dr. James	December 26 2024	Positive management strategies	Lacks tech-driven engagement	Provides engagement metrics and

Environment on Student Engagement	L. Paglinawan		correlate with engagement.	tracking.	intervention prompts.
Student perceptions on online student discipline programs and services	Diana Genevive H. Layag Ma. Dinah Espartero Asiatico Janice D. Panganiban Jocelyn R. Alerta	July 2021	Highlighted challenges in transitioning discipline programs to digital platforms during pandemic. Emphasized need for educator role adaptation and digital competencies.	Lacks structured framework for digital discipline management and real-time feedback mechanisms.	Provides integrated online discipline module with: • Automated case tracking • Digital counseling scheduling • Real-time parent-educator communication • Competency development resources for staff

Strategies in Managing Disruptive Behavior: A Review of Research Studies	Rey Avila Mangarin, Karen Grace D. Comilang	November 15 2024	Proactive strategies (e.g., restorative practices) work best.	No platform to deploy or monitor strategies.	Integrates behavior logs with automated intervention tips.
Implementation of Disciplinary Rules and Regulations in Selected Private Junior High Schools	Ken Paul M. Espinosa	January 2020	Uniform guidelines least enforced; substance use most tracked.	Manual processes hinder consistency.	Automates rule enforcement and compliance alerts.
The Influence of Classroom Management to the Students' Behavior of Junior High School Students	Fano, Mikyla, et al.	May 16 2024	Strong management improves student behavior.	No system to replicate effective practices.	Offers analytics to optimize management strategies.
The New Discipline	Vincent	March	Apps enforce	Overemphas	Balances

Machinery: Examining the Use of Apps for Classroom Behavior Management	Cho, PhD Decoteau J. Irby, PhD, and Katrina Borowiec	2024	rules but lack pedagogical alignment.	is on punitive measures.	rewards/punishments with developmental insights.
Effectiveness Of Learning Management System In University Of Science And Technology Of Southern Philippines Cagayan De Oro And Villanueva Campuses: A Policy Recommendation	Maria Farina V. Roa, Esjohol Lester A. Gimeno, Christine B. Tenorio and Ajree D. Malawani	2023	LMS improves performance but needs teacher training.	Academic-only focus; no behavior/discipline integration.	Combines LMS with discipline and development tracking.
Behavior and Attitude of Students in the New	Leovigildo Lito	March 2021	Online learning	No tools to mitigate	Includes engagement

Normal Perspective of Learning	Mallillin		caused disengagement and technical issues.	challenges.	metrics and parent-teacher communication.
Classroom Management Practices of Teachers and Academic Performance of Grade 3 Learners Across All Learning Areas	Chastine Joy Santander, Julieta Nabos	2024	Found significant relationship between activity management and written works ($p<0.05$). Very low correlation with performance tasks/formative tests.	No digital tools to bridge management practices with performance outcomes.	Incorporates learning analytics to link teacher practices with real-time student performance data.

Students Perceptions on Online Student Discipline Programs and Services	Diana Genevive H. Layag1, Ma. Dinah Espartero-Asiatico1, Janice D. Panganiban1, and Joelyn R. Alerta	July 2021	Transition to online discipline requires role adaptation.	Lacks structured digital frameworks.	Provides a comprehensive online discipline module.
Intellischool: A Student Information System for Senior High School	Azelle Marie F. Campanan, Ruby Mae M. Bermejo, and Dennis V. Madrigal	2024	Web-based SIS improves transparency (rated 1.21/5 PSSUQ).	Focused on records, not development.	Enhances SIS with developmental tracking.
School Management	Escobar, J.	2024	Digitizes	No predictive	Adds predictive

System: A Web and Mobile-Based Platform for Prefect of Discipline at Bestlink College of the Philippines	M. ., Magalong, E. ., Mantilla, R. ., & Sabidalar, M.		discipline records but lacks analytics.	or intervention tools.	analytics for proactive management.

Students' Behavioral Problems and Teachers' Discipline Strategies in Class	Jennifer M. Oestar*1, Ricardo O. Oestar	June 2022	Common issues: distraction, absenteeism, bullying.	No system to track or address these issues.	Provides tools to log, analyze, and resolve behavioral problems.
Behavioral Problems Amidst Initial Face-to-Face Classes: Intervention of Teachers	Amereza N. Lucernas	May 2024	Themes: cheating, attendance issues, distractions.	Relies on manual interventions .	Automates behavior tracking and suggests interventions.
Determinants of university students'	Rosemary R.	May 2024	Safety behavior	No digital tools to	Integrates safety protocol tracking

safety behavior during a pandemic	Seva,Jazmin C. Tangsoc,Wira F. Madria		linked to control and anxiety levels.	monitor compliance.	with behavior management.
Evaluating Technology Integration in the Philippines: A Narrative Review on Enhancing Elementary Teachers' Classroom Management Practices	Riches L. Tortola, PhD	June 2024	Tech enhances engagement but requires training and ethics.	No unified system for management.	Combines tech integration with ethical and pedagogical safeguards.
School-Based Management Practices and Academic Performance: Evidence from Philippine Schools	Charlyn Baylon, Edralin Manla, Ray Butch Mahinay	February 2025	Advanced SBM practices but no direct academic impact.	Lacks student-level data integration.	Links SBM practices to individual student outcomes.

Synopsis

The review of related literature and studies provided essential guidance in the conceptualization and development of Web-Based Student Development Management System with Predictive Analytics for Mataas na Paaralang Neptali A. Gonzales (MPNAG) Through a thematic synthesis of both local and international sources, the researchers were able to identify existing system gaps, best practices, and innovative approaches that directly informed the system's design and functionality. Several studies emphasized the importance of automated case documentation and structured resolution logs, highlighting the lack of follow-up processes in traditional systems. These findings influenced the inclusion of a built-in case tracker and behavioral history log in the current system. Moreover, insights from RRS and RRL showcasing the limitations of manual discipline monitoring guided the integration of behavioral analytics, allowing administrators to visualize trends and patterns in student behavior over time. The adoption of a web-based platform was similarly driven by multiple studies that demonstrated increased accessibility, centralized data management, and institutional efficiency through online systems. Recognizing the importance of stakeholder-specific access, the system also incorporated role-based user access, allowing designated permissions for administrators, teachers, and parents. This design addressed gaps in communication and accountability identified in prior research.

Finally, due to the repeated emphasis in related literature on data privacy and secure storage, the system ensured robust database management practices to uphold confidentiality and integrity of student records. In summary, the present system drew heavily from academic literature and empirical findings to ensure that the features implemented were not only practical but also evidence-based and responsive to the needs of a large educational institution like MPNAG.

Chapter 3

METHODOLOGY

This chapter outlines the fundamental components of the study, including the research design, development methodology, data sources, study locale, procedures for data gathering and system development, instrumentation, and statistical tools used for data analysis and evaluation.

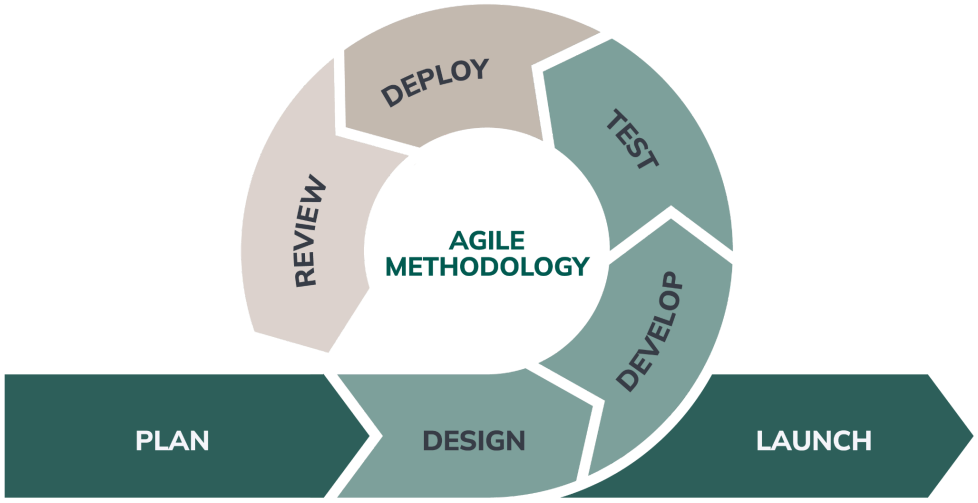


Figure 3.1. *Agile Methodology*

Planning

This phase focuses on understanding the needs of the school and defining clear goals for the Web-Based Student Development Management System. Data will be gathered from school administrators and teachers to identify discipline management challenges and establish key features for the system.

Design

The design phase involves mapping out user workflows and structuring the system's features to ensure smooth operation. A blueprint will be created using Figma to prototype the system's interface, allowing clients to visualize its functionality before development. This phase ensures that user interactions, navigation, and core features are effectively planned for a seamless experience.

Development

In this phase, the system is built and programmed, following Agile methodology to allow continuous improvements. Developers will create system modules in sprints, ensuring usability and efficiency at every stage.

Testing

Before the full deployment, the system will undergo thorough testing to ensure functionality, usability, and security. Teachers and administrators will participate in pilot testing to provide feedback.

Deployment

Once the system is fully developed and tested, it will be made available for use at Mataas Na Paaralang Neptali A. Gonzales (MPNAG). Training will be provided to ensure smooth adoption.

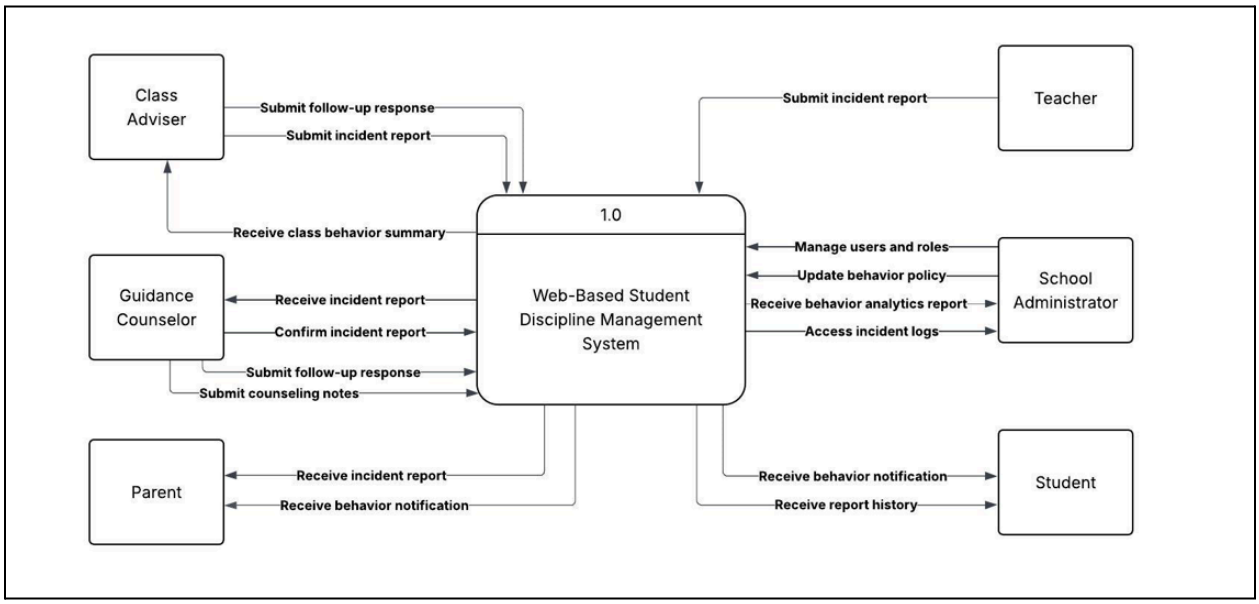
Research Design

The study utilized a descriptive and developmental research method to propose the design and development of a Web-Based Student Development Management System for Mataas Na Paaralang Neptali A. Gonzales (MPNAG). The descriptive component focused on analyzing the challenges of managing student behavior using traditional paper-based systems and identifying the school's specific needs for a more efficient and modernized discipline management system.

To guide the proposed system's design, data was gathered on common discipline issues, common practices, and the needs of users. Qualitative data was obtained through interviews with school administrators, teachers, and staff to better understand the challenges they face. Quantitative data, such as historical discipline records and responses from surveys, provided insights to inform the system's proposed functionalities.

The study proposed a functional, web-based system that could effectively monitor disciplinary incidents, generate reports, and send real-time alerts to users. Once the system is developed, it will be tested to determine its usability, functionality, and effectiveness in managing student development. User feedback from school administrators, teachers, and staff during pilot implementation will be gathered to refine the system and ensure that it serves the needs of the institution. The system is designed to offer effective tracking of disciplinary incidents, report generation, and real-time alerts, ultimately transforming the way MPNAG handles student behavior and development.

3.2 Context Level Diagram



This diagram shows the structure and interactions within the Web-Based Student Discipline Management System. It connects various users, including class adviser, guidance counselor, parent, teacher, school administrator, and student, ensuring efficient handling of disciplinary records. The system allows users to report incidents, track records, and receive notifications. Additionally, it centralizes behavioral data and provides insights through analytics.

Data Flow Diagram

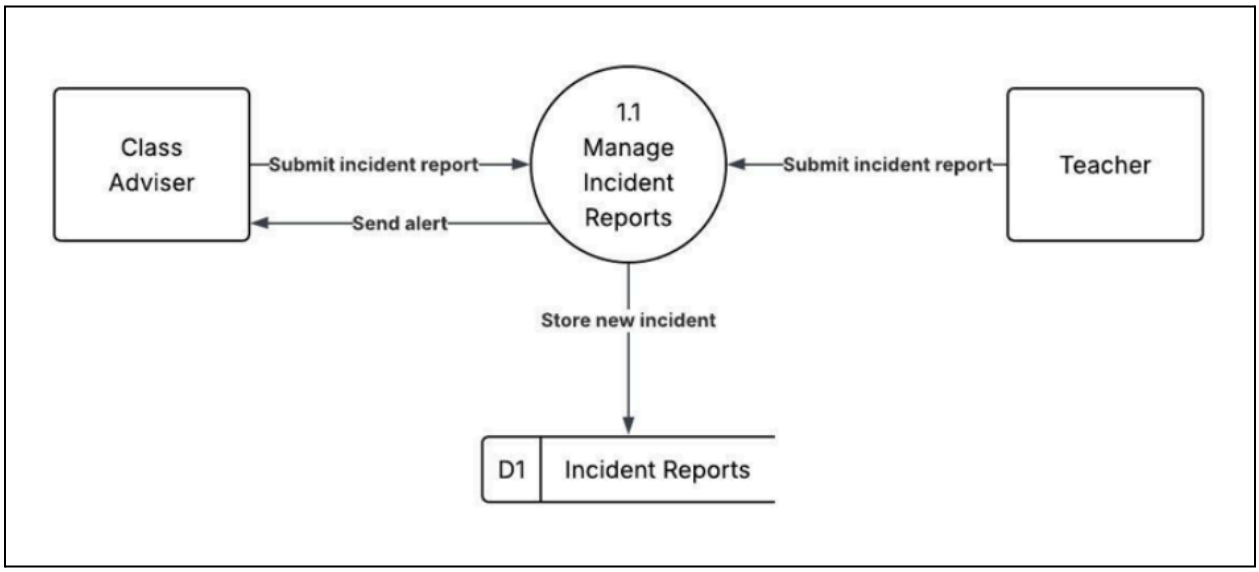


Figure 3.3 Class Adviser and Teacher Managing Incident Report

This Data Flow Diagram shows how the incident report is managed. Class advisers and teachers submit incident reports, which are stored in the “D1 Incident Reports” database. Then, the system sends an alert to the class adviser once a new incident report is recorded.

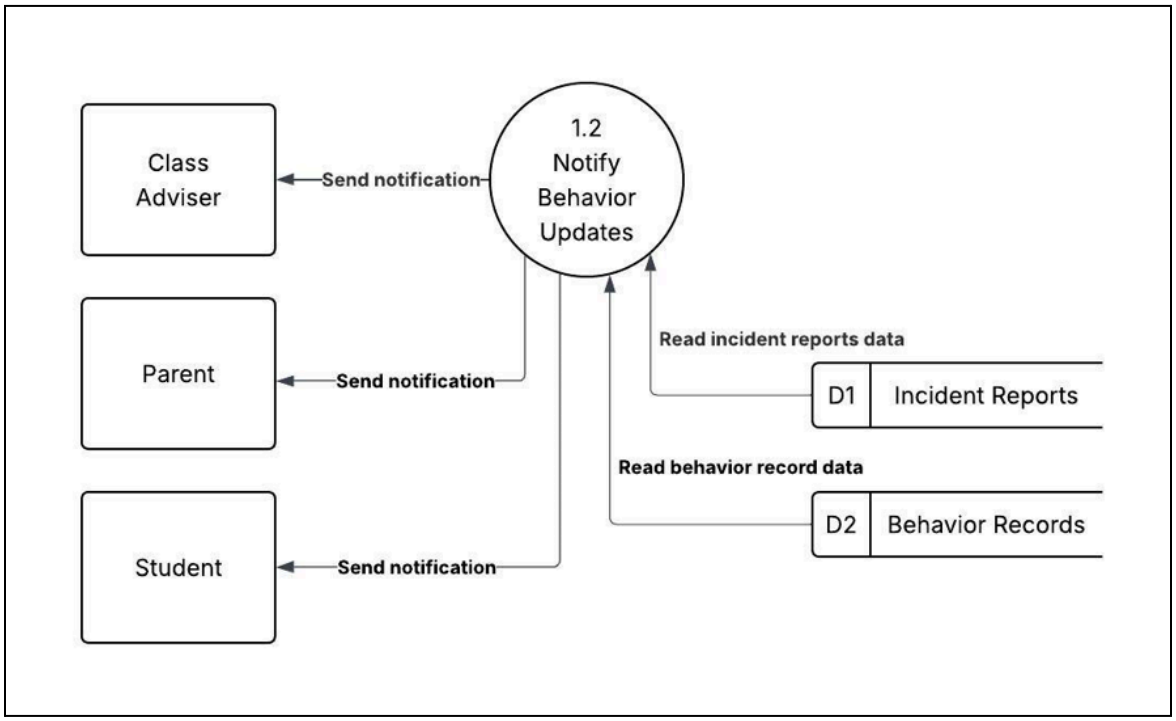


Figure 3.4 System Notifying Behavior Updates

This diagram shows the process of notifying behavior updates to class adviser, parent, and student. The central process gathers data from the Incident Reports and Behavior Records database. After the process, notifications are sent to the users. This allows all parties involved to stay informed and take action when needed.

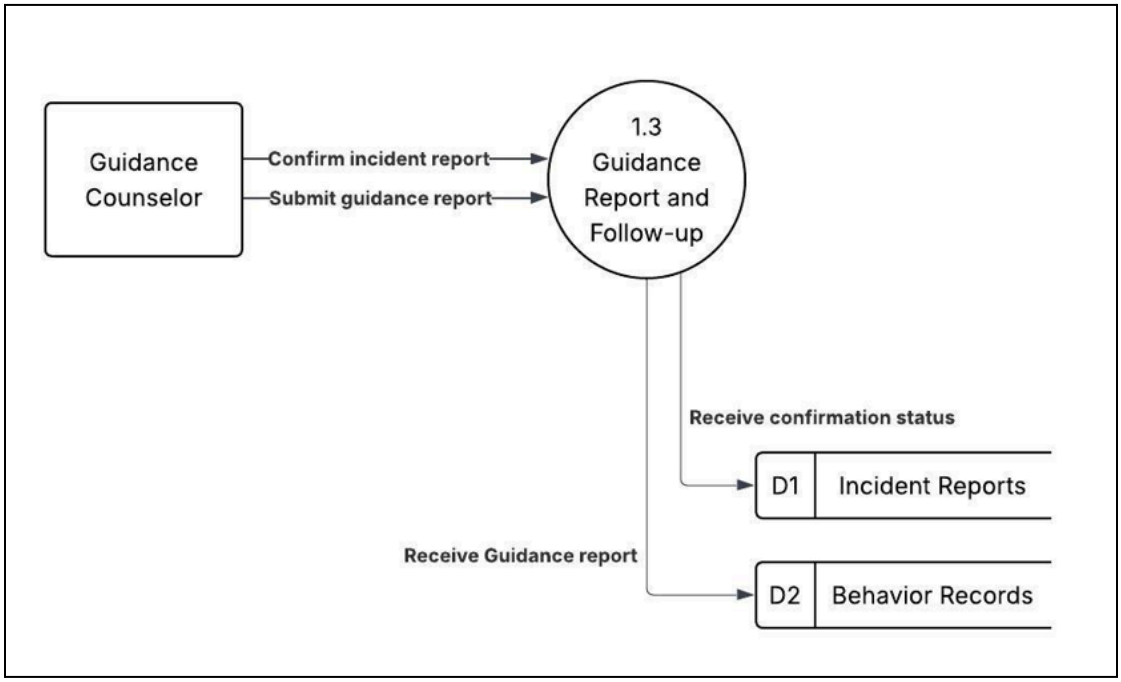


Figure 3.6 Generate Reports and Analytics for School Administrator

This diagram shows how reports and analytics are generated for the school administrator. It collects data from incident reports and behavior records databases, which are then processed to create reports, logs, and analytics. These insights are sent to the school administrator to help them track student behavior and make decisions.

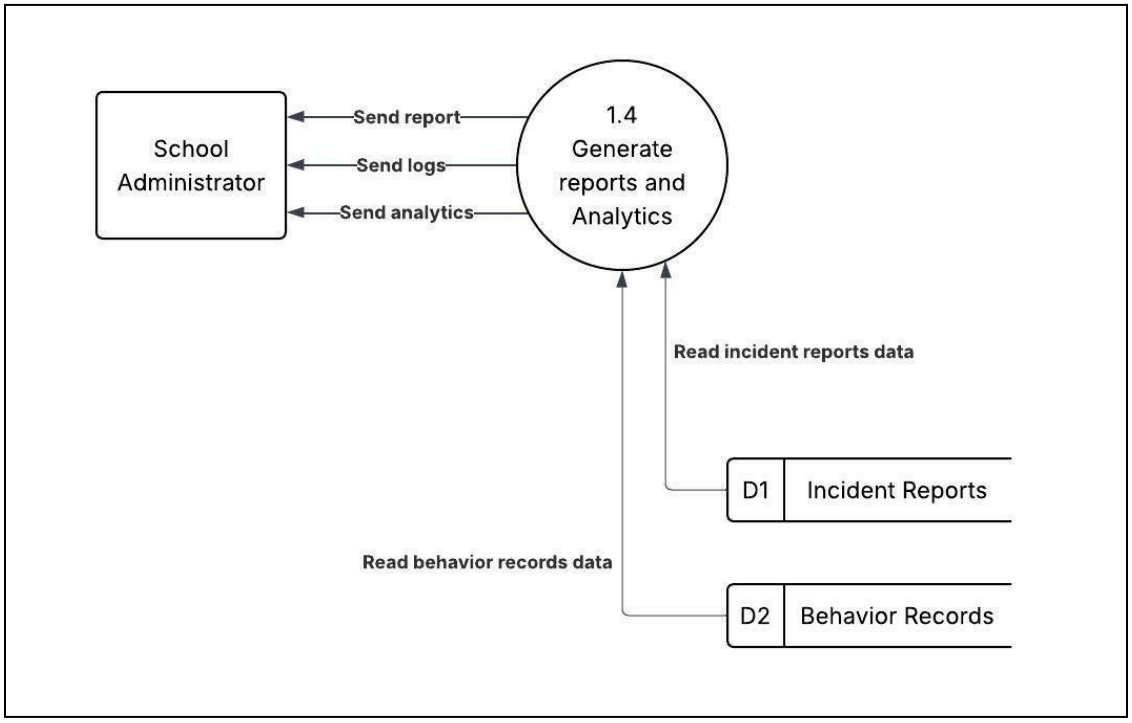
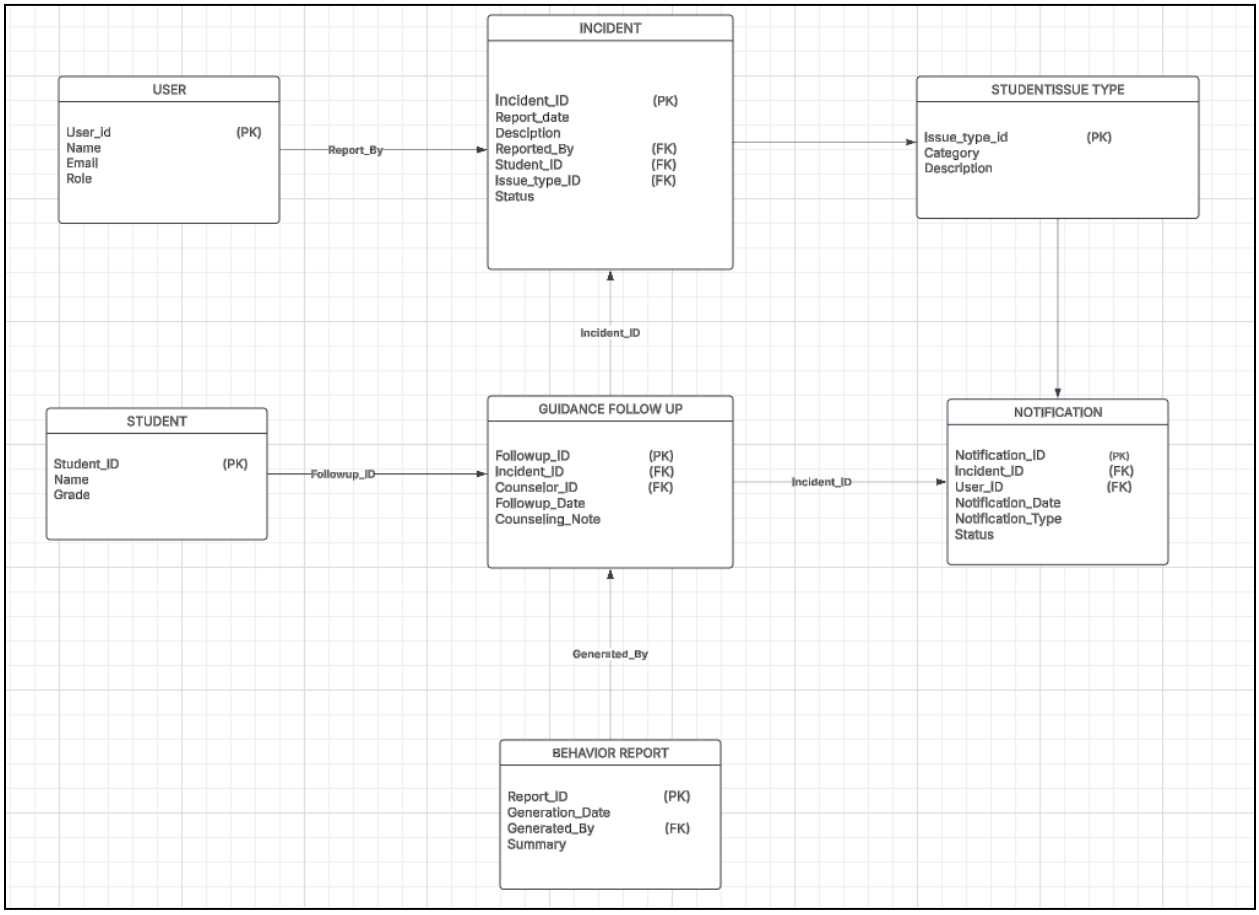


Figure 3.6 Guidance Managing Incident Report and Records

This diagram shows the process of guidance managing reports and follow-ups. The guidance counselor should first confirm an incident report, which will come from the “D1 Incident Reports” database before proceeding with the guidance process. After confirmation, the counselor then submits the guidance report which is stored in the “D2 Behavior Records” database. This helps guidance counselors, class advisers, and teachers to track incidents properly and follow up with guidance interventions when needed.

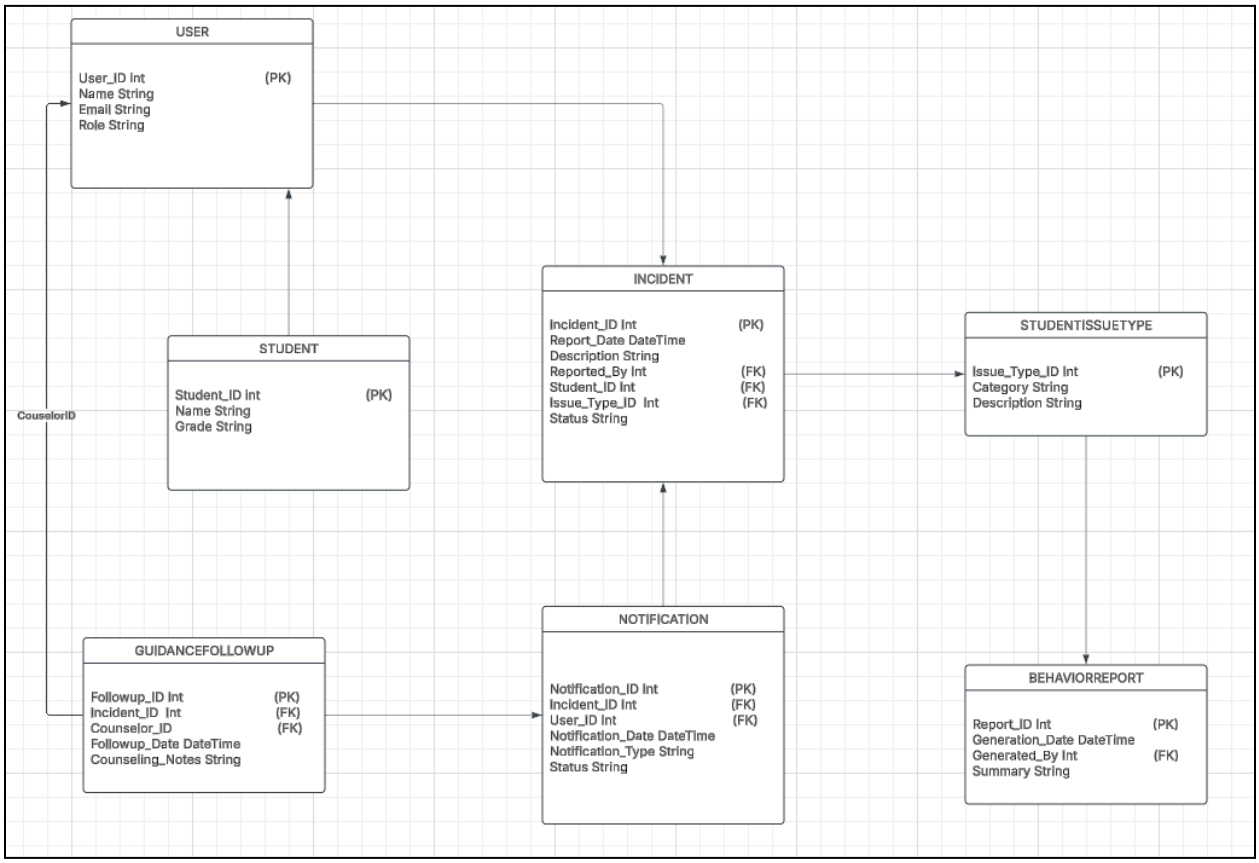
3.7 ERD - Entity Relationship Diagram



The figure above shows the ERD or Entity Relationship Diagram. It explains how different types of incidents—like bullying or being late—are grouped under StudentIssueType and linked to one or more incident records. Each Incident has a field called Issue_Type_ID that connects it to its correct issue type, helping organize the cases by behavior. After an incident is recorded, a counselor may handle it through a GuidanceFollowUp, where they write notes and monitor the student's progress. A BehaviorReport can also be made to show patterns or summaries based on the incidents. To keep everyone updated, Notifications can be sent out. Each Notification is linked to a specific Incident and assigned to a User. Each Incident also remains

connected to the Student involved and the User who reported it, which helps keep the process clear and responsible. Overall, the diagram shows how the system manages incidents, follow-ups, reports, and communication in an organized way.

3.8 UML Class Diagram

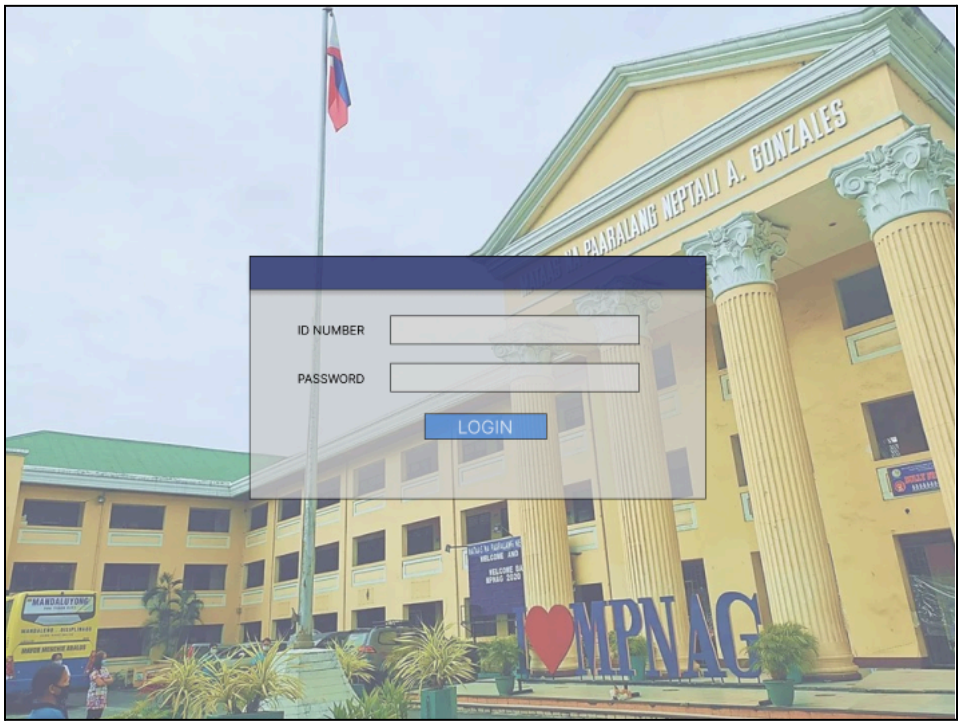


The figure above presents the Unified Modeling Language (UML) diagram where Students and Users—such as teachers, counselors, and administrators—are the main actors in the system. A Student can be involved in multiple disciplinary Incidents, while a User is responsible for reporting these cases. Each Incident stores key details, including the Student_ID of the involved learner, the User_ID of the one who reported it, and the Issue_Type_ID that connects the case to a predefined behavior listed in the

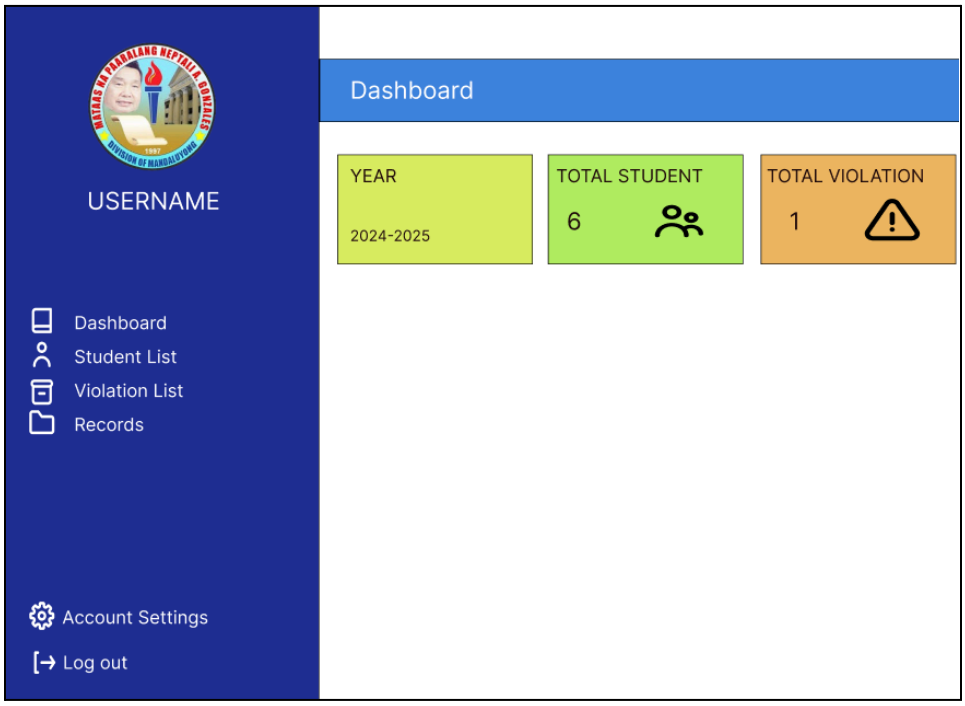
StudentIssueType. These issue types may include concerns like defiance or bullying and are later used in generating system-wide reports. A BehaviorReport summarizes overall patterns and is linked to the User who created it. Additionally, GuidanceFollowUp allows counselors to log follow-up actions related to specific incidents. Notifications are then sent out, each tied to a User and an Incident, to ensure the right people are informed with proper timing. The diagram shows these components as classes with attributes, clearly connected by arrows to represent the relationships across the system.

3.8 Prototype

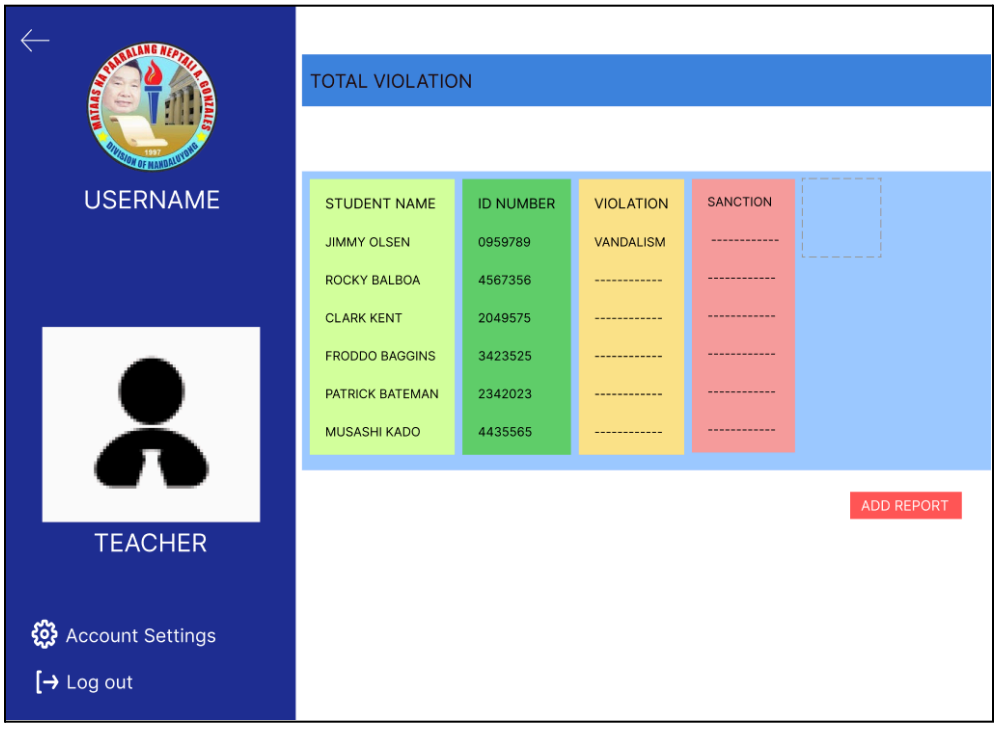
Login Page



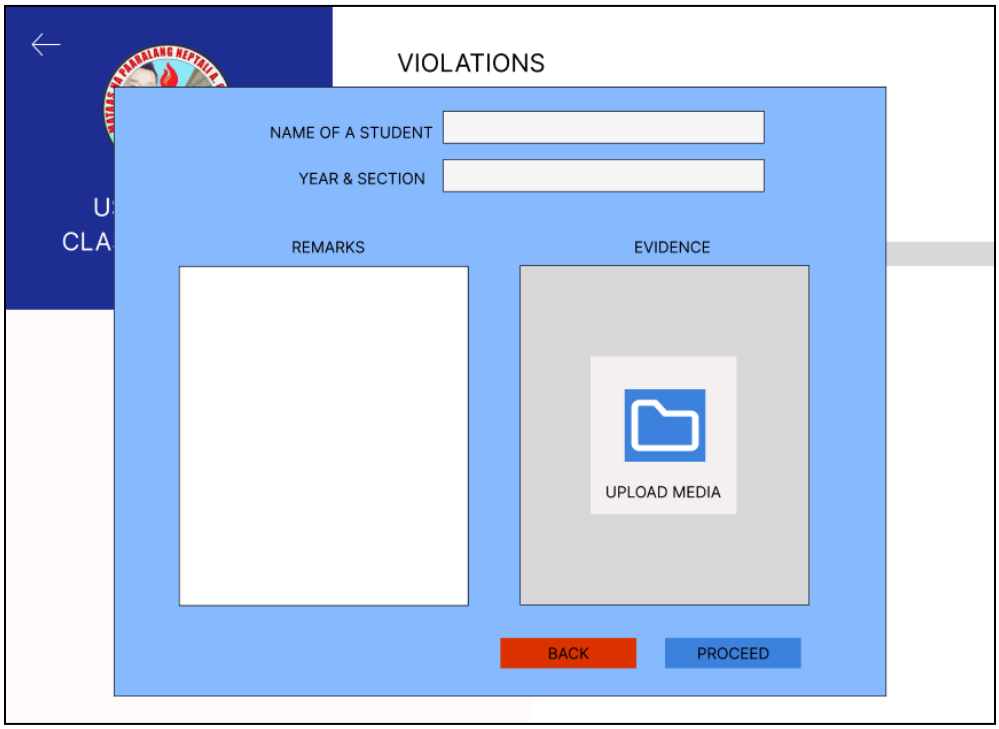
Dashboard

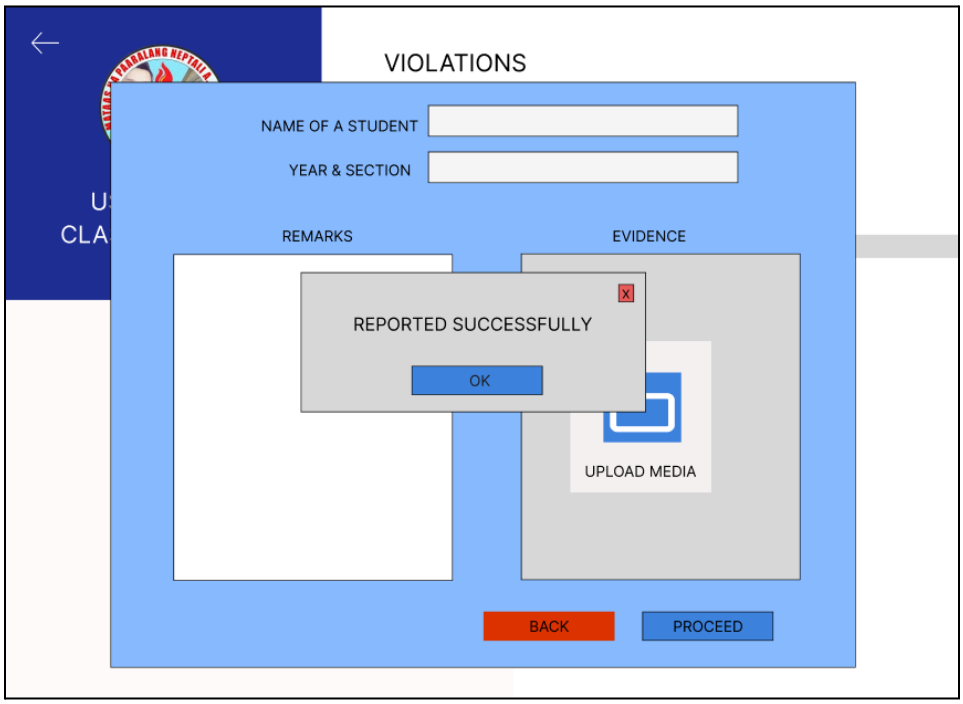


Total Violation Page



Generating Report Page


VIOLATIONS
NAME OF A STUDENT
YEAR & SECTION
REMARKS
EVIDENCE
UPLOAD MEDIA
BACK
PROCEED


VIOLATIONS
NAME OF A STUDENT
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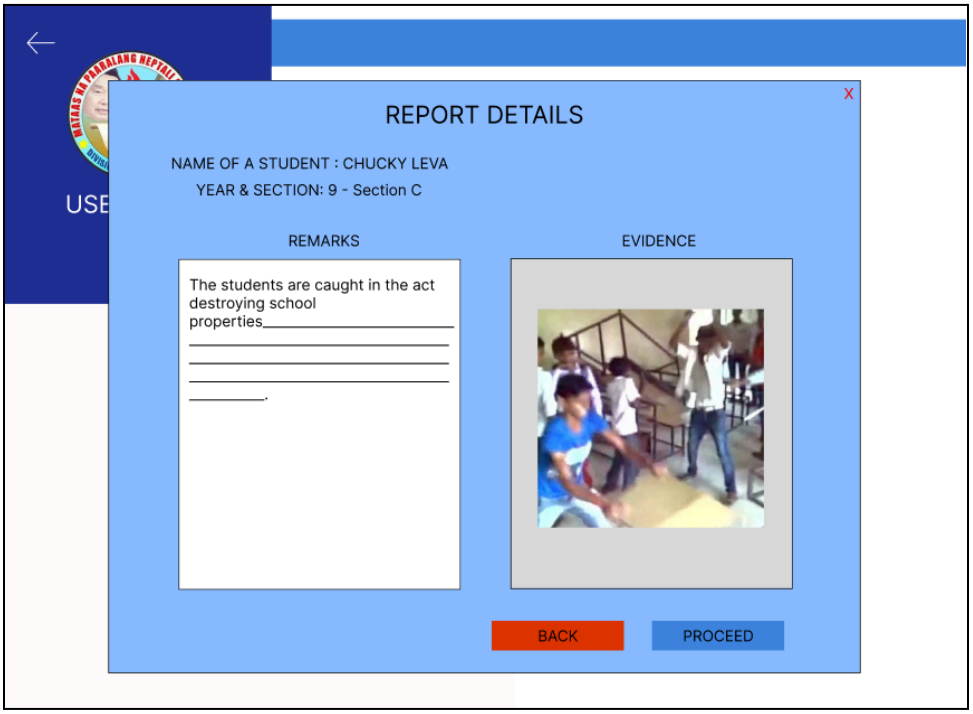
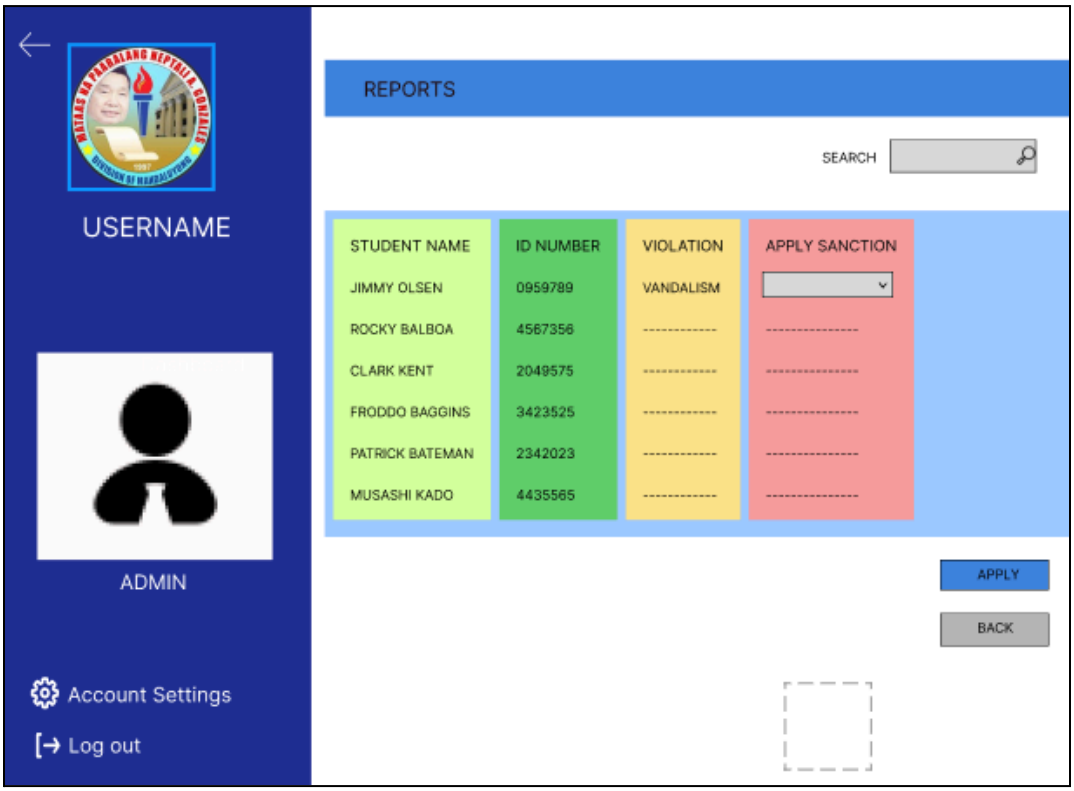
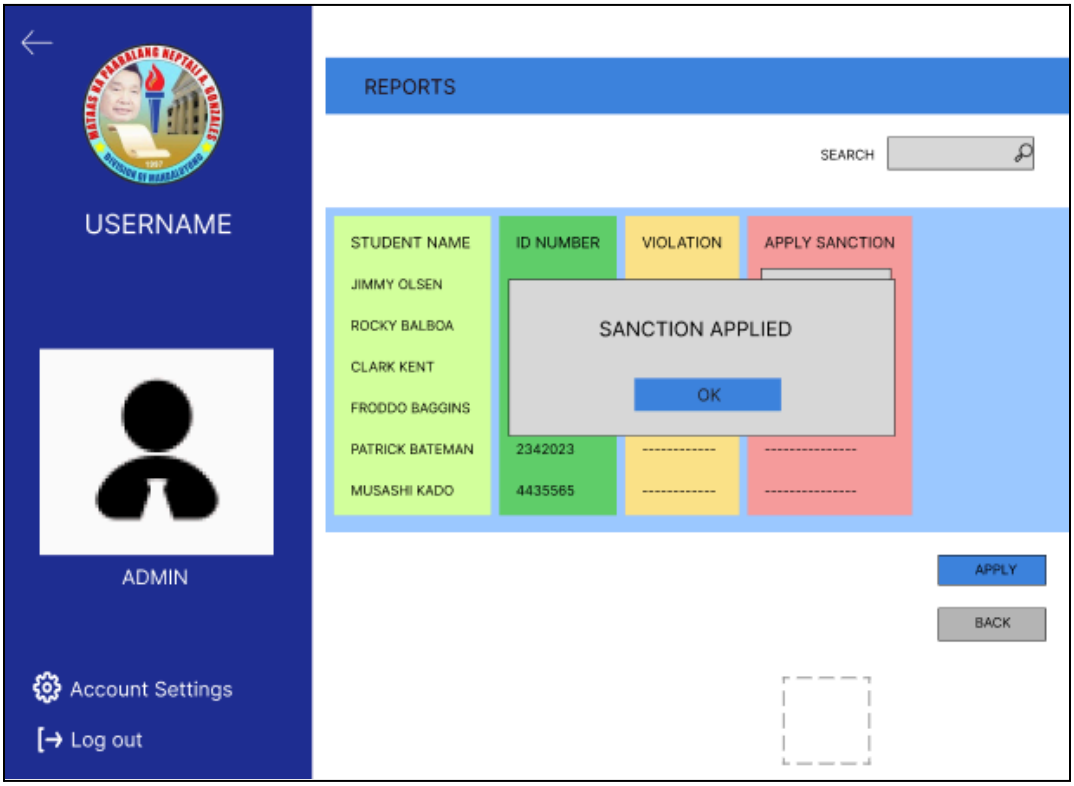


Reports Page





Population and Sample

The respondents of this study will be the teachers and students of MPNAG

Table 3.1 shows the target respondents who will answer the survey questionnaire

Table 3.1 *Target Respondents*

Respondents	Total Number of Respondents	Target Respondents
Teachers		30
Students		500
Guidance		2
IT Expert		2
	Total	**532**

Research Locale

The primary locale of this study is Mataas Na Paaralang Neptali A. Gonzales (MPNAG), located in Mandaluyong City, Metro Manila, Philippines. MPNAG is one of the largest public secondary schools in the area, catering to thousands of students from diverse backgrounds. As of the current school year, it accommodates over 18,000 enrolled students and employs a significant number of teaching and administrative personnel.

MPNAG was selected as the research locale for several important reasons. First, the school currently faces various challenges in managing student behavior and development due to its large population and reliance on manual or paper-based systems. These issues include delays in reporting incidents such as bullying, tardiness, and absenteeism, and a lack of centralized data for timely intervention. Second, the school's administration has expressed interest in adopting technological innovations that can improve operational efficiency and behavioral tracking.

The significance of choosing MPNAG lies in its active efforts to modernize educational processes and implement data-driven strategies in school management. This makes the institution an ideal setting for evaluating the effectiveness of a Web-Based Student Development Management System, which aims to address precisely these challenges through automation, real-time notifications, and behavioral analytics.

The location and environment of MPNAG provide the perfect opportunity to test the system's functionality in a high-demand, real-world educational setting. By implementing and assessing the system at MPNAG, the researchers can gather valuable insights into how digital transformation can support better discipline management and overall student development in large public schools.

"DepEd Tayo - MPNAG 305394 Mandaluyong | Mandaluyong," Facebook.com, 2022. https://www.facebook.com/BastaMPNAGDekalidad/photos (accessed May 05, 2025).

Method or Procedure

The researchers followed a structured process to ensure the successful development, implementation, and evaluation of the Web-Based Student Development Management System for Mataas Na Paaralang Neptali A. Gonzales (MPNAG). The following steps were undertaken:

- Proposal Preparation and Approval

The researchers first prepared a project proposal outlining the objectives, scope, significance, methodology, and expected outcomes of the study. This proposal was submitted to the faculty panel of the College of Computer Studies and Engineering at José Rizal University for review and approval.

- Review of Related Literature

A comprehensive review of local and international literature and studies was conducted to gain insights into existing web-based discipline management systems, best practices, and research gaps. This guided the system design and ensured relevance to current educational needs.

- Gathering of User Requirements

Surveys, interviews, and consultations were conducted with teachers, school administrators, and students of MPNAG to identify the specific challenges in behavior and academic performance monitoring. These inputs were used to draft the system's initial requirements and feature

Instruments

A questionnaire will be the main tool used to collect data for the research project on the "Student Development Management System." The purpose of the questionnaire is to gather data about the preferences, experiences, and developmental needs of students utilizing the system. The instrument's administration, reliability test, and preparation are described below.

1. **Preparation**

A comprehensive review of the literature will be done in order to determine which important aspects of student development need to be evaluated in order to create the questionnaire. The questions will be created to collect both qualitative and quantitative data in line with the study's objectives. The questionnaire's questions will be in line with the goals of the study and be divided up into separate parts to address different aspects of the investigation.

Questionnaire Structure:

- **Part 1: Demographic Information**

This section will collect basic demographic details about the respondents (e.g., name, age, gender, years of teaching experience). This will help contextualize the data and allow for demographic analysis.

Example items:

- Name
- Age
- Gender
- Grade Level
- Years of Teaching Experience
- Subject Taught

- **Part 2: Perception of the Student Development Management System**

  This section will evaluate respondents' opinions on the system's usability, effectiveness, and overall impact on managing student behavior and development.

  Example items:

  - "The Student Development Management System is user-friendly."
  - "The system enhances my overall student management experience."

Rating Scale: 5-point Likert scale (Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree)

- **Part 3: System Effectiveness**

  This part will evaluate how well the system helps teachers in supporting students' academic, personal, and extracurricular growth.

  Example items:

  - "The system provides effective tools to track and address student tardiness."
  - "The system aids in monitoring absenteeism and identifying patterns or causes."
  - The system supports teachers in preventing and resolving bullying incidents.

  Rating Scale: 5-point Likert scale (Very Effective, Effective, Neutral, Ineffective, Very Ineffective)

- **Part 4: Suggestions for Improvement**

  This section will allow respondents to provide open-ended feedback on what could be improved in the system.

  Example item:

  - "What features would you suggest adding to the Student Development Management System?"

- "How can the system better support your personal and academic development?"

2. Reliability Test

A small group of teachers who are representative of the diversity of the teaching population will participate in a pilot test to verify the validity and reliability of the questionnaire. Prior to the distribution of the complete survey, this pre-testing will help find any questions that are unclear or ambiguous and allow changes to be made.

Pilot Testing Process:

- Select a sample of 20-30 users from various grade levels.
- Administer the survey and gather feedback on the clarity and relevance of each question.
- Analyze the pilot test results to determine if any questions require rewording or removal.

Reliability Analysis:

The weighted mean will be used to analyze responses in order to assess the instrument's reliability. This will assist in evaluating each survey item's overall consistency and relevance. To guarantee reliability, weighted mean values will be found within a specified acceptable range.

3. Administration

The questionnaire will be administered electronically to a large group of teachers to gather insights on student behavior. The administration process will involve the following steps:

Distribution:

- The survey will be shared via an online platform (e.g., Google Forms, SurveyMonkey) to ensure accessibility and convenience.
- Links to the survey will be sent to teachers via email or shared through appropriate communication channels.

Instructions:

- Clear guidelines will be provided to teachers, outlining how to complete the questionnaire effectively.
- Teachers will be informed about the objectives of the study and assured that their responses will remain confidential.

Response Time:

- Teachers are expected to complete the survey in approximately 5-10 minutes.

Data Collection:

- Responses will be collected over a two-week period to allow sufficient time for participation.

Follow-up:

- A reminder will be sent to teachers who have not completed the survey after one week to encourage participation.

4. Likert Scale Interpretation

The Likert scale will be used to measure the attitudes and perceptions of students toward the system. For most sections of the questionnaire, a 5-point Likert scale will be employed. The scale will be interpreted as follows:

- **Strongly Agree (5):** The respondent strongly agrees with the statement, indicating a high level of satisfaction or positive perception.

- **Agree (4):** The respondent agrees with the statement, indicating a moderate level of satisfaction or positive perception.

- **Neutral (3):** The respondent is indifferent or has no strong opinion about the statement.

- **Disagree (2):** The respondent disagrees with the statement, indicating a moderate level of dissatisfaction or negative perception.

- **Strongly Disagree (1):** The respondent strongly disagrees with the statement, indicating a high level of dissatisfaction or negative perception.

Development Tools

Front End Development Software

HTML, CSS and Javascript will be used as the foundation for making the user interface (UI) with the help of different libraries such as Bootstrap or Tailwind for css and react or angular for Javascript. Git and github will be used for version control.

Database Management Software

MySQL will be used as the relational database management system while phpMyAdmin will be used to manage MYSQL.

Back End development Software

PHP will be our primary scripting language, handling server-side operations such as processing business logic and managing database interactions. To enhance development with PHP, we will use Laravel for its framework . This framework significantly speeds up the development process while maintaining clean, maintainable code. For API management, we'll leverage RESTful APIs implemented through Node.js.. Node.js is chosen for its ability to efficiently handle asynchronous operations, making it ideal for developing scalable and responsive APIs to manage communication between the front-end and back-end services. To secure these interactions, we will implement OAuth, ensuring that authentication is robust and that sensitive credentials are safeguarded throughout the process. On the infrastructure side, our application will be hosted on one of the major cloud platforms such AWS, Google Cloud, or Microsoft Azure, with the final decision based on factors like cost, service offerings, and ideal integration capabilities. Apache will serve as our web server, providing reliable technology to handle HTTP requests effectively.

Statistical Treatment

To effectively evaluate the outcomes of this study, the researchers will utilize a combination of descriptive and inferential statistical methods to interpret the data collected during development, testing, and implementation phases.

The primary objectives related to the development of the system such as the design of the core application, integration with databases, interface modules, visualization features, and system automation will be addressed through descriptive analysis. These aspects will be assessed by presenting technical specifications, implementation procedures, system architecture, and process flow diagrams. Supplementary insights may be gathered through user feedback or initial testing sessions to qualitatively support the system’s functionality and reliability. These elements will not require numerical statistical computation but rather rely on structured documentation and process review.

To evaluate the system’s performance, user experience, and practical effectiveness, quantitative data will be collected using survey instruments and system usage metrics. These data points will then be analyzed using inferential statistics to draw generalizations about the system's success, usability, and impact.

User Satisfaction

Responses gathered through a structured Likert scale questionnaire will be analyzed to measure user attitudes toward the system's usability, visual design, responsiveness, and overall satisfaction. The following statistical tools will be used:

- **Weighted Mean** – to derive an overall satisfaction index by assigning relative importance to each rating level. These results will be interpreted using a predefined interpretative scale to assess general sentiment.

Efficiency Gains

Survey questions assessing perceived improvements in the efficiency of group coordination, output creation, and documentation within our team project will be analyzed using Weighted Mean to determine the extent of perceived gains. Time-based data could be analyzed using descriptive statistics such as mean and standard deviation to identify potential changes in productivity and task execution over the course of the projects.

Data Accuracy

Survey questions assessing the perceived accuracy of the information documented and presented by our team will be analyzed using mean scores and frequency distributions, similar to other evaluation metrics.

Project outputs such as group reflections, task tracking, and individual evaluations can be assessed for accuracy based on consistency with assigned tasks and rubric guidelines. If feasible, a comparison between self-reported performance and actual documented contributions may be analyzed using frequency counts and percentages to identify any discrepancies or reporting gaps.

Overall Contribution

Data from survey questions assessing the overall contribution of our team project to improved collaboration, creativity, and task fulfillment will be analyzed using mean scores and frequency distributions. Qualitative data from group reflections and peer evaluations will be used to provide context and further explain the quantitative findings on the project's overall impact on teamwork, productivity, and learning outcomes.

Formulas

While more advanced inferential statistical methods may be considered for future studies (e.g., t-tests to compare project performance across different groups), this initial evaluation will primarily use descriptive statistics to interpret the data collected from our group team outputs and evaluations.

Weighted Mean ($\bar{x}w$): $\bar{x}w = \sum w_i x_i / \sum w_i$

Where:

- w_i = weight of each rating

- x_i = frequency of the corresponding rating

The analysis of the data will aim to provide a clear and comprehensive evaluation of our group's performance, collaboration, and output quality based on peer assessments, project reflections, and self-evaluations, directly addressing the objectives of the team's overall development.

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