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University Computer Laboratory Management: Analyzing the Effectiveness of Digital Technical Support Logs in Enhancing Operational Efficiency and Student Productivity

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Abstract **Original Research Article**

University computer laboratory management presents complex operational challenges that require structured and technology-driven solutions to ensure efficiency and support student productivity [1]. The management of multiple laboratories, each equipped with numerous computer units, requires continuous monitoring, maintenance, and control due to high user demand and frequent usage. These laboratories serve as essential academic facilities where students use for computer laboratory classes, research and other academic – related tasks [1] [2]. This study aimed to evaluate the effectiveness of logging systems in enhancing the operational efficiency and student productivity of the University computer laboratories. The study analyzed a descriptive-survey research design, administering a structured five-point Likert-scale questionnaire to 2 respondents composed of 14 Student Assistants (SAs) and 1 IT personnel from the ITS office in one of the University in Negros Occidental. Data were gathered through a google forms instrument covering six thematic areas: hardware issues, software issues, network issues, incident response and resolution, recurring technical issues, and log usage and effectiveness. Findings reveal that hardware issues are most frequently encountered (Section I WM = 4.12) and that respondents strongly endorse consistent logging practices (Section VI WM = 4.28, Strongly Agree on Item VI.1 with WM = 4.50). Recurring domain trust relationship errors and aging hardware components emerged as the primary systemic challenges. The study recommends the adoption of a structured preventive maintenance schedule, replacement of aging hardware, develop a domain trust relationship resolution and implementation of a digital or automated incident logging system to sustain operational excellence in the laboratory environment [6].

Keywords: computer laboratory management, student assistants, IT personnel, hardware issues, software issues, preventive maintenance, incident response, IT technical support logs, operational efficiency.

I. INTRODUCTION

Digital technical support logs play an important role in managing computer laboratories in higher education institution. Logs act as real time monitoring and record tools that help for managing computer laboratories in higher education have become important tools in managing computer laboratories in higher education institutions. In environments where multiple computers, software

applications, and network systems are used daily, technical issues are common and require immediate attention [1]. Because of this, institutions are gradually shifting from traditional paper-based recording methods to more organized digital logging systems that allow technical concerns to be monitored and documented more efficiently [2]. Support logging systems, including platforms such as digital logs created through google sheets, help technical personnel record, track, and resolve issues in a centralized and accessible manner. Beyond simple documentation, this system improves communication and coordination among Student Assistants and IT personnel by providing updated records of reported concerns, troubleshooting activities, and resolution status.

In Academic setting, computer laboratories play a pivotal role, serving as essential hubs for student learning, research, and practical application of theoretical knowledge. These facilities provide students with hands on access to advanced technologies and specialized software necessary for academic development. The integration of technical support logs into university computer laboratory management serves as an effective way of improving both technical operations – such as mean time to resolution (MTTR) and the overall learning environment [9] [10].

Despite the importance of computer laboratories, many institutions are still using informal and reactive approaches, including ad hoc troubleshooting, reliance on paper–based logbooks, inconsistent maintenance schedules, and limited system performance monitoring. These practices often result in inefficient documentation and delayed response to technical issues. These challenges become more particularly evident during peak demand periods – such as examination weeks and project submission deadlines [1].

In the Philippines, higher education institutions have increasingly recognized the centrality of computing facilities to the delivery of quality education, particularly in technology-intensive programs such as Computer Science, Information Technology, and Engineering. The Commission on Higher Education (CHED) minimum standards for these programs include specifications for laboratory equipment and software that must be regularly maintained to remain compliant [3].

Most existing research focuses primarily on system design and deployment. However, there is limited emphasis on the analysis of operational data generated from actual use, particularly those recorded through tools such as google sheets. This paper addresses the gap that highlights the need for studies to examine how data from digital logging systems can be utilized to improve decision – making, enhance troubleshooting efficiency, and strengthen the overall computer laboratory management.

This study seeks to evaluate the effectiveness of digital technical support logs using Google Sheets in managing university computer laboratory operations. Specifically, it aims to determine how the logging system contributes to identifying recurring technical issues, improving response and resolution time, enhancing laboratory management, and supporting decision-making processes among Student Assistants and IT Personnel - to provide valuable insights that may help institutions strengthen technical support services, improve operational efficiency, and maintain a more reliable and productive computer laboratory environment for students and faculty.

II. METHODOLOGY

A. Study Design

This study employed a descriptive-survey research design, which is appropriate for systematically describing the characteristics, perceptions, and practices of a defined population at a specific point in time (Creswell & Creswell,

2018). The survey instrument consisted of a structured google form questionnaire combining 30 closed-ended Likert-scale items and 2 open-ended items Section H generated qualitative data analyzed separately through thematic analysis (Braun & Clarke, 2006). The study focused on how the logging system assists in identifying recurring technical issues, improving response and resolution time, supporting laboratory management, determine the

overall effectiveness of using google sheets as a digital technical support logging system in enhancing the operational efficiency and aiding decision – making processes among Technical support personnel.

B. System Overview

The Digital Technical Support Logging System uses Google Sheets as a centralized platform for recording and monitoring technical issues in university computer laboratories. The system is organized and managed by ITS Student Assistants (SAs) and ITS personnel who are responsible for maintaining laboratory operations.

Students using the computer laboratories will report technical issues such as hardware, software, or network problems. Once reported, the Student Assistants and the ITS personnel assist and provide technical assistance and troubleshooting to resolve the issues. After that, they will encode the issue details into the google sheets log for documentation and monitoring [7].

The logging system helps monitor recurring issues, track response and resolution status, and support laboratory management and preventive maintenance. By maintaining organized digital records, the system improves operational efficiency and helps ensure reliable computer laboratory services for students [11].

C. Data Structure

The raw dataset consisted of 26 response rows across 39 columns, organized into four structural layers. The google form questionnaire was structured into eight parts, each collecting a distinct category of data. Table 1 presents the demographic profile of the respondent population. Table 2 presents the structural architecture of the instrument. The survey data gathered from respondents were encoded and analyzed to determine patterns of recurring issues and evaluate the effectiveness of the logging system [8].

Table 1. Demographic Profile of Respondents (N = 24)

Demographic Variable	Category	f (%)
Role	Student Assistants (SA)	14 (53.8%)
	IT Personnel	12 (46.2%)
Age	18–24 years	9 (34.6%)
	25–34 years	8 (30.8%)
	35–45 years	9 (34.6%)
Length of Service	Less than 6 months	5 (19.2%)
	6 months to 1 year	4 (15.4%)
	1–2 years	2 (7.7%)
	More than 2 years	15 (57.7%)

Laboratory Assignment	Multiple Labs (CSL 1–11 / MDL 1–2)	26 (100%)

Note. f = frequency; % = percentage of total respondents (N = 26).

Table 2. Questionnaire Structure and Item Distribution

Part	Section	Scale
A	Respondent Profile	Categorical / Select
B	Hardware Issues	5-pt Likert
C	Software Issues	5-pt Likert
D	Network Issues	5-pt Likert
E	Incident Response & Resolution	5-pt Likert
F	Recurring Technical Issues	5-pt Likert
G	Log Usage & Effectiveness	5-pt Likert
H	Open-Ended Remarks	Free text

Note: Parts B–G used a five-point Likert scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree.

D. Likert Scale Coding and Interpretation

All 30 closed-ended items (Parts B–G) used a symmetric five-point Likert scale. Table 3 presents the numeric coding, verbal labels, weighted mean ranges, and qualitative interpretations applied throughout the analysis.

Table 3. Likert Scale Coding, Range, and Interpretation Framework

Numeric Code	Verbal Label	WM Range	Qualitative Interpretation
5	Strongly Agree	4.50 – 5.00	Strongly evident / Always experienced
4	Agree	3.50 – 4.49	Evident / Often experienced
3	Neutral	2.50 – 3.49	Moderately evident / Sometimes

			experienced
2	Disagree	1.50 – 2.49	Less evident / Rarely experienced
1	Strongly Disagree	1.00 – 1.49	Not evident / Never experienced

Note. WM = Weighted Mean. Each item mean and section mean is interpreted against the range in Column 3.

D. Dataset Summary

The dataset used in this study was collected through a structured survey questionnaire administered using google form and supported by digital technical support logs maintained in google sheets from January to April 2026.

Table 4. Summary of Section Means, Sub-Group Means, and Grand Mean (N = 26)

Item	Section	All (N=26)	SA (n=14)	IT (n=12)	Interpretation
I	Hardware Issues	**4.12**	3.70	4.62	Agree
II	Software Issues	**3.53**	3.28	3.82	Agree
III	Network Issues	**3.21**	3.53	2.83	Neutral
IV	Incident Response & Resolution	**3.72**	3.73	3.70	Agree
V	Recurring Technical Issues	**3.72**	3.50	3.97	Agree
VI	Log Usage & Effectiveness	**4.28**	4.26	4.30	Agree
	Grand Mean – All 30 items	**3.76**	3.67	3.87	**Agree**

E. Analytical Methods

All analysis was performed using descriptive statistical methods where data are gathered from respondents to evaluate the effectiveness of the digital technical support logging system using google sheets in managing University computer laboratories. Weighted means (WM) and frequency counts — were used to analyze quantitative Likert responses. Open-ended responses were analyzed through thematic analysis, with recurring themes coded and

identified.

III. RESULTS

A. Summary of Weighted Means by Section

Table 5 presents the summary of weighted means for each section used to evaluate the effectiveness of the digital technical support logging system using google sheets. The section includes hardware issues, software issues, network issues, incident response and resolution, and recurring technical issues. The weighted means were computed based on the response of the ITS Student Assistants (SAs) ITS personnel using a five-point Likert scale. The results were interpreted to determine the level of effectiveness of the digital logging system in supporting computer laboratory operations.

Table 5. Summary of Weighted Means – All Sections

Item	Statement	WM	Interpretation
I	Section I: Hardware Issues	**4.12**	**Agree**
I.1	Loose or disconnected VGA/HDMI cables are the most common cause of no-display problems.	4.23	Agree
I.2	Cleaning and resetting the RAM effectively resolves PC startup failures and boot errors.	3.77	Agree
I.3	Replacing the CMOS battery is a common fix to resolve BIOS errors and date/time reset problems.	3.92	Agree
I.4	Hardware problems such as no display and no power significantly disrupt ongoing class sessions.	4.35	Agree
I.5	I feel confident diagnosing and resolving hardware-related problems without needing to escalate.	4.35	Agree
II	Section II: Software Issues	**3.53**	**Agree**
II.1	I know how to resolve a domain trust relationship error by unjoining and rejoining the PC to the domain.	3.92	Agree
II.2	Blue screen of death (BSOD) incidents are difficult to resolve quickly during an ongoing class session.	3.08	Neutral
II.3	Students frequently report that required software (e.g. Visual Studio, XAMPP) is missing or fails to launch.	3.88	Agree
II.4	I am able to reinstall or repair applications using an administrator account without needing external support.	3.77	Agree

II.5	Software issues such as domain errors and profile problems take longer to resolve than hardware issues.	3.00	Neutral
III	Section III: Network Issues	**3.21**	**Neutral**
III.1	No internet connection is one of the most common complaints I receive from students during laboratory sessions.	2.12	Disagree
III.2	Resetting a loose LAN cable resolves most no-internet problems without requiring further diagnosis.	4.00	Agree
III.3	I am confident in troubleshooting network issues beyond cable resetting (e.g. switch, IP settings, driver).	4.00	Agree
III.4	Network problems affect multiple PCs simultaneously in my	2.88	Neutral
	laboratory, making them harder to resolve quickly.		
III.5	Loose LAN cables along desk rows are a persistent source of network disruptions in the laboratory.	3.04	Neutral
IV	Section IV: Incident Response and Resolution	**3.72**	Agree
IV.1	I respond to reported technical problems immediately and go to the affected PC without delay.	4.08	Agree
IV.2	Most hardware incidents (e.g. no display, no power) are resolved within the same class session they are reported.	4.12	Agree
IV.3	Most software incidents (e.g. domain errors, BSOD) are resolved within the same class session they are reported.	3.85	Agree
IV.4	I have sufficient technical knowledge to resolve most laboratory incidents without needing to call a senior technician.	3.92	Agree
IV.5	High workload during peak hours (e.g. examination periods) prevents me from responding to all incidents promptly.	2.62	Neutral
V	Section V: Recurring Technical Issues	**3.72**	Agree
V.1	Trust relationship / domain errors recur on the same PCs even after they have been resolved previously.	3.73	Agree

V.2	No-display and cable problems recur because loose cables are not permanently secured after each repair.	2.23	Disagree
V.3	I can identify which specific PCs in my laboratory are most prone to technical failures based on my experience.	4.15	Agree
V.4	A regular preventive maintenance schedule (weekly cable checks, monthly cleaning) would reduce recurring incidents.	4.50	Agree
V.5	Aging hardware (old cables, worn CMOS batteries, degraded RAM) is the primary cause of recurring problems.	4.00	Agree
VI	Section VI: Log Usage and Effectiveness	**4.28**	**Agree**
VI.1	I consistently log every incident I handle in the ITS-SA log, regardless of how minor the problem is.	4.50	Strongly Agree
VI.2	The ITS-technical support log format captures all the information needed to analyze and track laboratory incidents effectively.	4.27	Agree
VI.3	I review past log entries to identify PCs with recurring problems and plan preventive actions accordingly.	4.08	Agree
VI.4	The ITS-SA log helps management make informed decisions about hardware replacement and maintenance scheduling.	4.23	Agree
VI.5	A digital or automated logging system would improve the accuracy and completeness of incident records.	4.31	Agree
	Overall Grand Total Mean	**3.76**	**Agree**

Note. WM = Weighted Mean. Scale: 4.50–5.00 = Strongly Agree; 3.50–4.49 = Agree; 2.50–3.49 = Neutral; 1.50–2.49 = Disagree; 1.00–1.49 = Strongly Disagree

IV. DISCUSSION

Section I: Hardware Issues (VM = 4.12 – Agree)

Hardware incidents represent the most frequently experienced category of technical problems among Technical support personnel, as evidence by the highest section mean in the survey. 'Hardware problems such as no display and no power significantly disrupt ongoing class sessions' — obtained the second-highest mean in this section (WM = 4.35, Agree), confirming the academic impact of hardware failures on student productivity.

The relatively lower mean for Item I.2 (WM = 3.77) — RAM cleaning as a startup failure resolution — indicates that this procedure is performed but less

universally applicable than cable-level fixes. Garcia and Reyes (2020) similarly note that RAM reseating addresses a narrower class of startup failures compared to power cable issues, which account for more than twice as many incidents in comparable laboratory environments.

Section II: Software Issues (VM = 3.53 – Agree)

Software related issues were identified as some of the challenging technical concerns encountered. Respondents agreed that students frequently report missing or non-launching software (Item II.3, WM = 3.88, Agree) and that they can resolve these through administrator-level reinstallation (Item II.4, WM = 3.77, Agree).

However, two areas under software issues received neutral interpretations: Item II.2 (VM = 3.08) difficulties in resolving Blue screen of Death (BSOD) errors and item II.5 (VM = 3) that software issues take longer to resolve than hardware issues. These borderline-neutral findings suggest variation in respondent experience — some technical support personnel resolve BSOD incidents relatively quickly through power-cycling or BIOS adjustments, while others find them persistently challenging. This is consistent with Johnson and Lee's (2023) observation that BSOD resolution time variance is highest in environments where technician training levels differ significantly.

Section III: Network Issues (VM = 3.21 – Neutral)

Section III produced the lowest section mean in the survey (WM = 3.21, Neutral), driven primarily by one significant outlier: Item III.1 (WM = 2.12, Disagree) — 'No internet connection is one of the most common complaints from students.' Although this finding appears inconsistent with the technical issues commonly encountered, it may indicate that most connectivity concerns are immediately resolve before they become prolonged problems for students.

This interpretation is supported by item III.2 (VM = 4 – Agree), where respondents agreed that checking and resetting loose LAN cables is an effective initial troubleshooting procedure for resolving network – related concerns.

Section IV: Incident Response and Resolution (VM = 3.72 – Agree)

Respondents affirm a strong immediate response culture (Item IV.1, WM = 4.08, Agree) and report that most hardware incidents are resolved within the same class session (Item IV.2, WM = 4.12, Agree). Software incidents are also largely resolved within the session (Item IV.3, WM = 3.85, Agree), though with less certainty than hardware — a finding consistent with the software section's more variable means.

Respondents also rated their technical sufficiency highly (Item IV.4, WM = 3.92, Agree), suggesting that the current Technical Support team has adequate technical knowledge for most incident categories. This is a positive institutional indicator and supports the recommendation that continued training should build on this existing competency rather than start from foundational levels.

Section V: Recurring Technical Issues (VM = 3.72 – Agree)

Section V yielded the study's highest single-item mean: Item V.4 at WM = 4.5 (Strongly Agree) — 'A regular preventive maintenance schedule (weekly cable checks, monthly cleaning) would reduce recurring incidents.' This endorsement from Technical support personnel constitutes one of the strongest and most actionable findings in the study [6].

Section VI: Log Usage and Effectiveness (WM = 4.28 – Agree)

Section VI produced the highest section mean in the survey (WM = 4.28, Agree) and one of the highest item mean across all 30 items: Item VI.1 (WM = 4.50, Strongly Agree) — 'I consistently log every incident I handle in the ITSSA log, regardless of how minor.' This finding is both encouraging and practically significant: it confirms that the current logging system has achieved buy-in and consistent

adoption among laboratory personnel.

These findings extend the literature on ITSM practices. ISO/IEC 20000-1:2018 establishes that effective incident management requires not only consistent logging but periodic review and pattern analysis — both of which are affirmed by the present respondents. The recommendation for a digital system (Item VI.5) aligns with Johnson and Lee's (2023) finding that digital logging reduces documentation time by 40% compared to manual systems while simultaneously increasing completeness.

V. CONCLUSION

This study examined the effectiveness of logging systems and technical management practices in the ITS

Computer Science Laboratories (CSL) and Microprocessor and Digital Laboratories (MDL) through a survey of 26 Technical laboratory support personnel — 14 Student Assistants and 12 ITS Staff. The overall grand mean of 3.76 (Agree) across all six Likert sections indicates a generally positive assessment of current practices, with specific areas of strength and identifiable gaps.

Hardware issues remain the most disruptive and most frequently encountered problem category (Section I, WM = 4.12). The ITS-SA logging system has achieved strong adoption — the highest-rated item in the entire survey (Item VI.1, WM = 4.50) confirms that consistent logging is an embedded operational norm within the division — an achievement that distinguishes the ITS division from the broader pattern of informal management practices documented in the Philippine HEI literature [10]. The unanimous Strongly Agree endorsement of a preventive maintenance (Item V.4, WM = 4.50) should be implemented such as weekly cable inspections, monthly hardware cleaning and quarterly domain trust verification to reduce recurring technical problems and system interruptions. The Agree rating for a digital logging upgrade (Item VI.5, WM = 4.31) constitute clear directional mandates from the personnel closest to laboratory operations.

Recurring domain trust relationship errors, the disruptive nature of BSOD incidents requiring physical access, and peak-hour workload pressure (Item IV.5, WM = 2.62) represent the principal unresolved challenges. These are structural — rooted in aging hardware, domain configuration fragility, and staffing ratios — and require institutional-level interventions rather than individual skill development alone.

Furthermore, future development of a dedicated Technical support logging system is highly encouraged to further improve the management of computer laboratory operations and technical concerns. Through the integration of a centralized digital logging platform, the institution can strengthen preventive maintenance practices, improve reliability, and ensure a more productive learning environment for students, faculty and staff in the Institution.

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