

Assessment of the Effectiveness of a Web-Based Equipment Inventory, Online Request, Accountability, and Monitoring System

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ABSTRACT

This study assessed the perceived effectiveness of a web-based Equipment Inventory, Online Request, Accountability, and Monitoring System developed for the College of Criminal Justice Education of Bato Institute of Science and Technology, Inc. The system was designed to replace a manual logbook-based process that lacked online request submission, real-time availability monitoring, automatic overdue identification, complete borrower histories, condition comparison, and consistent accountability procedures for unreturned, lost, or damaged equipment. Using the web application, students may check equipment availability, submit borrowing requests, and monitor whether requests are pending, approved, or rejected. After approval, the student proceeds to the custodian's office, where the request, identity, quantity, and pre-release condition are verified before physical issuance. A descriptive-evaluative quantitative design was employed, involving 100 respondents who completed a 26-item questionnaire based on the eight product-quality characteristics of ISO/IEC 25010:2011. The system obtained an overall weighted mean of 4.87, interpreted as Excellent. Performance efficiency and compatibility received the highest means of 4.89, followed by security at 4.88. The findings indicate strong overall user-perceived software quality and clearly demonstrate that the integrated workflow supports inventory visibility, request monitoring, custody traceability, overdue management, condition verification, accountability resolution, reporting, clearance control, and auditability within the evaluated institutional setting.

Keywords: *borrower accountability, equipment inventory, online borrowing request, overdue monitoring, request-status tracking, web-based information system*

INTRODUCTION

Academic laboratories and training units depend on equipment that must remain available, serviceable, identifiable, and traceable throughout its useful life. This requirement is particularly important in criminal justice education, where instruction may involve mock crime-scene kits, fingerprint materials, evidence containers, body-camera training units, and non-operational simulation devices. ISO 55000:2024 describes asset management as a coordinated life-cycle approach for realizing value, managing risk, improving performance, and supporting organizational objectives (International Organization for Standardization [ISO], 2024). Consequently, an academic department must maintain accurate information on the equipment it owns, each item's location and condition, the person responsible for its custody, its due date, and any unresolved action.

Before the system was developed, the department managed equipment primarily through a physical logbook. Although the logbook recorded individual transactions, it did not function as an integrated inventory and request-management system. It could not support online request submission or approval-status monitoring, automatically reconcile total and available quantities, connect an approved request and actual physical release with a verified return and condition record, identify overdue transactions, or produce a consolidated borrower-accountability history. Students therefore had to visit or contact the custodian's office before knowing whether equipment was available or a request could be approved. Similar Philippine higher-education studies have

reported incomplete borrower slips and transaction logs, time-consuming manual reservations, slow record retrieval and report preparation, difficulty monitoring equipment from issuance to disposal, and the value of online reservation and real-time status visibility (Cepeda & Saludes, 2025; German et al., 2021; Salvador, 2016; Tungcul & Kummer, 2021).

The most significant local gaps involved custody, traceability, and responsibility. Some equipment was returned late, while other items were lost or returned damaged. Because the manual logbook did not consistently preserve a complete chain of request, approval, release, due date, return, and condition verification, personnel could not readily determine who had failed to return an item on time or who remained accountable for an item that was not returned. The process also lacked a consistent mechanism for notifying borrowers, recording explanations, assessing negligence, documenting repair or replacement, and withholding clearance while an approved accountability case remained unresolved. Although Philippine public-property rules do not directly govern private student borrowers, Commission on Audit documentation and Presidential Decree No. 1445 provide relevant governance benchmarks by linking property custody with written acknowledgment and liability for loss or damage caused by negligence (Commission on Audit [COA], 2015; Republic of the Philippines, 1978).

Weak traceability also creates a sustainability concern. When losses or damage attributable to negligence are repeatedly absorbed by the department without a documented accountability process, limited funds may be diverted to replacement purchases instead of maintenance, upgrades, or additional instructional resources. ISO 55000 emphasizes value realization, risk control, cost management, and sustainability across the asset life cycle, while digital-identification research highlights the importance of reliable links between an asset and its history, status, and movement (Frankó et al., 2020; ISO, 2024). Although a centralized information system cannot prevent every loss or instance of damage, it can provide timely evidence for follow-up, fair decision-making, maintenance planning, and responsible budgeting.

Web-based inventory and request-management systems can address these weaknesses by centralizing records and linking asset attributes, online requests, user identity, approval status, physical release, due dates, condition evidence, and audit events. NIST's asset-management practice guide identifies centralized visibility, ownership information, state-change monitoring, audit records, and reporting as important capabilities of an effective asset-management environment (NIST, 2018). Related higher-education systems also use online reservations, real-time request status, digital borrowing workflows, dashboards, notifications, and audit histories to reduce unnecessary movement and waiting while strengthening oversight and accountability (Accad et al., 2023; Cepeda & Saludes, 2025; German et al., 2021). The present system applies these principles to the College of Criminal Justice Education's request, approval, claiming, release, return, accountability, and clearance workflow.

INSTITUTIONAL PROBLEM AND RESEARCH GAP

An analysis of the pre-implementation workflow identified the following interrelated control gaps, which guided the system requirements.

Manual and incomplete records. The department depended on handwritten logbook entries rather than a database-driven inventory system. Omitted fields, inconsistent item descriptions, incomplete borrower details, and legibility problems could weaken later verification. Salvador (2016) similarly reported substantial incompleteness in laboratory transaction logs and borrower slips in another Philippine higher-education setting.

Difficult search, retrieval, and reporting. Personnel had to review logbook pages sequentially to locate earlier transactions or prepare reports. University equipment-management studies have likewise identified manual record keeping, difficult data retrieval, and time-consuming report generation as recurring operational problems (German et al., 2021; Tungcul & Kummer, 2021).

No online request submission or request-status monitoring. The former workflow did not provide a web portal where students could check equipment availability, submit borrowing requests, or monitor whether

requests were pending, approved, or rejected. Students could therefore make unnecessary office visits or repeatedly contact the custodian before approval. Philippine higher-education studies describe manual reservation as time-consuming and identify online reservation and real-time status information as means of reducing movement, waiting, and follow-up effort (Cepeda & Saludes, 2025; German et al., 2021).

No real-time inventory visibility. The manual process could not automatically display total, available, borrowed, returned, overdue, damaged, unavailable, or serviceable quantities. Centralized asset information is essential because it enables authorized users to retrieve asset location, status, ownership, and state changes from a controlled source (NIST, 2018).

Late returns were not automatically detected. Due dates recorded in the logbook did not generate reminders, priority alerts, or a consolidated overdue list. As a result, personnel could not promptly identify borrowers who had failed to return equipment on time, a weakness also documented in a Philippine university equipment-borrowing study (Cepeda & Saludes, 2025).

Unreturned and lost equipment lacked an end-to-end accountability trail. When an item was not returned, the manual record did not reliably connect the request, approval, physical release, due date, follow-up actions, and final resolution. Research on asset identification and tracking emphasizes that reliable identifiers and complete transaction histories are fundamental to traceability (Frankó et al., 2020; NIST, 2018).

Damage and condition changes were difficult to attribute fairly. The logbook did not consistently record the quantity and condition of equipment at release or compare them with the quantity and condition at return. Without documented before-and-after verification, neither the institution nor the borrower had sufficient evidence to determine whether damage occurred during the borrowing period (COA, 2015; Republic of the Philippines, 1978).

Borrower liability was not consistently documented or enforced. The former process lacked an integrated acknowledgment of borrower obligations, written notice, an opportunity to explain, authorized review, an approved repair or replacement decision, proof of settlement, and a clearance hold for unresolved cases. Accountability standards generally connect property custody with an identified responsible person and require adequate evidence before liability is imposed or resolved (COA, 2015; Republic of the Philippines, 1978).

Repeated replacement purchases threatened departmental sustainability. When loss or damage caused by negligence remains unresolved, the department may be compelled to replace equipment from limited funds, reducing the resources available for preventive maintenance, upgrades, and additional instructional materials. Life-cycle asset management seeks to balance value, cost, risk, performance, and sustainability rather than repeatedly replace assets without addressing the underlying cause (ISO, 2024).

Weak auditability and management information. A paper logbook could not automatically identify who approved, released, received, modified, or resolved a transaction, nor could it generate timely exception reports by borrower, equipment, condition, or overdue duration. NIST recommends monitoring asset attributes and state changes, preserving audit information, and supporting management and audit reporting (NIST, 2018, 2020).

Privacy and access-control limitations. A physical logbook may expose borrower names and transaction details to anyone able to view its pages, while providing no role-based restrictions or access history. Digitalization must therefore be accompanied by least-privilege access, authentication, protected backups, audit review, and lawful processing of personal information (NIST, 2020; Republic of the Philippines, 2012).

Conceptual and Policy Basis

The study is grounded in three complementary frameworks. First, ISO 55000:2024 provides a life-cycle perspective in which equipment must continue to deliver value while cost, risk, condition, performance, and sustainability are managed (ISO, 2024). Second, custody and accountability benchmarks require a clear relationship among the property, the responsible person, documentary evidence, and the authorized resolution of loss or damage (COA, 2015; Republic of the Philippines, 1978). Third, centralized asset records, role-based

access, state-change monitoring, and audit logs support visibility and traceability (NIST, 2018, 2020). Software quality was evaluated using the eight-characteristic product-quality model of ISO/IEC 25010:2011. The assessment covered functional suitability, performance efficiency, compatibility, usability, reliability, security, maintainability, and portability (International Organization for Standardization & International Electrotechnical Commission [ISO/IEC], 2011).

Objectives of the Study

The study aimed to assess the perceived effectiveness of the web-based Equipment Inventory, Online Request, Accountability, and Monitoring System and determine how its workflow addresses the documented weaknesses of the former manual process. Specifically, it sought to:

- determine the system's perceived quality in terms of functional suitability, reliability, usability, performance efficiency, maintainability, portability, security, and compatibility;
- assess whether the implemented workflow addresses gaps in online request submission, approval-status monitoring, inventory visibility, borrower traceability, overdue follow-up, return and condition verification, accountability resolution, reporting, and auditability;
- examine how documented and proportionate borrower liability may support equipment preservation and departmental sustainability while observing institutional due process; and
- identify policy, operational, security, and evaluation improvements required before wider and long-term institutional implementation.

SYSTEM OVERVIEW

Scope and Core Functions

The system is a PHP- and MySQL-based web application developed for the College of Criminal Justice Education. It extends beyond basic inventory management by integrating online borrowing requests, request review and approval, status monitoring, physical release, return processing, and accountability management. Equipment records include an asset tag, name, category, location, description, image, total quantity, available quantity, status, condition, and acquisition date. Request and transaction records link the identified borrower, request timestamp, requested quantity, purpose, proposed return date, request status, approval decision and approving personnel, released quantity, releasing custodian, pre-release condition, due date and time, return status, returned quantity, return condition, overdue status, accountability decision, settlement evidence, notifications, clearance eligibility, and audit events. This structure converts an isolated logbook entry into a traceable record covering the complete request and custody cycle.

More Than Inventory: Online Request and Status Monitoring

Students can use a supported web browser to view available equipment, submit borrowing requests, and monitor request status without first visiting the custodian's office. A pending status means that the request awaits review; an approved status authorizes the student to proceed to the custodian's office to claim the equipment; and a rejected status indicates that no release is authorized. Approval is distinct from physical release. Available quantity and borrower custody are updated only after the custodian verifies the approved request, confirms the student's identity and the equipment's pre-release condition, and records the actual issuance. This separation reduces unnecessary pre-approval visits while preserving an accurate chain of custody (Cepeda & Saludes, 2025; German et al., 2021).

ROLE	PRIMARY RESPONSIBILITY	KEY FUNCTIONS
 Administrator	PRIMARY RESPONSIBILITY Institutional control	KEY FUNCTIONS Manage accounts and equipment; approve accountability policy settings; monitor all transactions; review authorized liability decisions, settlements, reports, and audit logs.
 Faculty/Staff	PRIMARY RESPONSIBILITY Request and return oversight	KEY FUNCTIONS Approve or reject borrowing requests; verify returns and condition; document findings and borrower explanations when authorized.
 Custodian	PRIMARY RESPONSIBILITY Physical custody	KEY FUNCTIONS Release approved equipment; record pre-release condition; receive and inspect returned quantities; monitor overdue, lost, damaged, and maintenance-related items.
 Student	PRIMARY RESPONSIBILITY Borrower accountability	KEY FUNCTIONS Submit requests; acknowledge due date and care obligations; monitor status; return equipment; respond to documented accountability cases; settle approved repair, replacement, or payment requirements; obtain clearance when eligible.

Figure 1. Role-based access and accountability functions

Operational Workflow

- **Authentication and role routing.** After signing in, users are directed only to the navigation options, records, and actions permitted for their assigned roles.
- **Inventory visibility.** Authorized users can view equipment identity, category, location, condition, total quantity, available quantity, borrowing status, and priority alerts from a centralized record.
- **Online borrowing request and acknowledgment.** Through the web portal, students select available equipment, specify the requested quantity, purpose, and proposed return date and time, acknowledge their obligations for proper use, care, timely return, and accountability, and submit the request without an initial office visit.
- **Online review, decision, and status monitoring.** Authorized personnel review each submitted request and record an approval or rejection. Students can monitor the resulting status online. An approved status indicates that the request is ready for claiming; it does not indicate that the equipment has already been physically released or assigned to the student's custody.
- **Claiming and physical release at the custodian's office.** The student visits the custodian's office only after approval. Before release, the custodian verifies the student's identity and approved request, confirms actual availability and quantity, records the pre-release condition and issuance date and time, and then updates available quantity and borrower custody.
- **Monitoring, reminders, and return.** The dashboard prioritizes pending and overdue transactions. When equipment is returned, authorized personnel compare the returned quantity and condition with the release record and classify the transaction as completed, incomplete, overdue, damaged, lost, or requiring maintenance.
- **Accountability resolution and clearance.** A late, incomplete, lost, or damaged return will generate an accountability case. The borrower is notified and given an opportunity to provide an explanation and supporting evidence. Authorized personnel then record the institutionally approved resolution, such as return, repair, replacement in kind, assessed payment, maintenance referral, or relief from liability. Clearance remains unavailable only while a valid approved obligation is unresolved.
- **Reporting, reconciliation, and audit.** The system generates reports on online requests, approval status, approval-to-release intervals, inventory, borrowing, overdue items, condition changes, damage, loss,

maintenance, accountability, settlement, and clearance, while preserving time-stamped audit records of significant actions.

Borrower Liability, Due Process, and Sustainability

Borrower liability can discourage negligence and help preserve departmental equipment, but it must be governed by an approved institutional policy rather than determined by the software alone. The policy should define borrower duties, due dates, acceptable wear and tear, inspection standards, notice requirements, opportunities to explain, authorized decision makers, available remedies, review or appeal procedures, settlement documentation, and grounds for relief. The system's role is to preserve evidence and apply authorized statuses consistently; it does not independently determine legal fault.

A proportionate response protects both the institution and the borrower. Ordinary wear and tear, pre-existing defects, force majeure, or loss without established negligence should not be treated in the same manner as deliberate misuse, unauthorized transfer, failure to return, or damage caused by negligent handling. This distinction is consistent with the broader accountability principle that liability for property loss or damage depends on documented custody and the circumstances of the event (COA, 2015; Republic of the Philippines, 1978).

To support sustainability, the department should use system-generated reports to monitor overdue duration, return completion, loss and damage incidence, repair and replacement costs, repeated cases, utilization, and preventive-maintenance requirements. These measures can help determine whether accountability controls preserve serviceable equipment and reduce avoidable purchases over time, consistent with life-cycle asset-management principles (ISO, 2024).

System Interface Screenshots

The following screenshots present the evaluated implementation and illustrate the principal user and custodian workflows.

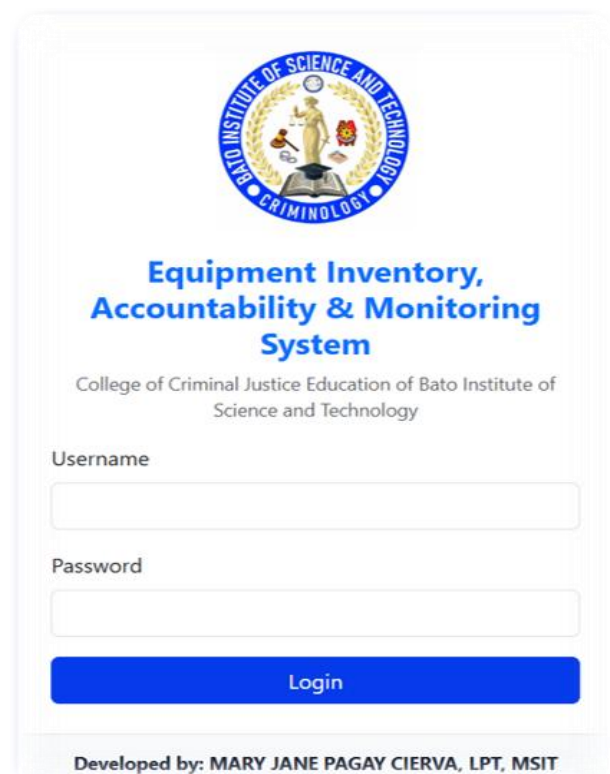


Figure 2. *Secure login interface for the Equipment Inventory, Online Request, Accountability, and Monitoring System.*

The login page presents the system's institutional identity and provides the authentication entry point for administrators, faculty and staff, custodians, and students.

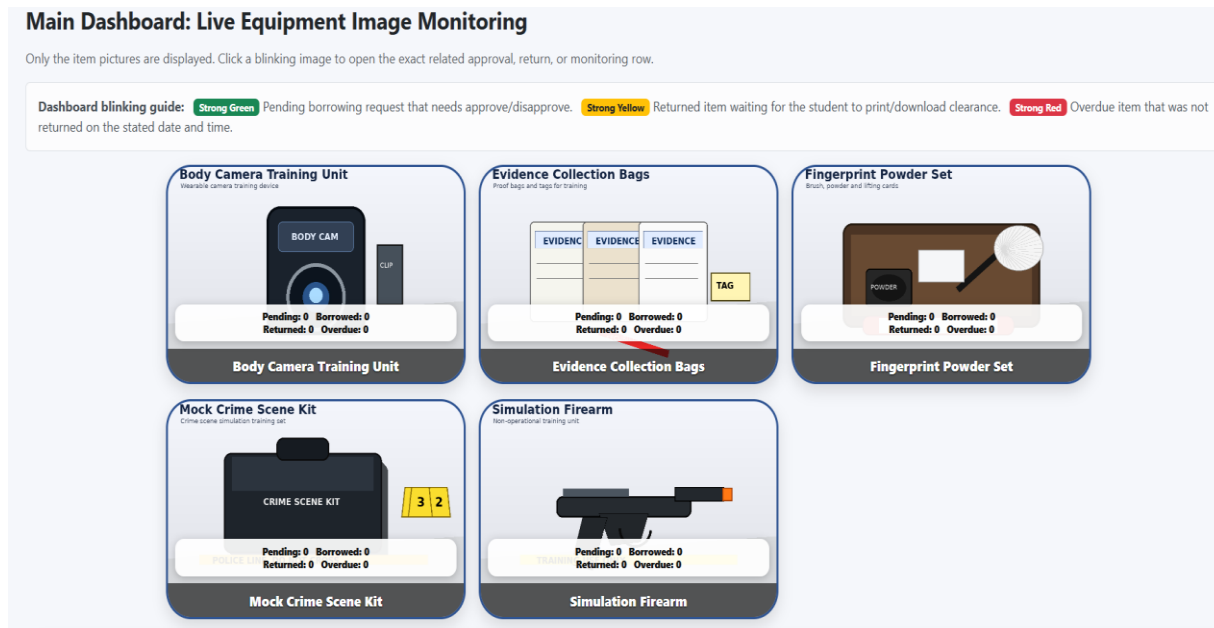


Figure 3. Live equipment image-monitoring dashboard in its normal state.

The dashboard displays equipment through image cards and summarizes pending, borrowed, returned, and overdue quantities. Its status guide enables users to interpret transaction conditions quickly.

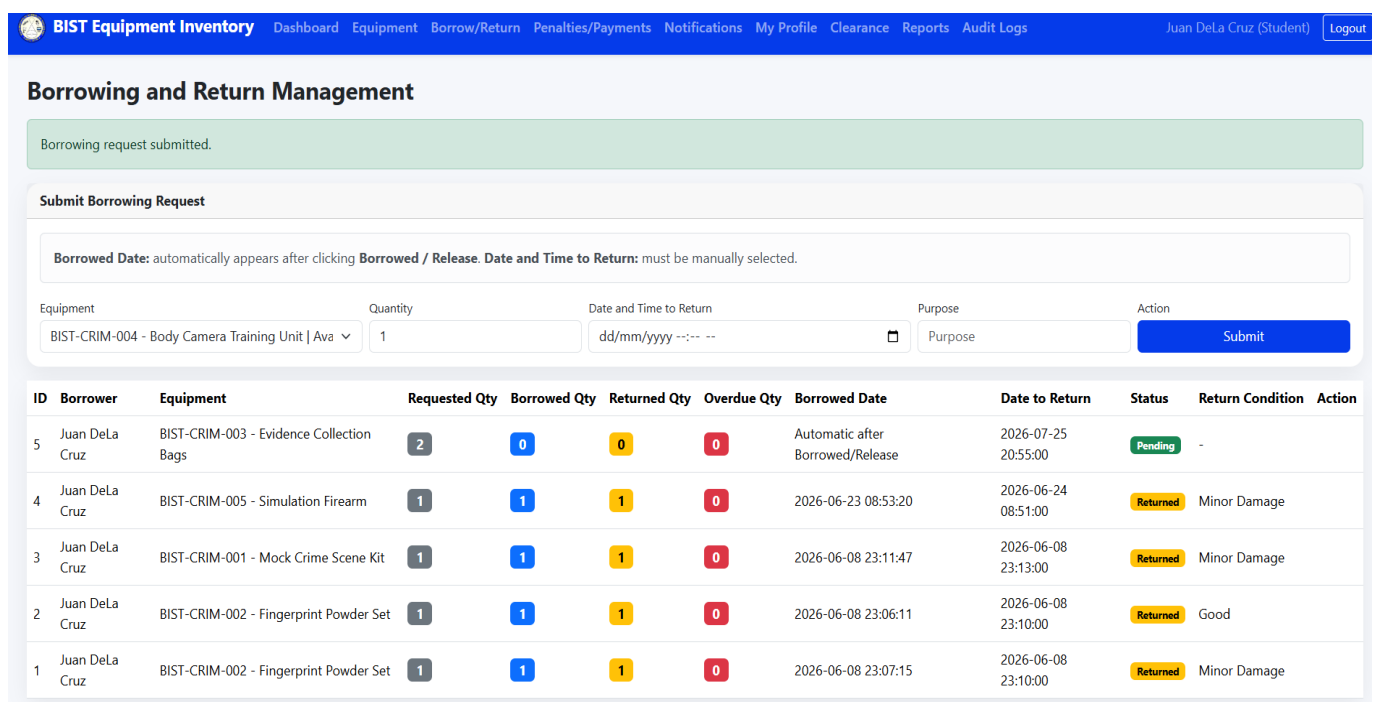


Figure 4. Student interface for online borrowing requests, status monitoring, and returns.

The student interface enables borrowers to view equipment, submit requests online, and monitor whether each request is pending, approved, or rejected. Students proceed to the custodian's office only after approval. The transaction history records the requested and released quantities, due date and time, current status, returned quantity, overdue quantity, and return condition to preserve borrower accountability.

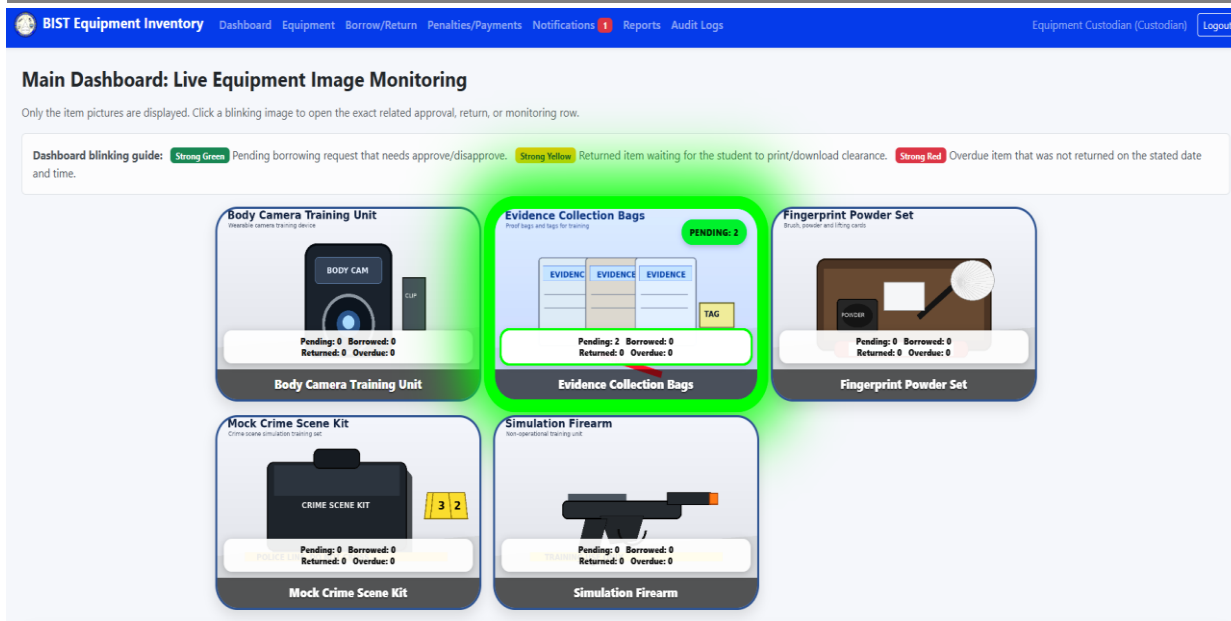


Figure 5. Custodian dashboard for reviewing pending online borrowing requests.

The green alert identifies equipment with a pending online request that requires review. After authorized personnel approve the request, the student can view the approved status and proceed to the custodian's office. The custodian then verifies the approved request before recording the physical release. The dashboard also uses red to prioritize overdue items and yellow to identify returned items awaiting clearance action.

METHODS

Research Design

The study employed a descriptive-evaluative quantitative research design. The descriptive component summarized the ratings provided by authorized users after they completed tasks appropriate to their assigned roles. The evaluative component interpreted the ratings using the eight product-quality characteristics of ISO/IEC 25010:2011 and the established five-point scale. The design measured user-perceived software quality and the perceived adequacy of the implemented workflow; it did not constitute a causal experiment or a pretest-posttest comparison of equipment losses, late returns, damage, or replacement costs.

Research Setting and Respondents

The study was conducted in the College of Criminal Justice Education at Bato Institute of Science and Technology, Inc., Dolho, Bato, Leyte. A total of 100 respondents participated in the evaluation, and all complete responses were included in the analysis. First-year Bachelor of Science in Criminology students comprised the primary student-user group because they use departmental training equipment during supervised academic activities. Faculty and staff, the equipment custodian, and administrative users evaluated the operational functions assigned to their respective roles, including request review, approval-status recording, physical release, return verification, condition monitoring, reporting, accountability review, and account administration.

Research Instrument

The primary data-gathering instrument was a structured 26-item questionnaire based on the eight product-quality characteristics of ISO/IEC 25010:2011: functionality or functional suitability (4 items), reliability (4 items), usability (4 items), efficiency or performance efficiency (3 items), maintainability (3 items), portability (2 items), security (4 items), and compatibility (2 items). The items were aligned with actual system tasks, including equipment recording, online request submission, approval-status monitoring, separation of approval from physical release, role-based borrowing and return processing, validation, availability monitoring, confidentiality, authentication, audit logging, deployment, and module integration (ISO/IEC, 2011).

Table 1. Five-point rating scale

Rating	Response	Mean Range and Interpretation
5	Excellent	4.21–5.00: Excellent
4	Very Good	3.41–4.20: Very Good
3	Good	2.61–3.40: Good
2	Fair	1.81–2.60: Fair
1	Poor	1.00–1.80: Poor

Data Collection Procedure

Authorized participants received an orientation on the system and completed tasks relevant to their roles. Student tasks included signing in, viewing available equipment, submitting a web-based request, monitoring whether the request was pending, approved, or rejected, proceeding to the custodian's office only after approval, checking due dates, initiating a return, and reviewing clearance eligibility. Operational-user tasks included reviewing online requests; recording approval or rejection; verifying identities and physically releasing approved equipment; documenting pre-release condition; monitoring overdue transactions; verifying returned quantity and condition; reviewing accountability and settlement records; updating equipment information; accessing reports; and examining audit logs. Respondents then completed the structured questionnaire. Only fully accomplished questionnaires were included in the analysis.

Data Analysis

Frequency counts and weighted means were used to summarize the responses. For each item, the frequency of each rating was multiplied by its assigned numerical weight; the resulting products were summed and divided by the number of valid respondents.

$$\text{Weighted Mean} = \Sigma(f \times x) / N$$

Characteristic means and the overall mean were interpreted using the established five-level ranges. The analysis was descriptive. No inferential comparisons among user roles or causal comparisons between the former manual process and the web-based process were conducted because the study did not include the required role-based subgroup data, baseline measures, or longitudinal operational outcomes.

Data Validation and Scope of Inference

The frequency totals and weighted means presented in Tables 3 through 10 were checked for arithmetic consistency. Each item represented 100 valid responses, and the reported item and characteristic means were consistent with the recorded frequencies using conventional two-decimal rounding. The findings are therefore reported as evidence of perceived software quality among the evaluated users. Claims that the system has already reduced losses, damage, overdue duration, or replacement expenditure were not made because pre-implementation baseline and longitudinal operational data were not included in the study.

Ethical and Data-Protection Considerations

Participation in the evaluation was voluntary. Respondents were informed of the study's purpose and advised that their ratings would not affect their academic standing or employment. Results were reported in aggregate. Borrower profiles, transaction histories, condition findings, explanations, settlement evidence, and audit records contain personal information and potentially adverse accountability information; access should therefore be role-restricted, necessary, accurate, retained only for an approved period, and protected from unauthorized disclosure or alteration. These safeguards are consistent with the Data Privacy Act of 2012 and established access-control and audit practices (NIST, 2020; Republic of the Philippines, 2012). Any liability

decision should include notice, an opportunity to explain, authorized review, documented reasons, and a proportionate institutional remedy.

RESULTS AND DISCUSSION

Summary of Software Quality Assessment

The system received Excellent ratings across all eight assessed quality characteristics. As shown in Table 2, performance efficiency and compatibility obtained the highest weighted means at 4.89, followed by security at 4.88. Reliability, maintainability, and portability each obtained 4.87, whereas functional suitability and usability each obtained 4.86. The overall weighted mean was 4.87, interpreted as Excellent.

Table 2. *Summary of ISO/IEC 25010:2011-based evaluation results*

Quality characteristic	Weighted mean	Interpretation
Functional suitability	4.86	Excellent
Reliability	4.87	Excellent
Usability	4.86	Excellent
Performance efficiency	4.89	Excellent
Maintainability	4.87	Excellent
Portability	4.87	Excellent
Security	4.88	Excellent
Compatibility	4.89	Excellent
Overall	4.87	Excellent

The narrow range of characteristic means, from 4.86 to 4.89, indicates consistently favorable user perceptions rather than strength limited to a single quality area. However, the concentration of responses in the Excellent and Very Good categories may reduce discrimination among features. Accordingly, the findings should be interpreted as evidence of perceived software quality within the evaluated setting. Confirmation of broader institutional effectiveness requires subsequent evidence on inventory discrepancies, overdue duration, unreturned items, loss and damage incidence, accountability-resolution time, repair and replacement costs, and equipment availability.

Table 3. *System assessment in terms of functional suitability*

Assessment item	E	V	G	F	P	Mean	Interpretation
The system accurately records equipment details, asset tags, quantities, availability, status, condition, and location.	90	6	4	0	0	4.86	Excellent
The online request, approval, status-monitoring, physical-release, return, and clearance functions produce the expected results.	89	7	4	0	0	4.85	Excellent
The equipment, transaction, accountability, notification, reporting, and audit modules work together as intended.	88	8	4	0	0	4.84	Excellent

Assessment item	E	V	G	F	P	Mean	Interpretation
The system restricts access to inventory and borrower records according to authorized user roles.	90	7	3	0	0	4.87	Excellent
Average						4.86	Excellent

Note. E = Excellent; V = Very Good; G = Good; F = Fair; P = Poor. N = 100.

Functional suitability obtained an average weighted mean of 4.86. Role-restricted access received the highest item mean at 4.87, while module integration received 4.84. These ratings support the perceived adequacy of functions that were absent from the former logbook process, including centralized equipment records, online request submission, approval-status monitoring, controlled physical release, return documentation, overdue tracking, condition verification, accountability resolution, clearance, reporting, and audit history. Because module integration received the lowest mean within this characteristic, regression testing should verify that each request, approval, rejection, release, return, damage, loss, settlement, and clearance action produces consistent updates across all related records.

Table 4. System assessment in terms of reliability

Assessment item	E	V	G	F	P	Mean	Interpretation
Routine inventory transactions are completed with minimal faults.	90	6	4	0	0	4.86	Excellent
The system appropriately handles errors during equipment, online request, approval-status, and borrowing transactions.	90	8	2	0	0	4.88	Excellent
The system notifies users when required information is missing or invalid.	90	8	2	0	0	4.88	Excellent
The software can resume operation and restore data after a recoverable failure.	90	7	3	0	0	4.87	Excellent
Average						4.87	Excellent

Note. E = Excellent; V = Very Good; G = Good; F = Fair; P = Poor. N = 100.

Reliability obtained an average weighted mean of 4.87. Error handling and input notification both received 4.88, indicating favorable perceptions of the system's validation of online requests, status transitions, quantities, due dates, release and return records, condition information, and settlement evidence. Reliability is critical because an incorrect availability count, a request mistakenly recorded as released, a missing issuance record, or premature clearance could reproduce the traceability weaknesses that the system was designed to address. Backup restoration, transaction consistency, duplicate prevention, and status-transition testing should therefore be maintained despite the high user ratings.

Table 5. System assessment in terms of usability

Assessment item	E	V	G	F	P	Mean	Interpretation
Users can quickly understand how to use the system.	92	6	2	0	0	4.90	Excellent
Users can learn to operate the system quickly.	91	7	2	0	0	4.89	Excellent
Users can perform inventory, online request, status-monitoring, and borrowing tasks with minimal effort.	90	7	3	0	0	4.87	Excellent

Assessment item	E	V	G	F	P	Mean	Interpretation
The system interface is visually clear and appropriate.	82	14	4	0	0	4.78	Excellent
Average						4.86	Excellent

Note. E = Excellent; V = Very Good; G = Good; F = Fair; P = Poor. N = 100.

Usability obtained an average weighted mean of 4.86. Rapid comprehension received the highest item mean at 4.90. Interface clarity, although still interpreted as Excellent, received the lowest item mean in the entire assessment at 4.78. The workflow was generally perceived as understandable; however, request and accountability statuses should be communicated through clear labels. Pending, approved, rejected, ready for claiming, physically released, due, overdue, returned, and unresolved-obligation statuses should be presented in plain language, supported by color-independent indicators and confirmation prompts.

Table 6. System assessment in terms of performance efficiency

Assessment item	E	V	G	F	P	Mean	Interpretation
The system responds promptly to user actions.	91	7	2	0	0	4.89	Excellent
The processing time for online requests, inventory updates, and accountability transactions is appropriate.	91	7	2	0	0	4.89	Excellent
The software uses available computing resources efficiently.	91	6	3	0	0	4.88	Excellent
Average						4.89	Excellent

Note. E = Excellent; V = Very Good; G = Good; F = Fair; P = Poor. N = 100.

Performance efficiency was one of the two highest-rated characteristics, with an average weighted mean of 4.89. Respondents perceived the system as responsive and appropriately timed for routine online request, inventory, and accountability tasks. The web-based workflow may reduce unnecessary pre-approval office visits by allowing students to submit and monitor requests remotely; however, the study did not quantify time or travel savings. Because the rating was based on user perception and no independent load test was conducted, performance should be verified under documented levels of concurrent use, network conditions, server specifications, database size, image volume, and audit-log growth before institutional capacity claims are made.

Table 7. System assessment in terms of maintainability

Assessment item	E	V	G	F	P	Mean	Interpretation
System faults can be diagnosed through validation messages, logs, and transaction records.	90	8	2	0	0	4.88	Excellent
The system continues to function correctly after authorized changes are implemented.	90	7	3	0	0	4.87	Excellent
The software can be tested efficiently after modification.	90	7	3	0	0	4.87	Excellent
Average						4.87	Excellent

Note. E = Excellent; V = Very Good; G = Good; F = Fair; P = Poor. N = 100.

Maintainability obtained an average weighted mean of 4.87. The modular organization of equipment records, online requests, approval statuses, physical releases, returns, accountability cases, reports, notifications, and user accounts can support fault diagnosis and controlled modification. Continued maintainability requires documented database migrations, version control, change approval, backup procedures, removal of obsolete

copies, and regression testing of request-state transitions, inventory quantities, overdue rules, condition records, liability decisions, settlements, and clearance controls.

Table 8. *System assessment in terms of portability*

Assessment item	E	V	G	F	P	Mean	Interpretation
The web-based system can be accessed and used properly on different supported devices and web browsers.	89	8	3	0	0	4.86	Excellent
The system can be used by authorized users without requiring complicated installation or configuration.	90	7	3	0	0	4.87	Excellent
Average						4.87	Excellent

Note. E = Excellent; V = Very Good; G = Good; F = Fair; P = Poor. N = 100.

Portability obtained an average weighted mean of 4.87, interpreted as Excellent. The results indicate that the web-based system can be accessed and used properly by authorized users through different supported devices and web browsers without requiring a separate client installation or complicated configuration. This allows students, faculty and staff, custodians, and administrators to use the system conveniently based on their assigned roles. Regular compatibility testing should be conducted to ensure consistent access, functionality, and display across commonly used devices, browsers, screen sizes, and operating systems.

Table 9. *System assessment in terms of security*

Assessment item	E	V	G	F	P	Mean	Interpretation
The system protects the confidentiality of user and accountability data.	90	7	3	0	0	4.87	Excellent
The system prevents unauthorized access to or modification of programs and data.	90	8	2	0	0	4.88	Excellent
The system requires users to authenticate before access is granted.	90	8	2	0	0	4.88	Excellent
The system maintains an audit log of significant user actions.	90	7	3	0	0	4.87	Excellent
Average						4.88	Excellent

Note. E = Excellent; V = Very Good; G = Good; F = Fair; P = Poor. N = 100.

Security obtained an average weighted mean of 4.88. Authentication, role-based access, password protection, restricted accountability records, and audit logging supported this rating. Nevertheless, a perception score does not substitute for technical security verification. The institution should enforce least-privilege access, secure transport, protected and tested backups, server-side input validation, safe file-upload handling, session controls, periodic account review, tamper-resistant audit records, retention rules, and regular security assessments. These controls are necessary because borrower and accountability records contain protected personal information (NIST, 2020; Republic of the Philippines, 2012).

Table 10. *System assessment in terms of compatibility*

Assessment item	E	V	G	F	P	Mean	Interpretation
The system performs its required functions while sharing the browser, server, and database environment without adversely affecting other components.	91	5	4	0	0	4.87	Excellent

Assessment item	E	V	G	F	P	Mean	Interpretation
The modules exchange and use shared equipment, user, online request, approval-status, release, return, accountability, and notification data.	92	6	2	0	0	4.90	Excellent
Average						4.89	Excellent

Note. E = Excellent; V = Very Good; G = Good; F = Fair; P = Poor. N = 100.

Compatibility tied with performance efficiency for the highest characteristic mean at 4.89. The 4.90 rating for information exchange reflects the perceived effectiveness of shared data relationships among equipment, users, online requests, approval statuses, physical releases, returns, accountability cases, settlements, notifications, clearance, and audit logs. This integration is central to the system because it replaces isolated logbook entries and repeated office follow-ups with a coherent request and custody history for each item and borrower.

Overall Effectiveness and Institutional Implications

Taken together, the evaluation indicates that users perceived the system as highly effective for its intended functions within the assessed environment. Its institutional contribution begins before physical custody: students submit requests online, monitor pending, approved, or rejected statuses, and visit the custodian's office only after approval. The custodian then verifies the approved request and records the actual issuance, after which the electronic chain of custody continues through due-date monitoring, return processing, condition comparison, accountability review, settlement, and clearance. The live dashboard highlights pending and overdue transactions, while reports and audit logs strengthen traceability. These functions directly address the former difficulty of tracking requests, identifying late returns, determining responsibility for unreturned items, and documenting actions involving loss or damage. The workflow is consistent with asset-management principles that emphasize life-cycle visibility, risk management, ownership information, state-change monitoring, and evidence-based control (ISO, 2024; NIST, 2018).

The system's contribution is not limited to inventory listing or faster data entry. It also serves as a student request and monitoring portal in which availability, request details, approval status, physical release, quantity, borrower identity, due dates, pre-release and return conditions, accountability findings, settlement status, and clearance eligibility are linked within a single record. This arrangement is more comprehensive than either a stand-alone inventory list or a conventional borrowing logbook and removes the need for students to make an initial office visit merely to submit or follow up a request. Related higher-education projects have likewise reported that integrated digital workflows improve status visibility, request processing, record completeness, and administrative oversight (Accad et al., 2023; Cepeda & Saludes, 2025; German et al., 2021; Salvador, 2016). The present implementation is specifically configured for the custody and accountability requirements of the College of Criminal Justice Education.

The accountability workflow can support sustainability only when policy, evidence, and implementation are applied consistently. A clearance hold or financial obligation should follow an authorized finding rather than an automated assumption. Conversely, when negligence, misuse, failure to return, or unresolved damage is established under an approved policy, documented repair, replacement, or assessed settlement can prevent the department from repeatedly absorbing the full cost. Longitudinal reports should therefore be used to determine whether the workflow actually reduces avoidable replacement expenditure and preserves instructional availability (COA, 2015; ISO, 2024; Republic of the Philippines, 1978).

LIMITATIONS OF THE STUDY

The study was limited to one department within one institution. The findings were based on 100 complete user evaluations and may have been influenced by respondent familiarity, social desirability, or the concentration of ratings at the upper end of the scale. The available data did not include role-specific counts for subgroup analysis, an independent reliability coefficient for the questionnaire, a quantified pre-implementation baseline,

or longitudinal operational records. Consequently, the study does not establish that the system has already reduced request-processing time, unnecessary office visits, overdue duration, unreturned items, loss, damage, repair costs, replacement expenditure, or inventory discrepancies. The evaluation also did not include an independent load test, penetration test, accessibility audit, or disaster-recovery exercise. These limitations do not invalidate the descriptive findings, but they restrict causal interpretation and institution-wide generalization.

CONCLUSION

The web-based Equipment Inventory, Online Request, Accountability, and Monitoring System obtained an overall weighted mean of 4.87, interpreted as Excellent, across the eight product-quality characteristics of ISO/IEC 25010:2011. Performance efficiency and compatibility received the highest means at 4.89, followed by security at 4.88. Reliability, maintainability, and portability each obtained 4.87, while functional suitability and usability each obtained 4.86. These findings demonstrate strong perceived software quality among the evaluated users.

Within the College of Criminal Justice Education, the system functions as more than an equipment inventory. It provides controls that were absent from the former manual logbook process, including web-based request submission, pending, approved, and rejected status monitoring, an approval-before-claim workflow, centralized inventory records, real-time availability, borrower identification, verified physical release, due-date and overdue monitoring, release and return condition documentation, accountability review for unreturned, lost, or damaged equipment, settlement and clearance controls, reports, and audit evidence. Students can submit and monitor requests without making an initial office visit and proceed to the custodian's office only after approval. The system's principal contribution is a traceable, role-based workflow that connects each online request to the actual custody of equipment, the responsible borrower, and the authorized institutional action. When supported by a fair written policy, this workflow can strengthen borrower accountability and reduce the risk of repeated replacement purchases caused by unresolved negligence. Actual reductions in office visits, processing time, late returns, loss, damage, and replacement expenditure should be established through longitudinal operational measurement.

RECOMMENDATIONS

- Adopt a formal equipment-request and accountability policy. Designate the system as the official departmental record and define required request fields, borrower eligibility, approval authority, the meaning of pending, approved, and rejected statuses, request validity and claiming periods, the rule that no physical release occurs before approval and custodian verification, inspection procedures, due dates, return verification, overdue escalation, maintenance referral, record retention, and audit review.
- Establish fair and proportionate borrower liability. Require borrowers to acknowledge their duties of care and timely return. For late, unreturned, lost, or damaged equipment, provide written notice, an opportunity to explain, custody and condition evidence, authorized review, documented reasons, and an appropriate resolution, such as return, repair, replacement in kind, assessed settlement, maintenance referral, or relief from liability. The system should not impose liability automatically.
- Enforce the request-to-custody chain and overdue follow-up. Record the request timestamp, item identity, requested quantity, borrower, purpose, decision, approver, status-change timestamp, claiming date, releasing custodian, released quantity, pre-release condition, release timestamp, due date and time, return verifier, returned quantity, return condition, and final resolution. Available quantity and borrower custody should be updated only when the custodian records the actual physical release, not when a request is merely approved. Use reminders and escalating alerts, and require documented follow-up for every overdue or incomplete transaction.
- Protect departmental sustainability. Conduct scheduled physical inventories and reconcile the results with system balances. Monitor utilization, overdue duration, loss and damage incidence, repair and replacement costs, repeated cases, and preventable purchases. Use these reports to guide maintenance, budgeting, and procurement decisions.

- Strengthen security, privacy, and operational continuity. Implement least-privilege access, secure transport, password and session controls, server-side validation, safe file handling, protected and tested backups, retention rules, account review, audit-log monitoring, and periodic security and recovery exercises in accordance with institutional policy and the Data Privacy Act of 2012.
- Provide role-specific training and communication. Develop concise guides for borrowers, faculty and staff, custodians, and administrators. Train students to submit requests online, monitor pending, approved, and rejected statuses, and visit the custodian only after approval. Train approvers and custodians to distinguish an approved request from a completed physical release. Guidance should also cover due dates, authorized use, care standards, condition verification, explanation and review procedures, settlement evidence, privacy, and clearance rules.
- Conduct longitudinal and technical validation. Over at least one academic year, compare baseline and post-implementation measures for online request completion, request-to-decision time, approval-to-release time, unnecessary office visits, inventory accuracy, overdue duration, unreturned items, loss and damage incidence, accountability-resolution time, repair and replacement costs, and equipment availability. Future studies should include additional departments, stronger evidence of instrument reliability and validity, accessibility testing, security assessment, backup-recovery testing, and documented load testing.

Declaration of Generative AI and AI-Assisted Technologies

During manuscript preparation, the authors used ChatGPT to assist with academic organization, language refinement, consistency checking, and document formatting. The authors critically reviewed and revised all AI-assisted output and remain fully responsible for the research design, source data, analysis, interpretation, originality, ethical compliance, and final manuscript.

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