

Evaluating Digital Governance in Nigerian Polytechnics: A Comparative Analysis of Web Presence and Automation of Administrative Systems

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Abstract

The integration of digital technologies in higher education institutions involves both front-facing informational portals and complex back-end administrative systems. This study evaluates the dual layers of digital governance across selected technical and vocational institutions in North East Nigeria by assessing stakeholders' perceptions. The paper pursued two primary objectives: first, to determine if perceived functionality of official institutional websites varies across campuses; and second, to evaluate disparities in the operationalization of advanced digital tools for tasks such as result processing and staff promotion tracking. Utilizing survey data from stakeholders across the institutions, a cross-tabulation and Chi-square analysis revealed a general, uniform consensus of functional basic web presence, with no significant institutional divergence ($X^2 = 28.134$, $p = .106$). Conversely, a one-way analysis of variance (ANOVA) exposed statistically significant disparities in the deployment of advanced administrative tools, $F(4, 188) = 3.453$, $p = .009$. Post-hoc analyses highlighted a pronounced gap between Ramat Polytechnic, Maiduguri, and Federal Polytechnic, Mubi. These findings suggest that while basic digital presence (websites) has been largely standardized across polytechnics, deeper institutional digitalization (advanced administrative e-governance) remains highly fragmented and subject to infrastructural and resource-based inequalities. The paper portrays significant implications regarding funding of digital interventions, capacity building and institutional support.

Keywords: *Digitalization, Governance, Administration, Polytechnics*

1.1 Introduction

The Nigerian higher education sector has experienced a gradual, yet imperative, shift from manual administrative processes to comprehensive digital governance. E-governance within educational institutions is a multi-layered endeavor. It encompasses foundational, public-facing digital infrastructure such as the deployment of functional institutional websites as well as complex, back-end administrative automation utilized for student admissions, timetable scheduling, academic result management, performance appraisal, staff retention and turnover prediction, payment platforms, stakeholder complaint management and personnel tracking (Eze & Chinedu, 2021; Oyelaran & Adeboye, 2021) among others.

In the polytechnic sector, the dual mandate of knowledge and skills development especially in the modern era underscores the imperative of digital presence. Modern teacher student engagement demands robust digital presence which in turn can only be handled and managed through electronic platforms. In the northeastern region of Nigeria, the scourge of Boko Haram crisis left the region in critical need of basic infrastructure and human resources to establish and maintain meaningful digital presence. As such, while many institutions lack robust web presence, others only have functional websites that only provide information without interactive capabilities to manage and control human resource functions. Assessing the success of educational policy and institutional modernization requires evaluating both of these layers simultaneously. Basic in the assessment however, is the need to understand the perception of key stakeholders including staff and students on the utilization of both the website and automation of administrative tasks.

The first layer of digital governance relies on the institution's official website, which serves

as the primary digital gateway for information dissemination, student engagement, and public perception. In addition to being an informational billboard, an official web portal also serves as a dynamic interface essential for student recruitment, alumni relations, and basic e-governance (Alabi & Okunola, 2023). Previous studies on the digital footprint of Nigerian higher educational institutions (HEIs) highlight that while internet penetration has improved, the actual maintenance and usability of institutional websites often suffer from infrastructural deficits (Ibrahim & Musa, 2022). Therefore, assessing stakeholder perceptions regarding website functionality provides a proxy measure for an institution's basic IT responsiveness and transparency.

Beyond foundational web presence, the second layer of e-governance involves the automation of advanced administrative tasks. Implementing digital systems for vital, complex processes such as academic result calculation and staff promotion tracking mitigates bureaucratic bottlenecks while enhancing data security and administrative efficiency (Omowunmi, 2025). However, unlike basic web portals, integrating these advanced systems requires a comprehensive shift in organizational culture and substantial technical architecture (Rahman & Malik, 2020). Consequently, the pace of this deeper digital transformation remains highly inconsistent across Nigerian public institutions due to disparate funding, hardware deficits, and varying levels of digital literacy among staff (Adebayo & Dada, 2021; Okonkwo, 2023). Institutions lagging in this area risk perpetuating administrative delays and compromising data integrity (Nwachukwu & Adebayo, 2022).

Despite the consensus on the utility of digital governance, there is a lack of comparative research evaluating whether the success of basic digital presence aligns with the successful implementation of deeper administrative

systems within the same institutions. To address this gap, this study investigates the digital transformation landscape across selected Nigerian polytechnics through two specific objectives:

1.2 Objectives of the Study

- i. To determine whether there is a significant dependency between a stakeholder's affiliated polytechnic and their perception of the institution's official website functionality.
- ii. To assess if there are significant institutional disparities in the perceived operational status of advanced digital tools (e.g., result processing, staff promotion tracking).

2.0 Literature Review

2.1 Digital Governance Infrastructure and Functional Maturity

The conceptualization of digital governance in the contemporary academic landscape has evolved from a mere focus on hardware procurement to a holistic evaluation of digital maturity including the organizational capacity to utilize technology to achieve strategic objectives (Alimam et al., 2023). Within the specific context of polytechnics in Northeast Nigeria, assessing the functional maturity of digital governance requires a multi-dimensional analysis of infrastructure, institutional policy, and human capital. This review weaves together emerging scholarship to evaluate the current state of these digital assets and their maturity levels in the Nigerian tertiary education sector with focus on web presence and the automation of administrative tasks.

Infrastructure serves as the bedrock upon which all digital governance initiatives are constructed. In the Nigerian polytechnic

system, this infrastructure is characterized by a baseline deployment stage, where most institutions have successfully integrated fundamental components such as internet connectivity and basic management information systems (Eze & Chukwuma, 2022). However, as noted by Omowunmi (2025), a critical infrastructure-service gap persists. While the physical presence of computers and servers is evident, the reliability of these tools specifically regarding broadband penetration and data center integrity, remains insufficient to support advanced, real-time governance functions (Adebayo & Dada, 2021).

The functional maturity of e-governance systems is often measured against linear progression models that transition from simple information dissemination to full transaction integration (Machova & Lnenicka, 2016). Scholars observe that many Nigerian tertiary institutions are currently stalled at the interaction stage. In this phase, platforms allow for rudimentary two-way communication, such as online fee payments or admission status checking, but they lack the transactional depth seen in more mature systems where complex institutional processes like result processing and staff promotions are fully automated (Isah et al., 2024; Waara, 2025). A recurring theme in the literature is the disparity between technical availability and functional readiness. Fadeyi and Oyebamiji (2025) argue that polytechnics frequently fall behind universities in digital innovation, often operating on outdated hardware that cannot support modern Integrated Learning Systems (ILS) or digital repositories. This technological obsolescence directly impacts stakeholder engagement; as workstations become insufficient or unreliable, the productivity of staff and the digital engagement of students are significantly curtailed (Bello & Ijagbemi, 2022).

Beyond hardware, the role of institutional policy in defining maturity cannot be

overstated. Success in digital governance relies heavily on supporting policies that dictate data privacy, cybersecurity, and interoperability (Olanrewaju & Eze, 2022). In the absence of comprehensive ICT policies, digital initiatives in many Nigerian polytechnics remain fragmented. This lack of a coordinated approach prevents the information integration phase of maturity, where disparate enterprise systems are connected through a single virtual interface to provide seamless service delivery (Bada et al., 2019; Mahlangu & Ruhode, 2020). Additionally, the human element, or human capital, is perhaps the most decisive factor in advancing functional maturity. Digital transformation is not merely about the adoption of technology but about the digital literacy and attitudinal readiness of the workforce (Cha et al., 2023; Okonkwo, 2023). Omowunmi (2025) highlights that a large proportion of the Nigerian public sector workforce lacks the necessary competencies to fully leverage digital tools. This creates a scenario where sophisticated systems are underutilized because the administrative staff that are the custodians of these systems are not adequately trained to manage digital workflows (Okonkwo, 2023).

Top management support is consistently identified as a primary enabler of digital maturity. Empirical evidence suggests that the attitude of institutional leadership significantly predicts the level of e-governance implementation, jointly explaining a vast majority of the variance in successful adoption (Roztock et al., 2025). When leadership prioritizes ICT growth and provides the necessary financial backing, institutions are more likely to move from digital beginners to digital leaders (Westerman, 2016). However, in many Northeast polytechnics, budget limitations and inadequate funding continue to hinder the procurement of advanced technologies (Olaopa, 2019). The socio-technical challenges specific to Northeast Nigeria add a layer of complexity to the maturity assessment. The region faces a

regional connectivity gap, where unreliable internet services inhibit access to online databases and remote services (Okiki & Adebayo, 2021; SEAH Publications, 2025). Adeyemi and Afolabi (2020) note that this unreliability does not just affect user access; it disrupts the internal digital processes of the institutions, such as digital cataloging and inter-departmental data sharing, thereby stalling the overall transformation effort. Further layers of complexity are added by the decades of Boko Haram insurgency that resulted in the destruction of digital facilities and competencies across the region.

Furthermore, the transparency effect of digital governance is often cited as its most transformative outcome. Digital platforms have the potential to erode unnecessary delays and increase efficient service delivery by eliminating red-tapism (Akinwale, 2020; Omowunmi, 2025). In institutions like JAMB, for example, e-governance indicators have been shown to have a strong positive relationship with service quality and employee engagement (Chukwuemeka et al., 2018). For polytechnics, this maturity translates into a service culture that prioritizes the user experience over bureaucratic procedures (Chukwuemeka et al., 2018). However, the risk of failure by transaction remains a significant threat to digital maturity. If transactional processes such as online result portals or payroll systems fail, it creates deep-seated dissatisfaction and a breakdown in stakeholder trust (Chohan et al., 2020). Waara (2025) emphasizes that trust is a key component of e-governance; if stakeholders do not trust the reliability and security of digital platforms, they will resist adoption, regardless of how advanced the infrastructure may be (Waara, 2025). Finally, the adoption of emerging technologies such as Artificial Intelligence (AI) and blockchain represents the next frontier in digital maturity for Nigerian institutions. These tools could automate stakeholder engagement and extract insights from unstructured data, moving the

polytechnic toward a smart campus model (He & Chen, 2024; Olaniyi, 2019). To reach this stage, however, polytechnics must first bridge the existing skills-infrastructure gap and develop tailored digital solutions that reflect their specific academic and regional needs (Omowunmi, 2025).

Hence, while there are positive signs of ICT integration in Nigerian polytechnics supported by initiatives from the National Board for Technical Education (NBTE) and the Tertiary Education Trust Fund (TETFund), the journey toward functional maturity is hindered by outdated hardware, low digital literacy, and fragmented policies (Bello & Ijagbemi, 2022). For polytechnics in Northeast Nigeria, the path forward involves not just the procurement of technology, but a strategic alignment of infrastructure, human competency, and leadership support to create a truly resilient digital governance ecosystem.

2.2 Digital Platforms Automation of Administrative Tasks and Bidirectional Stakeholder Engagement

The paradigm shift from traditional administrative monologues to digital dialogues constitutes the essence of modern institutional governance. The second objective seeks to assess the extent to which digital platforms facilitate bidirectional communication which is a process where information does not merely flow from the management to the stakeholders but allows for active feedback, consultation, and co-creation of institutional value through automation of administrative tasks. This literature review synthesizes scholarly perspectives on the transition from passive information dissemination to active participatory engagement within the Nigerian higher education sector. Central to the discourse on bidirectional engagement is the concept of e-participation, which Machova and

Lnenicka (2016) define as the use of ICTs to broaden and deepen political and administrative participation especially in the discharge of responsibilities. In the context of polytechnics, this involves moving beyond static portals to interactive governance (Meijer & Torenvlied, 2016). Recent studies suggest that while many Nigerian tertiary institutions have successfully digitized student registration and fee payments, they have largely failed to create digital avenues for policy consultation or grievance redress (Akinwale, 2020; Omowunmi, 2025). This results in a pseudo-digital engagement where stakeholders interact with the system for transactional purposes but remain excluded from the governance conversation.

The role of Social Media Technologies (SMTs) has emerged as a disruptive force in fostering bidirectional engagement. Unlike official portals, platforms such as X (formerly Twitter), Facebook, and LinkedIn offer a less formal, high-speed channel for real-time feedback. Meijer and Torenvlied (2016) argue that social media can overcome traditional bureaucratic silos by allowing students and staff to bypass layers of hierarchy to reach decision-makers. However, in Northeast Nigeria, the use of social media for official governance remains cautious. As Isah et al. (2024) observe, there is often a responsiveness gap where institutions maintain social media accounts for announcements but rarely engage in meaningful two-way conversations or resolving complaints initiated through these channels.

Stakeholder Theory provides a robust framework for understanding this objective. For a polytechnic to be sustainable, it must manage the interests of its primary stakeholders through continuous dialogue (Mainardes et al., 2012). Digital platforms theoretically offer the perfect medium for this Stakeholder Dialogue. However, empirical findings by Fadeyi and Oyebamiji (2025) indicate that the current digital maturity of polytechnic platforms often favors asymmetric communication because the

management controls the narrative, and the stakeholders occupy a subordinate, recipient role. To achieve true bidirectional engagement, platforms must incorporate features such as interactive forums, live-chat support, and digital polling for major institutional decisions (Waara, 2025).

The effectiveness of digital engagement is also heavily influenced by system trust and perceived responsiveness. Stakeholders are more likely to engage with digital platforms if they believe their input will lead to tangible administrative action (Chohan et al., 2020). In many Nigerian public institutions, the lack of a closed-loop feedback system where a stakeholder is notified of the action taken on their feedback, leads to digital cynicism (Adesina, 2021). When students or staff feel that their digital submissions disappear into a black hole of bureaucracy, they revert to traditional, often more confrontational, methods of engagement such as physical protests or industrial actions (Olaopa, 2019). Furthermore, the user experience of digital governance platforms serves as a silent gatekeeper to engagement. If a student portal or staff management system is clunky, prone to downtime, or difficult to navigate, it discourages voluntary participation (Al-Fraihat et al., 2020). Recent scholarship emphasizes that functional maturity (as discussed in 2.1) is a prerequisite for engagement maturity. Without a stable, high-speed digital infrastructure, the bidirectional aspect of communication becomes frustrated by technical glitches, leading to a breakdown in the communication chain (Eze & Chukwuma, 2022).

The socio-technical reality of Northeast Nigeria adds a layer of digital anxiety to this engagement. Due to the historical cybersecurity challenges, stakeholders may be wary of digital surveillance or data privacy breaches. Heeks (2017) notes that in fragile contexts, the trust-in-technology variable is as important as the

technology itself. Therefore, for bidirectional engagement to flourish in the Northeast, polytechnic management must not only provide the platforms but also guarantee the anonymity and security of those who use them to provide critical feedback or report administrative anomalies (Olaniyi, 2019).

Finally, the literature points toward the normalization of digital presence. For engagement to be truly bidirectional, digital interaction must become the standard rather than the exception. Roztock et al. (2025) suggest that top management support is vital in moving an institution toward a digital first culture. When leadership actively participates in digital forums or uses portals to explain policy changes, it legitimizes the platform and encourages stakeholders to follow suit. In summary, the transition from e-dissemination to e-governance in Northeast polytechnics depends on the ability to transform digital tools from simple notice boards into vibrant, secure, and responsive ecosystems of institutional administration (Waara, 2025).

3.0 Methodology

The study utilized a quantitative research design to evaluate stakeholder perceptions of digital governance across selected technical and vocational institutions in Nigeria. Data were collected from three stakeholder categories including teaching staff, non-teaching staff and students; and analyzed using DataStatPro. Depending on the specific variables analyzed, the sample sizes and the inclusion of specific institutions slightly varied between the two research objectives to account for complete data availability.

In addressing the first objective of evaluating the perceived functionality of official institutional websites, a cross-tabulation analysis was conducted. The sample for this objective comprised $n = 200$ respondents drawn from six institutions: Federal Polytechnic Damaturu, Federal Polytechnic Bali, Federal

Polytechnic Kaltungo, Ramat Polytechnic Maiduguri, Federal Polytechnic Mubi, and ATAP Bauchi. The dependent categorical variable measured agreement with the availability of a functional and regularly updated official website, utilizing a 5-point Likert scale (Strongly Disagree to Strongly Agree). The relationship between institutional affiliation and perception was evaluated using a 5 times 6 contingency table via a Pearson Chi-Square (X^2) test for independence, supplemented by the Likelihood Ratio Test (G-test) and Cramér's V to determine the strength of association. In addressing the second objective (assessing the operational status of advanced digital tools in the automation of administrative tasks), a one-way Analysis of Variance (ANOVA) was employed. The dataset for this objective included $N = 193$ valid responses across five institutions: Federal Polytechnic Damaturu ($n = 56$), Federal Polytechnic Kaltungo ($n = 65$), Federal Polytechnic, Bali ($n = 29$), Federal Polytechnic, Mubi ($n = 20$), and Ramat Polytechnic, Maiduguri ($n = 23$).

Prior to analysis, assumption diagnostics were performed. Shapiro-Wilk tests indicated that the assumption of normality was violated for Federal Polytechnic Damaturu ($p < .001$), Federal Polytechnic Kaltungo ($p < .001$), and Federal Polytechnic, Bali ($p = .042$). However, ANOVA is generally robust to deviations from normality. The assumption of homogeneity of variance was satisfied, as confirmed by the median-centered Levene's test, $F(4, 188) = 1.448$, $p = .220$. Statistical significance was evaluated at $\alpha = .05$, and Tukey's Honestly Significant Difference (HSD) procedure was utilized for post-hoc pairwise comparisons to control for familywise error.

4.0 Results

An analysis of the cross-tabulation frequency table revealed a predominantly positive consensus regarding basic web functionality across the six institutions. Out of 200

respondents, over half (51%, $n = 102$) selected Agree, and an additional 14.5% ($n = 29$) selected Strongly Agree making a total of 65.5%, $n=131$. Federal Polytechnic Kaltungo and Federal Polytechnic Damaturu recorded the highest absolute frequencies of agreement, with 34 and 32 respondents respectively stating they agree. Conversely, only 16% of respondents selected Disagree ($n = 32$) and 4% selected Strongly Disagree ($n = 8$) across the dataset making a negative total of 20%, $n = 40$.

The Pearson Chi-Square test yielded a test statistic of 28.1344 with 20 degrees of freedom, and a corresponding p-value of .106. Because the p-value exceeds the .05 threshold, there is no statistically significant association between institutional affiliation and the perceived functionality of the institutional website. The effect size, as measured by Cramér's V, was weak at 0.1875. While the G-test (LRT) returned a marginally significant value of 32.3243 ($p = .040$), assumption checks revealed that 63.3% of expected cell frequencies were less than 5 (minimum expected frequency = 0.280), suggesting that the non-significant Pearson Chi-Square is the more conservative and reliable metric for this sample.

Contrasting the uniform perceptions of website functionality, the evaluation of advanced digital administrative tools revealed significant disparities. Descriptive statistics indicated that Ramat Polytechnic, Maiduguri achieved the highest mean perception score ($M = 3.870$, $SD = 0.694$), while Federal Polytechnic, Mubi recorded the lowest ($M = 2.850$, $SD = 0.988$). The perception means for the remaining institutions were 3.569 ($SD = 1.089$) for Kaltungo, 3.321 ($SD = 1.064$) for Damaturu, and 3.207 ($SD = 1.013$) for Bali.

The omnibus one-way ANOVA test was statistically significant, indicating a divergence in the perceived operational status of these complex digital tools across the five institutions, $F(4, 188) = 3.453$, $p = .009$. The

calculated eta squared (η^2) was 0.068, representing a medium effect size.

To pinpoint the specific loci of these differences, Tukey HSD pairwise comparisons were examined. The post-hoc analysis demonstrated that the perceived operational efficiency at Federal Polytechnic, Mubi was

significantly lower than at Ramat Polytechnic, Maiduguri (mean difference = 1.020, 95% CI [-1.880, -0.160], adjusted $p = .011$). All other pairwise institutional comparisons such as between Damaturu and Kaltungo ($p = .672$), or Bali and Maiduguri ($p = .142$) failed to reach statistical significance.

Table 1: Descriptive Statistics for Digital tools for automation of administrative tasks

Group	n	M	SD	SE	95% CI
Federal Polytechnic Damaturu	56	3.321	1.064	0.142	[3.043, 3.600]
Federal Polytechnic Kaltungo	65	3.569	1.089	0.135	[3.304, 3.834]
Federal Polytechnic, Bali	29	3.207	1.013	0.188	[2.838, 3.576]
Federal Polytechnic, Mubi	20	2.850	0.988	0.221	[2.417, 3.283]
Ramat Polytechnic, Maiduguri	23	3.870	0.694	0.145	[3.586, 4.153]

Note. M = mean; SD = standard deviation; SE = standard error; CI = confidence interval. Total N = 193.

Table 2: One-Way Analysis of Variance

Source	SS	df	MS	F	p	η^2
Between groups	14.407	4	3.602	3.453	.009	0.068
Within groups	196.070	188	1.043	-	-	-
Total	210.477	192	-	-	-	-

Note. η^2 = eta squared. Statistical significance was evaluated at $\alpha = .05$.

Table 3: Assumption Diagnostics

Assumption	Group/Test	Statistic	df	p	Assessment
Normality	Federal Polytechnic Damaturu	0.347	55	< .001	Violated
Normality	Federal Polytechnic Kaltungo	0.332	64	< .001	Violated
Normality	Federal Polytechnic, Bali	0.835	28	.042	Violated
Normality	Federal Polytechnic, Mubi	0.839	19	.152	Satisfied
Normality	Ramat Polytechnic, Maiduguri	0.777	22	.075	Satisfied
Homogeneity	Levene's test	1.448	4, 188	.220	Satisfied

Note. Normality was evaluated using Shapiro-Wilk tests. Homogeneity was evaluated using the median-centered Levene test.

Table 4: Tukey HSD Pairwise Comparisons

Comparison	Mean difference	95% CI	Adjusted p	Significant
Federal Polytechnic Damaturu vs. Federal Polytechnic Kaltungo	-0.248	[-0.761, 0.265]	.672	No
Federal Polytechnic Damaturu vs. Federal Polytechnic, Bali	0.115	[-0.529, 0.758]	.988	No
Federal Polytechnic Damaturu vs. Federal Polytechnic, Mubi	0.471	[-0.261, 1.204]	.393	No

Federal Polytechnic Damaturu vs. Ramat Polytechnic, Maiduguri	-0.548	[-1.245, 0.149]	.197	No
Federal Polytechnic Kaltungo vs. Federal Polytechnic, Bali	0.362	[-0.266, 0.990]	.506	No
Federal Polytechnic Kaltungo vs. Federal Polytechnic, Mubi	0.719	[-0.000, 1.439]	.050	No
Federal Polytechnic Kaltungo vs. Ramat Polytechnic, Maiduguri	-0.300	[-0.983, 0.382]	.744	No
Federal Polytechnic, Bali vs. Federal Polytechnic, Mubi	0.357	[-0.461, 1.175]	.750	No
Federal Polytechnic, Bali vs. Ramat Polytechnic, Maiduguri	-0.663	[-1.448, 0.123]	.142	No
Federal Polytechnic, Mubi vs. Ramat Polytechnic, Maiduguri	-1.020	[-1.880, -0.160]	.011	Yes

Note. Familywise error was controlled using Tukey's honestly significant difference procedure. Mean differences are group 1 minus group 2.

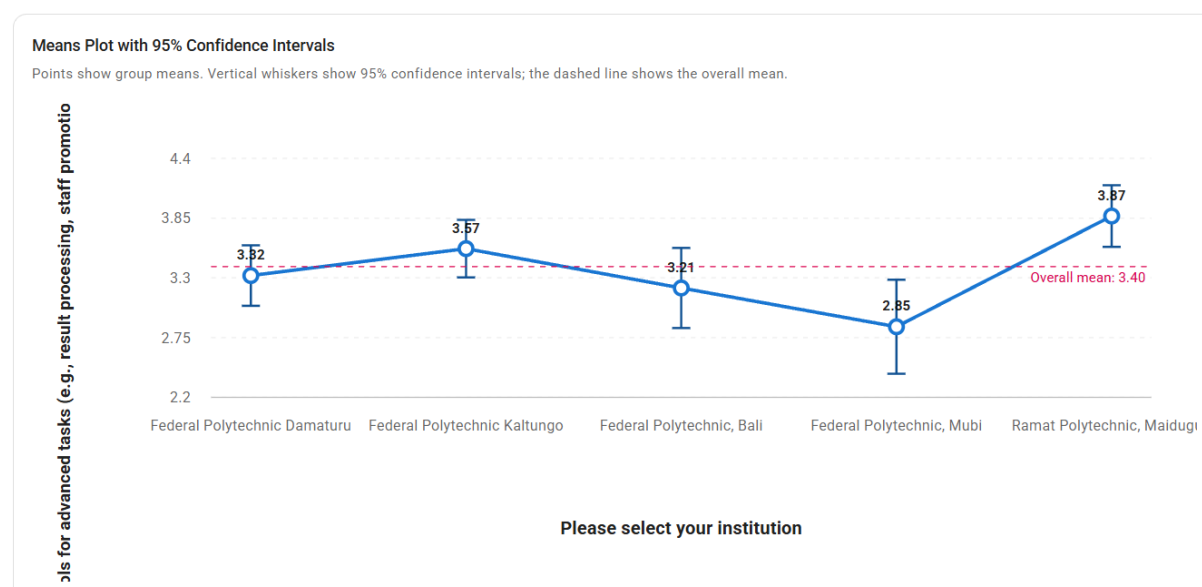


Figure 1: Means Plot with 95% confidence intervals for the selected Polytechnics

5.0 Discussion

The dual analyses of this study provide a nuanced, two-tiered perspective on the state of e-governance within Polytechnics in North East Nigeria. The first major finding reveals a homogenization of basic digital presence; stakeholder perceptions of website functionality did not significantly diverge based on their affiliated institution. The overarching consensus leans toward agreement, indicating that the sampled polytechnics have established a baseline level of public-facing web functionality. This uniformity suggests

that establishing an official website is an administrative milestone most institutions have successfully cleared. As noted by Alabi and Okunola (2023), many public institutions prioritize their web portals to ensure regulatory compliance with bodies like the National Board for Technical Education (NBTE), guaranteeing standard uptime and basic information dissemination. However, it remains pertinent that a combined 20% of respondents across the dataset still disagreed that their portals were fully functional or regularly updated, underscoring pervasive issues like broken links

or outdated interfaces (Oyelaran & Adeboye, 2021).

Conversely, the evaluation of the second layer of e-governance with focus on advanced administrative tools, paints a starkly divergent picture. The significant omnibus ANOVA confirms that deep digital transformation is highly inconsistent across the sampled polytechnics. The marked disparity in operational efficiency between Ramat Polytechnic, Maiduguri, and Federal Polytechnic, Mubi aligns with literature emphasizing acute regional and institutional inequalities in Nigeria's public sector digitalization (Ibrahim & Musa, 2022; Omowunmi, 2025).

This contrast between standardized web presence and fragmented administrative automation is theoretically sound. Maintaining a front-facing informational website is substantially less resource-intensive than deploying centralized back-end tools for automation of administrative tasks such as academic result processing or staff promotion tracking. Integrating these advanced systems requires a comprehensive shift in organizational culture, robust hardware architecture, reliable broadband, and continuous ICT capacity-building for staff (Okonkwo, 2023; Rahman & Malik, 2020). The higher efficacy reported at Ramat Polytechnic suggests a more successful integration of these complex e-administration frameworks, while the lower scores at Federal Polytechnic, Mubi point to ongoing systemic bottlenecks. Ultimately, institutions that fail to bridge this gap run the risk of perpetuating administrative delays and compromising data integrity, even if their public-facing websites appear modern and functional (Eze & Chinedu, 2021; Nwachukwu & Adebayo, 2022).

6.0 Implications and Recommendations

- i. Regulatory bodies like the National Board for Technical Education (NBTE) often use the presence of an official website as a baseline compliance metric. These findings imply that regulatory frameworks must evolve from measuring surface-level digital presence to evaluating digital maturity. The paper therefore recommends that accreditation should heavily weight the automation of core academic and administrative workflows.
- ii. The significant gap between institutions like Ramat Polytechnic, Maiduguri, and Federal Polytechnic, Mubi indicates that standard, cross-the-board IT funding is insufficient. Capital intervention and Tertiary Education Trust Fund (TETFund) allocations should be strictly earmarked for backend infrastructure specifically in lagging institutions. Contextualizing the funding will ensure that institutions progress into maturity faster than generic funding lines.
- iii. Because stakeholders perceive institutional websites to be functional, there is a risk of creating a digital facade. Institutions might project an outward image of modernization that attracts students and partners, only to frustrate them later with manual, delayed, or error-prone internal processes like result processing. Institutional leadership must align their internal operational realities with their external digital branding.
- iv. Advanced tools track highly sensitive data, such as staff promotions and academic results. The lack of fully operational digital tools in certain polytechnics implies a higher susceptibility to data loss, administrative fraud, and bureaucratic bottlenecks. Lagging institutions are

operating at a higher risk of compromising their institutional integrity.

- v. If institutions like Ramat Polytechnic continue to advance their internal digital frameworks while others stagnate, it will create a tiered system of efficiency. Staff and students at digitally mature campuses will experience faster academic progression and transparent appraisals, while those at less mature campuses will suffer from systemic delays.
- vi. The disparities suggest that the barrier to deeper digitalization is not just hardware, but human capital. Institutions struggling with advanced tools require specialized, continuous ICT training for administrative staff, moving beyond basic digital literacy to complex database and software management.

7.0 Conclusion

This study demonstrates that digital governance in the polytechnics of northeast Nigeria currently operates on two distinct maturity tiers. At the foundational tier, institutions have successfully standardized their basic digital footprints, maintaining functional official websites with broad stakeholder consensus and no significant institutional divergence. However, at the deeper operational tier, statistically significant disparities persist in the deployment of advanced administrative tools. This fragmentation is most vividly evidenced by the substantial operational gap between Ramat Polytechnic, Maiduguri, and Federal Polytechnic, Mubi. For Nigeria's technical and vocational education sector to fulfill its mandate efficiently, digitalization efforts must move beyond surface-level web presence to transition these institutions into fully integrated digital hubs. It is recommended therefore that regulatory bodies and institutional management prioritize targeted funding for back-end IT infrastructure. Furthermore, robust capacity-

building programs for administrative staff and the equitable deployment of centralized e-governance systems are essential to harmonize administrative efficiency across all campuses.

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