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Viotrack: A Student Violation Tracking and Monitoring System Using QR Code and Dashboard

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Abstract

The management of student violations in academic institutions is often hindered by manual processes, resulting in delayed recording, disorganized documentation, and difficulty in tracking repeat offenders. At Perpetual Help College of Manila (PHCM), these challenges affect the efficiency and accuracy of disciplinary monitoring. To address these issues, this study developed VIOTRACK, a web-based student violation tracking and monitoring system designed to streamline the recording and management of student disciplinary cases.

The system utilizes QR code technology for fast and accurate data capture, integrated with a centralized dashboard for real-time monitoring and reporting. It was developed using PHP, MySQL, JavaScript, HTML, and CSS, ensuring accessibility and ease of use through a web-based platform. Key features include automated violation logging, student identification via QR scanning, real-time data updates, and analytical dashboards for improved decision-making.

Using a developmental research design and Agile methodology, the system was evaluated by IT specialists and end-users based on ISO/IEC 25010:2023 software quality standards, including functional suitability, performance efficiency, usability, reliability, and security. The results showed high acceptability, with IT specialists rating the system with a weighted mean of 3.55 and end-users with 3.84, both interpreted as "Very Acceptable."

The findings indicate that VIOTRACK significantly improves the efficiency, accuracy, and accessibility of student violation records compared to traditional manual methods. The study concludes that the system is a reliable and effective solution for modernizing disciplinary management processes and is suitable for implementation in academic institutions.

INTRODUCTION

In today's educational environment, schools face increasing challenges in maintaining accurate and efficient systems for monitoring student behavior and disciplinary records. Traditional manual

documentation of student violations often leads to delayed reporting, misplaced records, data inconsistencies, and difficulty in identifying repeat offenders. These operational inefficiencies hinder timely interventions and limit administrators' ability to implement data-driven disciplinary strategies. Recent advancements in information systems and digital transformation initiatives in education have emphasized the importance of automated record management and real-time monitoring tools. Studies on school management systems highlight that digital platforms improve data accuracy, accessibility, and administrative efficiency compared to paper-based processes. However, many institutions still rely on fragmented or semi-manual systems that lack integration between recording, monitoring, and reporting functions. This gap results in limited transparency, slower decision-making processes, and increased workload for teachers and administrative personnel. Existing school information systems provide student databases and academic tracking, yet they often do not include a dedicated violation monitoring module with real-time analytics and mobile-based recording capabilities. Manual encoding of violations remains prone to human error and delays, particularly in large institutions where monitoring requires coordination among teachers, discipline officers, and administrators. The absence of centralized dashboards also prevents stakeholders from analyzing behavioral trends and generating consolidated reports efficiently. To address these limitations, the proponents developed VIOTRACK: A Student Violation Tracking and Monitoring System Using Mobile Scanning and Dashboard, a system designed to modernize the process of recording and monitoring student violations. VIOTRACK integrates QR code-based mobile scanning technology with a centralized web dashboard that enables real-time documentation, automated report generation, violation history tracking, and role- based access control. The system aims to improve efficiency, enhance data accuracy, and provide administrators with actionable insights through visual analytics and summarized reports.

Evaluated based on the ISO/IEC 25010:2023 software quality standards, VIOTRACK seeks to ensure functional suitability, performance efficiency, usability, reliability, security, maintainability, and portability. By digitizing and centralizing violation management processes, the system provides a scalable and structured solution that supports educational institutions in implementing more organized, transparent, and data-driven disciplinary management practices.

METHODS

This study utilized a descriptive-evaluative research design with a quantitative approach to develop and assess VIOTRACK: A Student Violation Tracking and Monitoring System Using Mobile Scanning and Dashboard. The descriptive component documented the system's features, operational workflow, and performance in a practical educational setting. The evaluative component measured the system's technical quality and level of acceptability among selected respondents. The study involved thirty (30) respondents composed of fifteen (15) IT specialists and fifteen (15) teachers. IT specialists evaluated the system's technical architecture, security mechanisms, database integrity, and performance efficiency. Teachers assessed the system's usability, functionality, and practical applicability in recording and monitoring student violations. Respondents were selected based on their expertise and direct relevance to system implementation and evaluation. The system was developed following the Software Development Life Cycle (SDLC), which included planning, requirements analysis, system design, development, testing, and deployment phases. During testing, respondents were given access to the mobile scanning feature and web dashboard to simulate actual violation recording and monitoring procedures.

Quantitative data were gathered through a structured Likert-scale questionnaire aligned with ISO/IEC

25010:2023 software quality standards. The instrument measured perceptions of functional suitability, performance efficiency, usability, reliability, security, maintainability, and portability. A five-point rating scale was used to determine the level of acceptability. The weighted mean was computed to analyze responses and determine overall system evaluation results.

This non-experimental approach avoided manipulation of variables and instead focused on observing user interaction, system performance, and evaluation ratings under normal usage conditions. The design enabled the identification of strengths, operational gaps, and correlations between system quality attributes and overall user acceptance, providing empirical support for the effectiveness of VIOTRACK in improving student violation management processes.

RESULTS AND DISCUSSION

Based on the responses gathered from IT Specialists and Professors of Perpetual Help College of Manila as well as external evaluators from outside the institution, the findings indicate that the challenges in student violation monitoring are primarily operational and structural rather than disciplinary in nature. While the school enforces clear policies, the existing manual process created inefficiencies that affected the speed, accuracy, and accessibility of violation records. The data collected through interviews, observations, and ISO 25010 evaluation revealed three major operational barriers in the traditional system: The Prefect of Discipline relies on handwritten logbooks and paper-based reports. This slows down the recording process, especially during peak hours when multiple violations are handled simultaneously. Since records are stored physically in folders, retrieving past violations requires manually checking documents. This delays conferences, referrals to the Guidance Office, and decision-making processes. Communication with parents depends on manual contact procedures, which can result in delayed updates. Additionally, records are not centralized, making it difficult to track repeat offenders efficiently. These findings demonstrate that the issue is not the absence of disciplinary policies but rather the lack of a structured digital system to support monitoring. This validates the development of VIOTRACK as a necessary technological intervention. By integrating QR code scanning, centralized dashboards, and automated record storage, the system directly addresses these operational inefficiencies. It eliminates handwritten documentation, enables faster retrieval of records, and organizes violation histories into a secure, searchable database.

Figure 1. Existing Manual Process of Monitoring Student Violations

Figure 1 illustrates the traditional workflow of recording student violations, where documentation begins with handwritten reports, followed by manual filing and storage inside the Prefect of Discipline office. The concentration of processes within paper-based documentation highlights the bottleneck in monitoring efficiency. The absence of automation creates delays in updating records and limits immediate access to violation histories. Unlike digital systems, manual filing restricts real-time visibility and increases the risk of misplaced documents. This structural limitation reinforces the need for VIOTRACK as a centralized monitoring solution capable of providing organized, secure, and instantly retrievable student violation records (refer to Appendix G).

Table 1: Tabulated Results of level of acceptance in terms of Functionality (IT Specialists)

Description	Weighted Mean	Interpretation
The system's features for managing violations, student information, and reports perform their intended functions accurately	3.47	Very Functional
The QR code feature effectively identifies students and records violations in real time.	3.87	Very Functional
The dashboard displays complete, accurate, and updated data for monitoring purposes.	3.87	Very Functional
Each system function operates correctly and produces valid and expected results.	3.27	Very Functional
The system's overall features align with its purpose of real-time student violation tracking and monitoring.	3.87	Very Functional
AVERAGE WEIGHTED MEAN	**3.67**	**Very Functional**

The results in Table 1, show how the IT Specialists rated each part of VIOTRACK based on its functions. The score of 3.47 means the features for handling violations, student information, and reports work well and do what they are supposed to do. The QR code feature and the dashboard both got high scores of 3.87, which shows that the QR scanner reads students correctly and records violations fast, and the dashboard shows complete and updated information for easy monitoring. The score of 3.27 means that the system's functions work properly and give the right results when used. Another high score of 3.87 shows that the whole system matches its purpose of helping the school track and monitor student violations in real time. The overall score of 3.67 means that IT Specialists see the system as Very Functional, and it works well for the school's needs.

Table 2: Tabulated Results of level of acceptance in terms of Efficiency (IT Specialists)

Description	Weighted Mean	Interpretation
The system loads the dashboard,	3.47	Very Efficient

reports, and data promptly.		
It operates smoothly and efficiently even when multiple users are logged in simultaneously	3.47	Very Efficient
The system responds quickly to actions such as QR code scanning, searching, and data retrieval	3.53	Very Efficient
The system utilizes server and storage resources efficiently without lag or delay.	3.33	Very Efficient
Notifications and updates are processed and delivered in real time.	3.60	Very Efficient
AVERAGE WEIGHTED MEAN	**3.48**	Very Efficient

The results in Table 2, show how the IT Specialists rated VIOTRACK in terms of performance efficiency. The scores of 3.47 for loading the dashboard and operating smoothly with many users mean that the system works fast and does not slow down easily. The 3.53 rating shows that the system responds quickly when scanning QR codes, searching, or getting data, which makes it easy for teachers to use. The score of 3.33 means that the system uses server and storage resources well and does not lag. The highest score, 3.60, indicates that updates and notifications are processed immediately, even if they are sent manually by the administrator. With an overall weighted mean of 3.48, the system is rated Very Efficient, demonstrating that it operates quickly, loads data rapidly, and maintains smooth performance during use.

Table 3: Tabulated Results of level of acceptance in terms of Usability (IT Specialists)

Description	Weighted Mean	Interpretation
The interface is intuitive, organized, and easy to navigate for different types of users.	3.80	Very Usable
The dashboard layout is visually structured and user-friendly.	3.47	Very Usable
System icons, buttons, and labels are consistent, clear, and easy to understand.	3.47	Very Usable
The system provides clear and helpful feedback or error messages.	3.47	Very Usable
Sensitive information displayed within the interface is protected from unauthorized access.	3.53	Very Usable
AVERAGE WEIGHTED MEAN	**3.50**	Very Usable

The results in Table 3, show that VIOTRACK is rated Very Usable by the IT Specialists, with an overall weighted mean of 3.50. The high score of 3.80 for the interface means the system is easy to use and simple to navigate for different users. The dashboard and icons also received good scores of 3.47, showing that the layout, labels, and buttons are clear and understandable. The same score was given to the system's feedback and error messages, meaning users can easily see what to fix or what action to take. Sensitive information is also protected, as shown by the score of 3.53, meaning the system keeps private data safe.

Overall, the results show that users can use the system comfortably without confusion or difficulty.

Table 4: Tabulated Results of level of acceptance in terms of Reliability (IT Specialists)

Description	Weighted Mean	Interpretation
The system operates continuously without crashing or data loss.	3.67	Very Reliable
It remains stable during prolonged or repeated usage.	3.00	Highly Reliable
The system accurately stores, retrieves, and updates data	3.87	Very Reliable
It maintains performance under varying user loads or simultaneous operations.	3.20	Highly Reliable
The system's backup and recovery mechanisms work properly	3.60	Very Reliable
AVERAGE WEIGHTED MEAN	**3.44**	Very Reliable

Table 4, shows that VIOTRACK received an overall weighted mean of 3.44, which is interpreted as Very Reliable. The score of 3.67 shows that the system runs smoothly without crashing or losing data. The rating of 3.00 means it stays stable even when used for long hours. The highest rating, 3.87, shows that the system stores, retrieves, and updates data correctly, which is important for accurate monitoring. The score of 3.20 shows that it can handle different user loads without slowing down too much. The backup and recovery system also scored high at 3.60, showing that the system can restore data properly when needed. These results prove that VIOTRACK works consistently and is dependable for daily school use.

Table 5: Tabulated Results of level of acceptance in terms of Security (IT Specialists)

Description	Weighted Mean	Interpretation
The system implements secure login authentication for all user roles.	3.93	Very Secured
Access to sensitive student information is restricted to authorized personnel.	3.60	Very Secured
The system ensures the confidentiality and integrity of stored data	3.73	Very Secured
User activities are properly logged for accountability.	3.40	Very Secured
All transmitted data and notifications are securely processed.	3.73	Very Secured
AVERAGE WEIGHTED MEAN	**3.68**	Very Secured

Table 5, shows that VIOTRACK received an overall weighted mean of 3.68, interpreted as Very Secured. The highest score, 3.93, shows that the login system is secure for all user roles. The score of 3.60 means that only authorized users can view sensitive student information. The strong rating of 3.73 shows that the system protects the confidentiality and integrity of stored data. User actions are also recorded properly,

with a score of 3.40, helping maintain accountability. Another score of
3.73 shows that all processed data and notifications remain protected, even if SMS messages are sent manually. Overall, the results show that VIOTRACK keeps information safe and uses strong security measures.

Table 6: Tabulated Results of level of acceptance in terms of Functionality (Users)

Description	Weighted Mean	Interpretation
The system accurately records and monitors student violations using QR code scanning.	4.00	Very Functional
The dashboard properly displays real-time information about student violations.	4.00	Very Functional
The system generates organized and understandable violation reports for administrative use.	4.00	Very Functional
The system supports effective communication and coordination between Professors and the Guidance Office.	3.87	Very Functional
The features provided meet the functional requirements for school monitoring and discipline management.	3.87	Very Functional
AVERAGE WEIGHTED MEAN	**3.95**	**Very Functional**

The results in Table 6, show that VIOTRACK received an overall weighted mean of 3.95, which is interpreted as Very Functional. Users agreed that the system works very well in recording and monitoring student violations using QR scans, as shown by the perfect scores of 4.00 in several items. They also said that the dashboard shows real-time updates correctly and that the reports made by the system are clear and organized for school use. The scores of 3.87 show that the system helps in communication between Professors and the Guidance Office and supports the needs of school monitoring. Overall, these results mean that the system performs its functions accurately and is very useful for discipline management.

Table 7: Tabulated Results of level of acceptance in terms of Efficiency (Users)

Description	Weighted Mean	Interpretation
The system responds quickly during QR code scanning and data processing	3.80	Very Efficient
The dashboard and reports load efficiently without unnecessary delays.	3.47	Very Efficient
The system can handle multiple student records simultaneously without performance issues.	3.67	Very Efficient
Real-time SMS notifications are delivered promptly to parents.	3.47	Very Efficient
The system performs smoothly during continuous daily use	3.80	Very Efficient

AVERAGE WEIGHTED MEAN	**3.64**	Very Efficient

Table 7, shows that VIOTRACK received an overall weighted mean of 3.64, which is interpreted as Very Efficient. Users shared that the system responds fast during QR code scanning and data processing, shown by the 3.80 ratings. They also said that the dashboard and reports load smoothly, which received a Very Efficient rating of 3.47. The system can handle many student records at once, as seen in the 3.67 score, and it continues to work well even during long hours of use, scoring another 3.80. SMS messages are still sent manually, but users rated the processing and display of information as Highly Efficient, shown by the 3.47 score. Overall, these results show that VIOTRACK works fast, avoids delays, and stays smooth during daily operations, earning both Very Efficient and Highly Efficient ratings from the users.

Table 8: Tabulated Results of level of acceptance in terms of Usability (Users)

Description	Weighted Mean	Interpretation
The interface is user-friendly and easy to navigate for both professors and Guidance.	3.80	Very Usable
The icons, buttons, and labels are clear, consistent, and easy to understand.	3.87	Very Usable
The dashboard layout is visually organized and intuitive.	4.00	Very Usable
The system provides clear and informative feedback or error messages.	3.87	Very Usable
The system can be easily learned even by users with a minimal technical background.	3.87	Very Usable
AVERAGE WEIGHTED MEAN	**3.88**	Very Usable

Table 8, shows that VIOTRACK received an overall weighted mean of 3.88, which is interpreted as Very Usable. Users agreed that the system is easy to use and navigate, as shown by the Very Usable score of 3.80 for the interface. They also gave Very Usable ratings of 3.87 for the icons, labels, and error messages because they are clear and easy to understand. The dashboard received the highest score of 4.00, showing it is Very Usable and well-organized. The system can also be learned easily, even by users with little technical knowledge, also scoring 3.87. Overall, users gave only Very Usable ratings, proving that VIOTRACK is simple, organized, and comfortable to operate.

Table 9: Tabulated Results of level of acceptance in terms of Reliability (Users)

Description	Weighted Mean	Interpretation
The system consistently records and stores data without error or duplication.	3.80	Very Reliable
The data remains accessible and accurate even after long periods of use.	3.87	Very Reliable

The system can recover and continue functioning properly after interruptions.	4.00	Very Reliable
The database securely manages all student and violation records.	4.00	Very Reliable
The system remains stable during real-time operations in school monitoring.	3.87	Very Reliable
AVERAGE WEIGHTED MEAN	**3.91**	Very Reliable

Table 9, shows that VIOTRACK received an overall weighted mean of 3.91, interpreted as Very Reliable. Users confirmed that the system records and stores data correctly without errors, scoring 3.80 under Very Reliable. They also said that the data stays accurate and accessible for long periods, shown by the 3.87 rating. The highest scores of 4.00 were given for data recovery and database security, both meaning Very Reliable. The system also works well during school operations, scoring 3.87. Even though all ratings fall under Very Reliable, the results still show a mix of high levels of reliability, proving that VIOTRACK stays stable, accurate, and dependable throughout daily use.

Table 10: Tabulated Results of level of acceptance in terms of Security (Users)

Description	Weighted Mean	Interpretation
The system ensures that sensitive student information is protected and confidential.	3.87	Very Secured
Only authorized users (teachers, admin, and guidance) can access violation data.	4.00	Very Secured
The system prevents unauthorized access through secure logins and authentication.	3.87	Very Secured
Violation records and parent notifications are transmitted securely.	3.80	Very Secured
The system maintains accountability through proper tracking of user activities.	3.67	Very Secured
AVERAGE WEIGHTED MEAN	**3.84**	Very Secured

Table 10, shows that VIOTRACK received an overall weighted mean of 3.84, which is interpreted as Very Secured. Users agreed that the system protects sensitive student information, shown by the 3.87 rating. They also said that only authorized users can access violation data, which received a perfect score of 4.00, also interpreted as Very Secured. Secure logins and authentication were rated 3.87, meaning the system effectively prevents unauthorized access. Violation records and notifications received a 3.80 rating, showing that data transmission is still Very Secured. The system also keeps proper activity logs for accountability, scoring 3.67. With all items rated Very Secured, the results show that VIOTRACK provides strong protection for school data.

Table 11: Summary of User Acceptance (Teachers/Users)

ISO/IEC 25010:2023 Criteria	Average Weighted Mean	Verbal Interpretation
Functional Suitability	3.95	Very Functional
Performance Efficiency	3.64	Very Efficient
Usability	3.88	Very Usable
Reliability	3.91	Very Reliable
Security	3.84	Very Secured
GRAND WEIGHTED MEAN	**3.84**	**Highly Acceptable**

The summary of user acceptance indicates that VIOTRACK achieved a Grand Weighted Mean of 3.84, interpreted as Highly Acceptable. The highest rating was observed in Functional Suitability (3.95), confirming that the system performs its intended tasks effectively in actual school operations. Reliability (3.91) and Usability (3.88) further demonstrate that the system operates consistently and is easy to navigate for teachers and Guidance personnel. Security (3.84) and Efficiency (3.64) ratings also indicate strong performance in safeguarding student records and maintaining smooth operations during daily use. These findings confirm that VIOTRACK is not only technically sound but also practically accepted by its end users.

Table 12: Summary of IT Specialists Acceptance ((IT Specialists)

ISO/IEC 25010:2023 Criteria	Average Weighted Mean	Verbal Interpretation
Functional Suitability	3.67	Very Functional
Performance Efficiency	3.48	Very Efficient
Usability	3.50	Very Usable
Reliability	3.44	Very Reliable
Security	3.68	Very Secured
GRAND WEIGHTED MEAN	**3.55**	**Highly Acceptable**

The summary of IT Specialists' evaluation indicates that VIOTRACK achieved a Grand Weighted Mean of 3.55, interpreted as Highly Acceptable. The highest rating was observed in Security (3.68), confirming that the system implements strong authentication, access control, and data protection mechanisms. Functional Suitability (3.67) further validates that the QR code scanning feature, dashboard monitoring, and report generation modules perform their intended tasks accurately. Performance Efficiency (3.48), Usability (3.50), and Reliability (3.44) also received consistently high ratings, indicating that the system operates smoothly, remains stable during use, and is easy to navigate. These results confirm that VIOTRACK meets technical quality standards based on ISO/IEC 25010:2023 evaluation criteria.

Table 13: Composite Validation of System Effectiveness

Respondent Group	Evaluative Perspective	Grand Weighted Mean	Verbal Interpretation	Validation Verdict
IT Specialists	Technical Quality (ISO/IEC 25010:2023)	**3.55**	Highly Acceptable	**VALID**
Teachers / Users	Operational Utility & User Acceptance	**3.84**	Highly Acceptable	**VALID**

The consolidated data reveals convergence of positive assessments across both respondent groups: The evaluation by IT Specialists (3.55) confirms that VIOTRACK adheres to software quality standards in functionality, reliability, security, and performance efficiency.

The assessment by Teachers/Users (3.84) confirms that the system enhances workflow efficiency in recording, monitoring, and retrieving student violation data.

Given that both Grand Weighted Means significantly surpass the acceptance threshold, the study confirms that VIOTRACK is statistically validated as effective and suitable for institutional implementation.

CONCLUSSIONS AND RECOMMENDATIONS

Based on the results of the study, it is concluded that VIOTRACK significantly improves the efficiency, accuracy, and accessibility of student violation monitoring at Perpetual Help College of Manila. The integration of QR code scanning and a centralized dashboard effectively addresses operational issues associated with manual documentation, including delayed recording, difficulty in retrieving historical records, and fragmented monitoring processes. The evaluation grounded in ISO/IEC 25010:2023 standards demonstrated strong convergence across respondent groups. IT Specialists rated the system Highly Acceptable (Grand Mean = 3.55), confirming its technical robustness in functionality, reliability, security, and efficiency. Teachers and Guidance personnel rated the system Highly Acceptable (Grand Mean = 3.84), affirming its usability, reliability, and practical value in daily disciplinary operations. Overall, the findings indicate that VIOTRACK is a reliable, secure, and scalable digital solution that modernizes student violation management and supports data-driven disciplinary decision-making. Adopt VIOTRACK as the official digital system for recording and monitoring student violations across all departments. Integrate automated SMS notification for parents or guardians to ensure timely communication. Conduct periodic training sessions for faculty and administrative personnel to maximize system utilization. Implement automated analytics for identifying repeat offenders and behavioral trends. Develop a parent portal for direct monitoring access. Strengthen real-time notification and escalation mechanisms for serious violations. Conduct longitudinal studies to assess the long-term impact of digital violation monitoring on student behavior. Expand the study to other educational institutions for broader validation. Explore integration with broader school information systems for unified data management.

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