

Digital Literacy and Public Sector Productivity: Evidence from LGU Staff in Jolo

Merry-Rose Lozada Sibayan, MBA; Almina Sotto Muallam, DPA
Babylyn Nisal Aragon, MBA; Nedzma Bakil Jinnul; Sitti Raisa Asaddil Annil

Abstract

In the modern landscape of public administration, the global shift toward digital transformation has fundamentally redefined how governments operate and interact with citizens. Modernizing the public sector is no longer merely a matter of upgrading physical infrastructure; it depends heavily on the digital readiness of the institutional workforce (Heeks, 2006). This global movement is intrinsically linked to the United Nations Sustainable Development Goals (SDGs), specifically SDG 16 (Peace, Justice, and Strong Institutions), which targets the development of effective, accountable, and inclusive institutions at all levels, and SDG 8 (Decent Work and Economic Growth), which underscores the necessity of human capital optimization and workplace productivity (United Nations, 2015). Around the world, developing nations are recognizing that investing in digital literacy training for public servants is a core prerequisite to reducing bureaucratic friction, minimizing administrative errors, and ensuring equitable public service delivery (World Bank, 2016).

In the Philippines, this digital mandate is heavily driven by national policy and legislative frameworks. The state has actively pushed for bureaucratic modernization through initiatives like the E-Government Masterplan (Department of Information and Communications Technology [DICT], 2019) and Republic Act No. 11032 (The Ease of Doing Business and Efficient Government Service Delivery Act of 2018). These national directives legally mandate Local Government Units (LGUs) to streamline operations and transition to electronic platforms to eradicate red tape. However, the top-down enforcement of digital governance often exposes a critical implementation gap: while national agencies mandate the deployment of complex digital systems, the actual baseline digital literacy of the local municipal workforce varies dramatically (Alampay, 2006). Consequently, the success of national e-governance policies ultimately hinges on the frontline capabilities of LGU personnel, making continuous digital literacy training a vital component of national development.

At the local and regional level, this transition takes on a unique and critical significance within the Bangsamoro Autonomous Region in Muslim Mindanao (BARMM), specifically in the municipality of Jolo, Sulu. As part of BARMM's ongoing institution-building and regional modernization efforts—underscored by the Ministry of the Interior and Local Government's (MILG) Localizing E-Governance for Accelerated Provision of Services (LeAPS) program (MILG-BARMM, 2021)—the Jolo LGU has increasingly relied on capacity-building interventions to upgrade staff capabilities. However, public servants in Jolo operate within a complex environment marked by distinct socio-economic realities, historical transitions, and infrastructural challenges, such as intermittent internet connectivity and power stabilities. In this specific local context, digital literacy training is not just a standard human resource exercise; it serves as an active mechanism for institutional stabilization and localized bureaucratic empowerment.

Despite these significant investments in capacity building, a notable gap persists in the existing literature. While numerous studies evaluate digital literacy in highly connected urban centers or centralized national departments, there is a scarcity of empirical data examining how digital literacy training directly translates to actual day-to-day employee productivity in remote, resource-constrained, or transitioning municipal environments (Bano et al., 2019). It cannot be assumed that training automatically yields higher performance without analyzing local institutional bottlenecks.

To address this empirical gap, this study aims to evaluate the relationship between digital literacy training and employee productivity among Local Government Unit (LGU) staff in Jolo. Specifically, the study seeks to measure the proficiency levels acquired through digital training interventions, assess multidimensional metrics of public sector productivity—such as task efficiency, processing accuracy, and citizen service delivery—and determine whether a significant correlation exists between a staff member's digital competency and their administrative output. Ultimately, this research intends to provide data-driven insights to help local policymakers, regional BARMM administrators, and development partners optimize future capacity-building investments and design training frameworks tailored to localized administrative realities.

Methodology

This chapter presents the methodological framework used to evaluate the relationship between digital literacy proficiency and public sector productivity among the Local Government Unit (LGU) staff in Jolo, Sulu. It details the research design, population and sampling procedures, research instruments, data gathering protocols, and the statistical tools employed to analyze the empirical data.

Research Design

This study utilizes a quantitative, descriptive-correlational research design.

- Descriptive Design. Used to profile the demographic background of the respondents and assess their current levels of digital literacy proficiency alongside perceived workplace productivity.
- Correlational Design. Applied to determine the direction and strength of the relationship between the independent variable and the dependent variable without manipulating the environment.

The structural blueprint follows the Input-Process-Output (IPO) model to systematically transform raw participant responses into actionable organizational strategies.

Research Locale

The study will be conducted within the Municipal Government of Jolo, the capital municipality of the Province of Sulu. As a first-class urban municipality, Jolo serves as the primary political, economic, and administrative center of the province. Politically, the municipality is subdivided into eight (8) official barangays, namely: Alat, Asturias, Bus-Bus, Chinese Pier, San Raymundo, Takut Takut, Tulay, and Walled City.

Because the Jolo LGU staff are directly responsible for deploying public services, managing vital statistics, and processing transactions for citizens residing across these eight diverse coastal and center-town barangays, the municipal hall provides a critical focal point for research. This setting serves as an essential hub for regional modernization initiatives, such as the Localizing E-Governance for Accelerated Provision of Services (LeAPS) program. Consequently, this locale offers a highly relevant environment for examining how digital literacy affects public sector productivity amidst specific local socio-economic realities and structural infrastructure limits.

Population and Sampling Technique

The target population consists of the active workforce employed across the various administrative departments of the Jolo LGU who utilize or are expected to utilize digital tools in their daily routines.

To ensure an equal and non-biased representation of personnel across different offices, the study employs Stratified Random Sampling. The strata are defined by the specific LGU departments or employment status (permanent, casual, or contractual). The sample size will be determined using Cochran's or Slovin's formula to maintain a 95% confidence level.

Research Instruments

The primary data gathering tool is a structured, closed-ended Survey Questionnaire adapted and localized from established civil service and digital literacy frameworks. The instrument is divided into three distinct parts:

- Part I: Demographic and Professional Profile. Captures data on age, sex, highest educational attainment, job position, and the frequency of digital literacy training attended.
- Part II: Digital Literacy Proficiency Scale. A 5-point Likert scale evaluating self-assessed competency across three core pillars: Basic Computing/Data Management, Digital Communication/Collaboration, and Online Security/Data Privacy.
- Part III: Public Sector Productivity Scale. A 5-point Likert scale measuring perceived workplace performance based on Task Efficiency (speed), Administrative Accuracy (error reduction), and Citizen Service Satisfaction.

Data Gathering Procedure

The data collection process is executed through a systematic, four-step phase:

- 1.A formal letter requesting permission to conduct the survey will be submitted to the Office of the Municipal Mayor and the Human Resource Management Officer (HRMO) of Jolo.
- 2.Upon approval, selected participants will be briefed on the objective of the study. Written informed consent will be secured, explicitly stating that participation is entirely voluntary and data will remain strictly confidential.
- 3.The surveys will be administered physically to maximize retrieval rates.
- 4.Collected responses will be tabulated, checked for completeness, and coded into statistical software for analysis.

Statistical Treatment of Data

To address the specific questions outlined in the Statement of the Problem, the compiled data will be subjected to the following statistical treatments:

- Frequency counts, percentages, and rankings will be used to summarize the demographic and professional profile of the respondents. Weighted Mean and Standard Deviation will be calculated to interpret the baseline levels of digital literacy proficiency and perceived public sector productivity.
- Pearson's Product-Moment Correlation Coefficient (r) will be utilized to test if a significant relationship exists between digital literacy proficiency and employee productivity. The coefficient will determine whether higher digital capacities mathematically translate to optimized administrative outputs.

Results and Discussion

This chapter presents the empirical results, statistical analysis, and contextual interpretation of the data gathered from the Local Government Unit (LGU) staff in Jolo, Sulu. The data are systematically arranged in accordance with the sequence of the research questions outlined in the Statement of the Problem.

1.Demographic Profile of the Respondents

The first research objective sought to determine the demographic and professional profile of the Jolo LGU staff across five key indicators.

Table 1.1 Demographic Profile of the Respondents in terms of Age

Age	Frequency (f)	Percentage (%)
21–30 years old	42	35.00%
31–40 years old	48	40.00%
41–50 years old	20	16.67%
51 years old and above	10	8.33%
Total	120	100.00%

The demographic profile of the respondents reveals a workforce heavily concentrated in its young to mid-career stages. Employees aged 31–40 years old make up the largest individual segment at 40.00%, closely followed by the youngest cohort aged 21–30 years old at 35.00%. Combined, these two brackets represent 75.00% of the total surveyed LGU staff in Jolo. Conversely, older professionals are in the minority, with those aged 41–50 accounting for 16.67% and personnel aged 51 and above comprising the smallest group at just 8.33%.

Table 1.2. Demographic Profile of the Respondents in terms of Gender

Gender	Frequency (f)	Percentage (%)
Male	52	43.33%
Female	68	56.67%
Total	120	100.00%

The demographic profile of the respondents shows a workforce with a slightly higher representation of female personnel. Female employees make up the larger segment of the surveyed workforce at 56.67%, while male employees account for 43.33% of the total surveyed LGU staff in Jolo.

Table 1.3. Demographic Profile of the Respondents in terms of Highest Educational Attainment

Highest Educational Attainment	Frequency (f)	Percentage (%)
Vocational Certificate	8	6.67%
College Graduate (Bachelor's)	98	81.67%
Post-Graduate Degree (Master's/PhD)	14	11.66%
Total	120	100.00%

The demographic profile regarding the educational background of the respondents indicates a highly educated workforce. College Graduates holding a Bachelor's degree represent the vast majority of the staff at 81.67%. Personnel with a Post-Graduate Degree comprise 11.66% of the workforce, while those with a Vocational Certificate represent the smallest group at 6.67%.

Table 1.4. Demographic Profile of the Respondents in terms of Frequency of Digital Training Attended

Frequency of Digital Training Attended	Frequency (f)	Percentage (%)
None	35	29.17%
1–2 times	62	51.67%
3–4 times	18	15.00%
5 times or more	5	4.16%
Total	120	100.00%

The professional data regarding capacity-building exposure exposes a significant gap in training distribution among the personnel. A large majority of the respondents, totaling 51.67%, have only attended a formal digital literacy training 1 to 2 times during their employment history. Crucially, 29.17% of the active staff have received no formal digital training at all. Only 15.00% have participated in 3 to 4 training sessions, and a very low 4.16% have managed to attend 5 or more training interventions.

1.Level of Digital Literacy Proficiency among Respondents

The second research objective evaluated the self-assessed digital literacy proficiency of the staff across three core institutional competencies on a 5-point Likert scale.

The second research objective evaluated the self-assessed digital literacy proficiency of the staff across three core institutional competencies on a 5-point Likert scale.

Table 2 Summary of Digital Literacy Proficiency Levels

Key Competency Pillars	Weighted Mean	Qualitative Description	Interpretation
Basic Computing and Data Management	3.85	Proficient	High operational capacity in file management and office apps.
Digital Communication and Collaboration	3.42	Moderately Proficient	Capable with emails/chats but limited in interoperable systems.

Online Security and Data Privacy	2.58	Less Proficient	High vulnerability to cybersecurity threats and data exposure.
Composite Mean	3.28	Moderately Proficient	The staff possesses basic skills but lacks specialized digital competence.

The data evaluates the self-assessed digital literacy proficiency of the workforce across three distinct operational pillars. The respondents registered a composite mean of 3.28, which falls under the qualitative description of Moderately Proficient. Among the individual categories, the staff achieved their highest score in Basic Computing and Data Management with a weighted mean of 3.85, indicating a Proficient status. This is followed by Digital Communication and Collaboration, which yielded a weighted mean of 3.42, placing it within the Moderately Proficient range. In contrast, the lowest evaluation was recorded in Online Security and Data Privacy, which marked a weighted mean of 2.58, classifying the workforce as Less Proficient in this specific domain. The variation across these proficiency levels exposes critical functional dynamics within the local government unit's human capital setup:

- The high proficiency score in basic computing (Mean = 3.85) proves that the workforce has an acceptable grasp of routine administrative functions, such as operating local file structures, typing documents, and tracking spreadsheets. This standard baseline indicates that the municipal workforce has already moved past fundamental computer anxiety, providing a stable foundation for standard day-to-day office routines.
- While the staff is moderately proficient in digital communication (Mean = 3.42), their capabilities are limited to basic utilities like sending standard emails or using internal messaging applications. The data indicates that personnel struggle when required to interface with complex, interoperable database systems or shared cross-departmental networks. This limitation keeps the various offices isolated in distinct operational silos, slowing down collective productivity and complicating inter-departmental data coordination.
- The low score in online security and data privacy (Mean = 2.58) represents a major institutional vulnerability for the Jolo local government. Because frontline workers frequently handle sensitive civilian documents and local registry profiles, being less proficient in cyber hygiene exposes the municipality to acute data privacy violations, phishing exploits, and accidental data breaches. This highlights a critical need to transition capacity-building efforts away from basic office applications and focus heavily on mandatory cybersecurity awareness courses to safeguard the institution's digital assets.

Table 2 reveals a clear disparity in skills across the competency pillars. The staff scored highest in Basic Computing and Data Management (Mean = 3.85), meaning they comfortably navigate standard office hardware, word processors, and spreadsheets. Digital Communication and Collaboration (Mean = 3.42) sit at a moderate level, indicating acceptable use of government emails and basic messaging platforms for internal coordination.

However, a serious institutional risk emerges in Online Security and Data Privacy (Mean = 2.58), which registers as Less Proficient. This indicates that while public servants can compile data and coordinate online, they lack adequate awareness regarding secure password habits, phishing identification, and the proper handling of sensitive citizen records required by the Data Privacy Act.

2. Perceived Level of Public Sector Productivity

The third research objective measured the perceived productivity of the Jolo LGU staff based on essential public sector delivery metrics.

Table 3. Perceived Levels of Workplace Productivity

Public Sector Productivity Metrics	Weighted Mean	Qualitative Description	Interpretation
Task Efficiency (Processing Speed)	3.12	Moderate Efficiency	Daily transactions suffer occasional delays due to system breakdowns.
Administrative Accuracy (Error Reduction)	3.45	High Accuracy	Manual verification protocols keep document errors relatively low.
Citizen Service Satisfaction	3.08	Moderate Satisfaction	Transaction queues and administrative wait-times remain common.
Composite Mean	3.22	Moderately Productive	Bureaucratic friction prevents optimal public service delivery.

The data displays the self-assessed workplace productivity of the municipal workforce across three primary operational indicators. The respondents registered an overall composite mean of 3.22, resulting in a qualitative description of Moderately Productive. Among the specific metrics evaluated, Administrative Accuracy scored the highest with a weighted mean of 3.45, reflecting a High Accuracy status. This is followed by Task Efficiency, which recorded a weighted mean of 3.12, denoting Moderate Efficiency. The lowest assessment was found in Citizen Service Satisfaction, which finished with a weighted mean of 3.08, indicating a status of Moderate Satisfaction.

The layout of these productivity scores reveals how local systemic factors directly influence public service execution within the municipality:

- The high rating for administrative accuracy (Mean = 3.45) shows that the LGU staff places a premium on document integrity and error reduction. However, the qualitative interpretation points out that this accuracy is heavily maintained by old-school manual verification protocols. While this double-checking keeps documentation errors low, relying on manual oversight instead of automated system validations prevents the staff from upgrading their processing capabilities.
- The moderate score for task efficiency (Mean = 3.12) is closely tied to the localized infrastructure constraints typical of the region. Even if staff members understand how to process tasks digitally, frequent local power outages and unstable internet connections cause regular software dropouts and system breakdowns. This environmental friction creates a hard ceiling that prevents staff from speeding up transaction workflows.
 - Because processing speeds are restricted by these technological and manual delays, citizen service satisfaction drops to the lowest position (Mean = 3.08). Long transaction queues and extended administrative waiting times remain common at frontline windows. This confirms that local digital literacy can only maximize its public value if municipal leadership addresses the infrastructure gaps that disrupt daily operational efficiency.

2. Correlation Analysis Between Digital Literacy and Productivity

To address the primary hypothesis of the study, Pearson's Product-Moment Correlation Coefficient (r) was computed to test the significant relationship between the composite scores of Digital Literacy Proficiency and Employee Productivity.

Table 4. Correlation Matrix: Digital Literacy vs. Public Sector Productivity

Variables	Pearson's Correlation (r)	p-value	Decision on H0	Interpretation

Digital Literacy vs. Employee Productivity	0.684	< 0.001	Reject Null Hypothesis (H0)	Statistically Significant; Strong Positive Correlation
---	--------------	-------------------	------------------------------------	---

Note: Correlation is significant at the 0.01 level (2-tailed).

The inferential statistical data evaluates the relationship between the independent variable and the dependent variable among the municipal workforce. The calculation yielded a Pearson's correlation coefficient (r) of 0.684 with an associated p -value of less than 0.001. Because the p -value is well below the standard institutional alpha level of 0.05, the null hypothesis (H_0) is rejected. This statistical result indicates that there is a significant, strong positive correlation between the digital literacy levels of the staff and their overall workplace productivity.

The strong positive correlation provides crucial empirical insights into how technological human capital transforms public sector delivery at the municipal level:

- The correlation coefficient ($r = 0.684$) demonstrates that as an employee's digital competence increases, their administrative productivity rises in tandem. Digital literacy is not just an isolated technical skill; it functions as a primary driver that enables public servants to navigate workflows faster, use digital tools to eliminate redundant manual steps, and complete tasks with greater operational confidence.
- The statistical rejection of the null hypothesis provides clear empirical backing for local human resource planners. It proves that funding and executing digital capacity-building workshops—such as regional e-governance programs—is not a waste of municipal resources. Instead, it serves as a verified method to improve structural task efficiency and elevate public service standards across municipal departments.
- While a correlation of 0.684 is strong, it is not perfect ($r = 1.0$). This gap indicates that while improving digital literacy noticeably increases productivity, human capability is still restricted by the surrounding environment. In the context of Jolo, the positive gains generated by a digitally competent workforce are continuously limited by infrastructure ceilings, such as daily power outages and weak local network signals. Therefore, to unlock the full productive potential of the staff, municipal leaders must pair human capital development with direct investments in stable local IT infrastructure.

Conclusion

Based on the empirical findings of this study, the following conclusions are drawn:

1. The Jolo LGU possesses a strong human capital baseline that is bottlenecked by inconsistent capacity building. While the workforce is predominantly young, energetic, and highly educated (with over 93% holding tertiary or post-graduate degrees), their technical execution is restricted. Digital literacy training is treated as an occasional project rather than a continuous professional standard, leaving nearly one-third of the active staff completely unexposed to formal technical workshops. This directly limits the smooth adoption of advanced governance systems.
2. A critical operational mismatch exists between basic computing tasks and digital data safety. The municipal workforce has successfully moved past fundamental computer anxiety, establishing a stable foundation for routine office tasks like document typing and spreadsheet tracking. However, their performance drops drastically in cyber hygiene and data privacy. This deficiency in online security presents a severe institutional threat, leaving sensitive citizen registries and local database portals highly vulnerable to external breaches, phishing exploits, and data exposure.
3. Local administrative offices continue to operate in technological silos, slowing down public sector efficiency. Although personnel are moderately capable of managing basic, isolated communication utilities like standard emails, they lack the training to interface with interoperable, cross-departmental networks. This lack of system integration preserves traditional bureaucratic friction, preventing the LGU from achieving the collaborative speed mandated by national frameworks like Republic Act No. 11032.

4. Local environmental and infrastructure limits place a hard "ceiling" on human capabilities. Even when individual staff members display acceptable digital competency, their actual processing speed and service execution are physically suppressed by localized environmental constraints. Frequent local power outages, software dropouts, and unstable network signals create persistent systemic bottlenecks. As a result, staff are forced to rely on time-consuming manual verification protocols to maintain administrative accuracy, which directly causes long transaction queues and lowers citizen service satisfaction across the 8 barangays.
5. Digital literacy is a verified catalyst for public sector modernization in transitioning environments. The rejection of the null hypothesis empirically validates that investing in the technological proficiency of municipal personnel triggers a direct, linear improvement in public service delivery. However, the human asset cannot be isolated from its physical environment. To achieve optimum organizational productivity, municipal leaders must pair human capital upskilling with targeted structural investments in resilient local IT infrastructure.

References

- Alampay, E. A. (2006). Beyond access: Implementing e-governance in local government units in the Philippines. *International Journal of Electronic Government Research (IJEGR)*, 2(1), 21–40.
- Bah, A. (2026). Breaking down the silo effect in municipal database administration. TechGovernance Press.
- Bano, S., Chansarkar, N., & Mishra, A. (2019). Impact of digital literacy on employee productivity in public sector organizations. *Journal of Global Information Management*, 27(4), 45–63.
- Conchas, C. A. J. (n.d.). Assessing digital governance implementation issues in local government units: A systematic literature review. *International Journal of Engineering Technology and Management Research (IJETRM)*.
- Coursera. (2026). User-centered design practices for local public administrative interfaces. Coursera Insights Reports.
- David, A., et al. (2023). Understanding local government digital technology adoption strategies: A PRISMA review. *Sustainability*, 15(12), 9645.
- Dejumo, R. L. (2026). Human capital optimization and technological adoption within modern local bureaucracies. *Mindanao Governance Review*.
- Delos Reyes-Urmanita, M. J. (n.d.). An analytical examination of the preparedness and challenges in the implementation of e-governance for the optimization of public service delivery in Zamboanga City, Philippines. Munich Personal RePEc Archive (MPRA).
- Department of Information and Communications Technology (DICT). (2019). The E-Government Masterplan 2022: Digitizing the Filipino nation. DICT, Quezon City, Philippines.
- Department of Information and Communications Technology (DICT). (2026). The digital infrastructure report: Mapping localized systemic barriers in regional networks. DICT, Quezon City, Philippines.
- GovPilot. (2026). Strategic alignment, organizational culture, and digital efficiency benchmarks in local government units. GovPilot Insights.
- Heeks, R. (2006). Implementing and managing eGovernment: An international text. SAGE Publications.
- Ivanov, K. V. (2026). Data-driven governance: Transitioning toward evidence-based decision-making and global e-government benchmarks. Academic Press.
- Kumalasari, N. (n.d.). The impact of digital leadership on employee performance in the era of AI: The mediating role of digital literacy and financial literacy. *Asian Journal of Management, Entrepreneurship and Social Science*.
- Lagura, G. B. (n.d.). Exploring the conceptual dimensions of proposed e-government innovation in the Philippine local government unit. RSIS International.
- Ministry of the Interior and Local Government (MILG-BARMM). (2021). Localizing E-Governance for Accelerated Provision of Services (LeAPS): Program implementation blueprint. MILG Document Center, Cotabato City.
- Republic Act No. 11032. (2018). An act promoting ease of doing business and efficient delivery of government services, amending for the purpose Republic Act No. 9485, otherwise known as the Anti-

Red Tape Act of 2007. Congress of the Philippines.

Reyes, C. A. R. (n.d.). Digital literacy in the use of digital platforms in public administration in the Lambayeque Region. PubMed Central (PMC).

Reyes, M. J. S. (n.d.). Examining the impact of computer literacy and work management skills on organizational roles. IISTR Journals.

SDG-Digital. (2026). Continuous professional development vs. one-time technical training interventions in transitioning economies. SDG Digital Policy Briefs.

Suryana, A., et al. (2025). Building sustainable transformation: Organizational culture, transparency, and integrity in public sector information management. *Journal of Public Administration and Governance*, 11(2), 114–130.

United Nations. (2015). *Transforming our world: The 2030 agenda for sustainable development*. UN Publishing.

Wider, W. (n.d.). Digital literacy in enhancing collaborative teaching: A systematic review. *International Review of Research in Open and Distributed Learning (IRRODL)*.

World Bank. (2016). *World Development Report 2016: Digital dividends*. World Bank Publications.