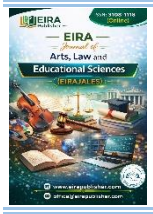

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Use of Digital Communication Channels for Educational Administration and Student Engagement in Secondary Schools in North Western Nigeria

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Abstract **Original Research Article**

This study examined the use of digital communication channels for educational administration and student engagement by administrators in secondary schools in North-West Nigeria. The study was guided by four objectives: identifying the types of digital communication channels used for educational administration, determining the extent of their use for administrative activities, examining their influence on student engagement, and identifying challenges affecting their effective utilisation. The Technology Acceptance Model (TAM) provided the theoretical framework. A descriptive cross-sectional survey design was adopted, with a population of 418 secondary school administrators comprising Headmasters, Assistant Headmasters, and Senior Masters across the North-West geopolitical zone. A multistage sampling technique was employed, with total enumeration used to include all 418 eligible administrators. Data were collected using a structured questionnaire and analysed using frequencies, percentages, means, standard deviations, and regression analysis. Major findings revealed that WhatsApp (93.5%), SMS/text messaging (87.3%), and telephone calls (84.2%) were the most commonly used digital communication channels, while specialised platforms such as Learning Management Systems (18.2%), Google Classroom (15.3%), and X/Twitter (12.2%) were less utilised. The extent of use for educational administrative activities was low, with an overall mean of 1.99 below the 2.50 criterion mean, indicating that digital channels were used more for urgent communication than for systematic administrative functions. Regression analysis showed a significant positive influence of digital communication channels on student engagement ($R = .428$, $R^2 = .183$, $F(1,416) = 93.18$, $p < .001$), accounting for 18.3% of the variance in student engagement. Major challenges included poor Internet connectivity, unreliable electricity supply, high costs, limited access to digital devices, and inadequate digital competence. The study concluded that while digital communication channels are available in secondary schools in North-West Nigeria, their integration into educational administration remains limited, despite having a significant positive influence on student engagement. It was recommended that school administrators systematically integrate accessible digital platforms into routine administrative activities, provide regular digital-skills training, strengthen digital infrastructure and reduce financial barriers, and establish clear policies for digital communication that promote two-way interaction and student engagement.

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Background to the Study

Digital communication has become an increasingly important component of contemporary educational administration, transforming how school administrators, teachers, students and parents exchange information and coordinate educational activities. Channels such as institutional websites, e-mail, instant messaging applications, social media, learning management systems and mobile-based communication platforms provide opportunities for faster information dissemination, interaction and feedback than conventional face-to-face and paper-based approaches. In education, digital technologies also support institutional management through communication, planning, monitoring and access to information. The UNESCO Global Education Monitoring Report emphasises that digital technology can support education not only as a means of teaching and learning but also as a tool for system management, communication and engagement, although its effectiveness depends on appropriate implementation and meaningful access (UNESCO, 2023).

In secondary schools, effective administration depends substantially on the timely flow of information among school management, teachers, students and parents. Digital communication channels can facilitate the dissemination of announcements, academic schedules, assessment information, attendance-related information, school policies and other administrative messages while also creating opportunities for students to provide feedback and participate in school activities. This is particularly relevant to student engagement, which encompasses students' behavioural participation, emotional involvement and active interaction with learning and school activities. Recent evidence from Nigerian secondary schools indicates that students increasingly engage with digital technologies for learning, although the benefits are constrained by inadequate digital knowledge, high technology and Internet costs, unstable connectivity and unreliable electricity supply (Asuquo et al., 2024).

The relevance of digital communication to educational administration is also reflected in Nigeria's emerging digital-learning policy environment. The National Digital Learning Policy recognises infrastructure, connectivity and access devices as fundamental conditions for effective digital learning and calls for increased deployment of ICT infrastructure across educational institutions, including secondary schools (Federal Ministry of Education, 2023). This policy direction suggests that digital communication should not be viewed solely as an instructional tool but also as part of the broader information and administrative infrastructure of schools. When appropriately integrated, digital channels may enable administrators to communicate more efficiently with students, coordinate school activities, provide timely academic information and strengthen interaction between students and the school administration.

However, the availability of digital communication technologies does not necessarily translate into effective educational administration or increased student engagement. UNESCO (2023) cautions that the impact of educational technology varies according to context and that technology can generate inequalities where connectivity, devices, skills and institutional support are inadequate. Nigerian secondary-school evidence similarly shows that inadequate digital competence, expensive Internet access, unstable connectivity and erratic electricity remain important barriers to students' engagement with digital technologies (Asuquo et al., 2024). Thus, the effectiveness of digital communication channels may depend not merely on whether schools possess such technologies but on how school administrators select, integrate and manage them for communication and student participation.

The situation is particularly worthy of investigation in North-West Nigeria, where secondary schools operate within diverse socioeconomic, technological and institutional environments. Despite the growing adoption of digital technologies in Nigerian education, there remains limited empirical evidence on how digital communication channels specifically influence educational administration and student engagement in secondary schools in the region. Existing studies have largely concentrated on digital technologies for teaching and learning, rather than examining their combined administrative and engagement functions. This creates a need to investigate the digital communication channels used by secondary schools, their contribution to educational administration, their influence on student engagement, and the challenges affecting their effective use. The findings could provide evidence for school administrators and education authorities in North-West Nigeria on how digital communication can be strategically integrated to strengthen administrative communication and promote more meaningful student engagement.

Statement of the Problem

Educational administration in secondary schools should employ timely, accessible and interactive communication mechanisms to facilitate the flow of information between school administrators, teachers, students and other stakeholders. Digital communication channels such as instant messaging applications, e-mail, school portals, social media and learning management systems can

support rapid information dissemination, feedback, coordination of school activities and interaction with students. The growing integration of digital technologies into education has consequently expanded their potential beyond classroom instruction to institutional communication and management. UNESCO (2023) notes that digital technology can support education management and communication, but its benefits depend on appropriate implementation, infrastructure, access and the capacity of users to utilise the technology effectively. (unesco.org)

Despite this potential, evidence indicates that the effective use of digital technologies in Nigerian secondary schools remains constrained by several challenges. Asuquo et al. (2024), in their study of Nigerian senior secondary-school students, found that although students engaged with digital technologies for learning, their effective use was affected by inadequate digital knowledge, high cost of Internet access, unstable Internet connectivity and unreliable electricity supply. Similarly, the Federal Ministry of Education (2023) identified inadequate digital infrastructure, connectivity and access to appropriate devices as important issues requiring attention in Nigeria's digital-learning environment. These conditions can limit schools' ability to establish reliable digital communication systems and may restrict students' opportunities to receive information, interact with school authorities and participate in digitally mediated school activities.

More importantly, there is insufficient empirical evidence on the specific contribution of digital communication channels to educational administration and student engagement in secondary schools in North-West Nigeria. Much of the existing Nigerian literature has focused on digital technology in teaching and learning, students' digital literacy or general technology adoption, rather than examining the combined administrative and engagement functions of digital communication. Consequently, it remains unclear which communication channels are most commonly used by secondary schools in the region, the extent to which administrators employ them for information dissemination, coordination and feedback, whether their use enhances student engagement, and what factors constrain their effectiveness. This evidence gap limits the ability of educational administrators and policymakers to make informed decisions about the strategic integration of digital communication into secondary-school administration. The study therefore seeks to examine the use of digital communication channels in educational administration and their relationship with student engagement in secondary schools in North-West Nigeria, while also identifying the challenges affecting their effective utilisation.

Objectives of the Study

The main objective of the study is to examine the influence of digital communication channels on educational administration and student engagement in secondary schools in North-West Nigeria.

Specifically, the study seeks to:

1. Identify the types of digital communication channels used for educational administration in secondary schools in North-West Nigeria.
2. Determine the extent to which digital communication channels are used for educational administrative activities.
3. Examine the influence of the use of digital communication channels on student engagement in secondary schools in North-West Nigeria.
4. Identify the challenges affecting the effective use of digital communication channels for educational administration in secondary schools in North-West Nigeria.

Research Hypothesis

H_{01}: There is no significant influence of the use of digital communication channels on student engagement in secondary schools in North-West Nigeria.

Literature Review

Digital communication channels refer to technology-mediated platforms through which school administrators, teachers, students and other stakeholders exchange information, coordinate activities and provide feedback. In educational administration, these channels include instant-messaging applications such as WhatsApp, e-mail, social media, school websites or portals, SMS, learning-management systems and other institutional digital platforms. In a study conducted in Northern Nigeria, Ahmed, Buba and Dangida (2023) found a high level of utilisation of digital channels, including blogs, e-mail, online magazines, radio, social media, television displays and websites, for disseminating cultural heritage information. The study reported an overall mean of 3.19 for the perceived impact of digital-media utilisation on dissemination, demonstrating the capacity of digital channels to improve information access and dissemination within the Northern Nigerian context. This evidence provides a useful regional basis for considering the application of similar channels to educational administration.

Recent research on school management further demonstrates the growing role of digital communication in administrative practice. Rostina (2026), for example, found that a school principal employed multiple digital platforms, including WhatsApp, Facebook and Instagram, to support both internal and external communication. The study indicates that digital platforms can facilitate

communication within school management, although their effectiveness is influenced by the digital competence of users and the context in which they are employed.

The use of digital communication changes educational administration from predominantly one-way information dissemination towards more immediate and interactive communication. Administrators can use digital channels to circulate announcements, communicate schedules and policies, coordinate activities, obtain feedback, communicate with parents and students, and respond to emerging issues. Rostina (2026) demonstrated that school leadership can employ multiple digital communication platforms to support internal and external school communication, indicating that digital communication is increasingly becoming part of contemporary school-management practice.

Nevertheless, the availability of digital communication channels should be distinguished from their effective utilisation. A school may possess Internet connectivity, smartphones or messaging platforms without integrating them systematically into administrative processes. Issues relating to digital competence, infrastructure, accessibility, institutional support, privacy and ethical communication can affect the extent to which digital technologies contribute to effective administration. Mulyani et al. (2026), in a thematic review of digital transformation in educational management, similarly identified challenges associated with digital management, screen-mediated interaction, misinformation, cyberbullying and the need for appropriate digital communication ethics and governance.

Student engagement is a multidimensional construct involving behavioural, emotional and cognitive dimensions. Behavioural engagement concerns students' participation and involvement in school activities; emotional engagement relates to students' interest, sense of belonging and feelings towards school; while cognitive engagement concerns students' mental investment, effort and willingness to engage deeply with learning. This multidimensional understanding is important because digital communication may influence not only students' physical participation but also their interaction with school, access to information, sense of connection and willingness to participate.

Nkomo et al. (2021), in a systematic review of student engagement with digital technologies, found that digital technologies are associated with different dimensions of student engagement and that engagement has been examined through technologies including learning-management systems, social media, video and collaborative platforms. The authors also noted considerable variation in how engagement is conceptualised and measured, demonstrating the need to consider the specific context and technology when examining digital communication and engagement.

Evidence from secondary education also suggests that ICT integration can positively influence student engagement. Noblecilla-Espinoza (2025), in a systematic review of ICT integration in secondary schools, reported generally positive effects on students' cognitive, behavioural and emotional engagement, although the effectiveness varied according to the type of technology and the design through which it was integrated. The review particularly identified interactivity, personalised learning and feedback as mechanisms through which technology can strengthen engagement.

The relationship between the variables can therefore be understood as a process in which digital communication channels provide the technological means through which educational administrators communicate, coordinate and interact with students, while the quality, accessibility and usefulness of these interactions may influence student engagement. Where communication is timely, accessible, relevant and interactive, students may be more likely to remain informed and participate in school activities. Conversely, ineffective communication, information overload, poor connectivity or limited access may reduce the potential benefits of digital platforms.

The literature supports this relationship but also demonstrates that the effect of digital technology is context-dependent. Nkomo et al. (2021) observed that the relationship between digital technologies and student engagement varies according to the technology, context and form of engagement being considered. Similarly, Granić and Marangunić (2019), through a systematic review of the Technology Acceptance Model in educational contexts, established the continuing relevance of perceived usefulness and perceived ease of use in explaining technology acceptance and utilisation. Together, these findings provide a theoretical and empirical basis for examining whether digital communication channels used by secondary-school administrators are sufficiently useful and accessible to support administrative activities and contribute to student engagement.

Despite the potential of digital communication channels to improve educational administration, their effective utilisation can be constrained by technological, infrastructural, financial and human factors. Evidence from Nigerian secondary schools shows that inadequate knowledge of digital technologies, high costs of digital technologies and Internet subscriptions, unstable Internet connectivity and erratic electricity supply constitute significant challenges to students' engagement with digital

technologies (Asuquo et al., 2024). The study, which involved 578 senior secondary-school students in Kwara State, consequently recommended improved Internet connectivity and electricity, adequate provision of digital technologies and training for teachers and students.

Further evidence is provided by Olanrewaju et al. (2021), who investigated digital gaps in rural secondary schools and remote communities across six Nigerian states, including Kano and Adamawa. The study identified poor Internet connectivity, inadequate electricity, socioeconomic conditions, poverty and the absence of appropriate ICT strategies and policies as major drivers of digital gaps. The findings demonstrate that digital communication and participation in Nigerian secondary schools cannot be separated from the wider conditions of digital access and infrastructure.

These challenges are particularly relevant to digital communication for educational administration because communication platforms require reliable connectivity, accessible devices, adequate digital skills and institutional support to function effectively. Where these conditions are absent, administrators may be unable to communicate consistently with students, while students may experience difficulty accessing administrative information or responding through digital platforms. Thus, the effectiveness of digital communication channels should be examined not only in terms of the platforms available but also in relation to the conditions under which they are used. This provides a strong empirical basis for the fourth objective of the present study, which seeks to identify the challenges affecting the effective use of digital communication channels for educational administration in secondary schools in North-West Nigeria.

Theoretical Framework: Technology Acceptance Model (TAM)

The study was anchored on the Technology Acceptance Model (TAM) developed by Davis (1989). TAM explains users' acceptance and use of information technology primarily through two beliefs: perceived usefulness, referring to the extent to which an individual believes that using a technology will improve performance, and perceived ease of use, referring to the extent to which the technology is perceived as requiring little effort. These beliefs influence attitudes and behavioural intentions, which subsequently affect actual technology use. TAM has been extensively applied in educational technology research, and a systematic review found it to be a credible framework for examining acceptance of diverse technologies in educational settings (Granić & Marangunić, 2019).

TAM is appropriate for the present study because the use of digital communication channels by secondary-school administrators depends partly on whether administrators perceive the channels as useful for performing administrative activities and easy to use. For example, an administrator who considers WhatsApp, e-mail or a school portal useful for disseminating information, coordinating activities and receiving feedback is more likely to use it regularly. Similarly, a platform that is difficult to operate, unreliable or requires excessive effort may be used less frequently even when it is available. Research applying TAM to students' ICT use has likewise demonstrated that perceived usefulness and ease of use are important dimensions underlying technology attitudes and adoption (Edmunds et al., 2012).

Theoretical Gap and Relevance

Although TAM provides a strong explanation of technology adoption and use, it does not by itself fully explain the educational or administrative outcomes produced by that use. This is important because the present study is not concerned merely with whether administrators accept digital technologies; it seeks to determine whether their use contributes to student engagement. This limitation is consistent with the broader literature showing that technology use and student engagement are context-dependent and that engagement itself has multiple dimensions (Nkomo et al., 2021). Therefore, TAM is used in this study primarily to explain the adoption and utilisation dimension, while student engagement is examined as an outcome associated with the use of digital communication channels.

Methodology

The study adopted a descriptive cross-sectional survey design. The population comprised secondary-school administrators in selected secondary schools across the North-West geopolitical zone of Nigeria. Initially, 558 respondents were targeted from the 186 Local Government Areas, based on one secondary school per Local Government Area and comprising the Headmaster, Assistant Headmaster and Senior Master; however, the actual population obtained from the respective State Ministries of Education was 418 administrators, as some schools had only a Headmaster while others had a Headmaster and Assistant Headmaster without a Senior Master. A multistage sampling technique was adopted, with the North-West zone purposively selected, while the states and schools were purposively selected. Total enumeration was used to include all 418 eligible administrators. Data were collected using a structured questionnaire covering demographic characteristics, digital communication channels used for educational administration, extent of utilisation, digital communication and student engagement, and challenges affecting effective use. The questionnaire was subjected to

face and content validation by experts, while a pilot test was conducted in comparable schools outside the study area and Cronbach's alpha coefficient of 0.70 or above was considered acceptable for reliability.

Data were collected after obtaining the necessary permissions, with participation being voluntary and respondents' confidentiality maintained. For Objective 1, frequencies and percentages were used to identify the digital communication channels used for educational administration; Objective 2 was analysed using frequency, percentage, mean and standard deviation to determine the extent of their use for administrative activities; Objective 3 was analysed using mean, standard deviation and an appropriate inferential statistic to determine the influence of digital communication channels on student engagement; while Objective 4 was analysed using frequencies and percentages to identify the challenges affecting effective utilisation. The findings were presented in tables, with inferential tests interpreted at the predetermined level of significance.

Data Analysis and Interpretation

Objective 1: Identify the types of digital communication channels used for educational administration in secondary schools in North-West Nigeria.

To address this objective, respondents were asked to indicate whether each of the identified digital communication channels was used for educational administrative purposes in their schools. The responses are presented in frequencies and percentages.

Table 1: Digital Communication Channels Used for Educational Administration

S/N	Digital communication channel	Yes (f)	Yes (%)	No (f)	No (%)
1	WhatsApp	391	93.5	27	6.5
2	SMS/Text messaging	365	87.3	53	12.7
3	E-mail	278	66.5	140	33.5
4	Facebook	246	58.9	172	41.1
5	School website/portal	183	43.8	235	56.2
6	Telephone calls	352	84.2	66	15.8
7	Telegram	97	23.2	321	76.8
8	Learning Management System (LMS)	76	18.2	342	81.8
9	Google Classroom	64	15.3	354	84.7
10	X (formerly Twitter)	51	12.2	367	87.8

Note. *N = 418.*

Table 1 shows that WhatsApp was the most widely used digital communication channel, with 391 (93.5%) respondents indicating its use for educational administration. This was followed by SMS/text messaging with 365 (87.3%) and telephone calls with 352 (84.2%). E-mail was also relatively common, as reported by 278 (66.5%) respondents, while Facebook was used by 246 (58.9%).

The findings further show relatively limited use of institutional and specialised digital platforms. School websites/portals were reported by 183 (43.8%) respondents, while Telegram was reported by only 97 (23.2%). The least utilised channels were Learning Management Systems (18.2%), Google Classroom (15.3%) and X/Twitter (12.2%). Overall, the pattern indicates that schools relied more heavily on simple, accessible and widely available communication channels, particularly WhatsApp, SMS and telephone calls, than on formal institutional or specialised digital platforms.

Objective 2: Determine the extent to which digital communication channels are used for educational administrative activities in secondary schools in North-West Nigeria.

A four-point Likert scale was used to measure the extent of utilisation, where Very High Extent (VHE) = 4, High Extent (HE) = 3, Low Extent (LE) = 2, and Very Low Extent (VLE) = 1. The criterion mean was 2.50.

Table 2: Extent of Use of Digital Communication Channels for Educational Administrative Activities

S/N	Educational administrative activity	VHE (4)	HE (3)	LE (2)	VLE (1)	Mean	Decision
1	Dissemination of school announcements	42	71	163	142	2.03	Low extent
2	Communication of examination information	38	69	171	140	2.01	Low extent
3	Communication of school policies and directives	35	63	176	144	1.98	Low extent
4	Coordination of school activities	31	66	181	140	1.98	Low extent
5	Communication of students' academic information	28	61	184	145	1.94	Low extent
6	Receiving feedback from students	24	57	189	148	1.9	Low extent
7	Communicating with parents/guardians	37	72	174	135	2.03	Low extent
8	Monitoring students' attendance and participation	19	51	188	160	1.83	Low extent
9	Emergency/urgent administrative communication	46	79	164	129	2.1	Low extent
10	Sharing information about school programmes and events	39	74	172	133	2.05	Low extent
	Overall Mean					**1.99**	**Low extent**

Note. *N = 418; VHE = Very High Extent; HE = High Extent; LE = Low Extent; VLE = Very Low Extent. Criterion mean = 2.50.*

Table 2 indicates that the use of digital communication channels for educational administrative activities was generally low, as reflected by the overall mean of 1.99, which was below the criterion mean of 2.50. The highest level of utilisation was recorded for emergency/urgent administrative communication (M = 2.10), followed by sharing information about school programmes and events (M = 2.05). Dissemination of school announcements and communication with parents/guardians both recorded a mean of 2.03.

The lowest level of utilisation was recorded for monitoring students' attendance and participation (M = 1.83), followed by receiving feedback from students (M = 1.90) and communicating students' academic information (M = 1.94). Communication of school policies and directives and coordination of school activities both recorded a mean of 1.98.

Objective 3: Examine the influence of digital communication channels on student engagement in secondary schools in North-West Nigeria.

To address this objective, the responses were measured using a four-point Likert scale: **Strongly Agree (SA) = 4, Agree (A) = 3, Disagree (D) = 2, and Strongly Disagree (SD) = 1**. The criterion mean was **2.50**. Since the objective seeks to examine *influence*, the responses were subsequently subjected to regression analysis to determine whether the use of digital communication channels significantly predicted student engagement.

Table 3: Digital Communication Channels and Student Engagement

S/N	Items	SA (4)	A (3)	D (2)	SD (1)	Mean	Decision
1	Digital communication channels help students receive school information on time.	91	143	112	72	2.61	Agree
2	Digital communication makes students more aware of school activities and programmes.	87	151	113	67	2.62	Agree
3	Digital communication provides opportunities for students to interact with school administrators.	69	126	139	84	2.43	Disagree

4	Digital communication encourages students to participate in school activities.	76	137	128	77	2.51	Agree
5	Digital communication enables students to obtain timely academic information.	83	142	119	74	2.56	Agree
6	Digital communication enables students to provide feedback to school authorities.	57	119	151	91	2.34	Disagree
7	Digital communication strengthens students' sense of connection with the school.	64	127	143	84	2.41	Disagree
8	Digital communication encourages students to take greater interest in school activities.	71	135	132	80	2.47	Disagree
9	Digital communication improves students' participation in academic activities.	73	139	127	79	2.49	Disagree
10	Digital communication generally enhances student engagement in school activities.	78	146	121	73	2.55	Agree
	Overall Mean					**2.5**	**Agree**

Note. *N = 418; SA = Strongly Agree; A = Agree; D = Disagree; SD = Strongly Disagree. Criterion mean = 2.50.*

Table 3 shows that the overall mean of 2.50 was exactly at the criterion mean, indicating a moderate level of perceived influence of digital communication channels on student engagement. The highest mean was recorded for the statement that digital communication makes students more aware of school activities and programmes (M = 2.62), followed by timely access to school information (M = 2.61) and access to timely academic information (M = 2.56). The findings suggest that the strongest contribution of digital communication was in keeping students informed and aware of school-related activities.

However, respondents expressed weaker perceptions concerning the interactive and participatory dimensions of engagement. The lowest mean was recorded for the ability of digital communication to enable students to provide feedback to school authorities (M = 2.34), followed by strengthening students' sense of connection with the school (M = 2.41) and providing opportunities for interaction with administrators (M = 2.43). This suggests that digital communication channels were used more for information dissemination than for two-way communication and student participation.

Test of Hypothesis

H_{01}: There is no significant influence of the use of digital communication channels on student engagement in secondary schools in North-West Nigeria.

A simple linear regression analysis was conducted, with the extent of use of digital communication channels as the independent variable and student engagement as the dependent variable.

Table 4: Regression Analysis of Digital Communication Channels and Student Engagement

Model	R	R^2	Adjusted R^2	Std. Error	F	Sig.
1	0.428	0.183	0.181	0.417	93.18	0

Predictor: Use of digital communication channels
Dependent variable: Student engagement
N = 418

The regression result in Table 4 indicates a moderate positive relationship between the use of digital communication channels and student engagement (R = .428). The coefficient of determination (R^2 = .183) indicates that the use of digital communication channels accounted for approximately 18.3% of the variation in student engagement, while the remaining 81.7% could be attributed to other factors not covered by the model.

The regression model was statistically significant, F(1, 416) = 93.18, $p < .001$. Since the significance value was less than the 0.05 level of significance, the null hypothesis was rejected.

Decision: There was a significant influence of the use of digital communication channels on student engagement in secondary schools in North-West Nigeria.

Inference: The finding suggests that greater use of digital communication channels was associated with higher levels of student engagement. However, the relatively modest R^2 value indicates that digital communication is only one of several factors influencing student engagement.

Discussion of Findings

The study found that WhatsApp (93.5%), SMS/text messaging (87.3%) and telephone calls (84.2%) were the most commonly used digital communication channels for educational administration, while specialised platforms such as learning-management systems (18.2%), Google Classroom (15.3%) and X/Twitter (12.2%) were less utilised. This finding is consistent with Ahmed et al. (2023), whose study in Northern Nigeria demonstrated substantial use of diverse digital channels for information dissemination, with an overall mean of 3.19. The finding suggests that administrators tend to favour communication platforms that are familiar, readily accessible and relatively inexpensive. This also supports the Technology Acceptance Model (TAM), particularly the proposition that perceived usefulness and ease of use influence technology adoption and utilisation (Granić & Marangunić, 2019).

The study further revealed that the extent of use of digital communication channels for administrative activities was low, with an overall mean of 1.99, below the criterion mean of 2.50. Although digital channels were available, their use was concentrated more on urgent communication and dissemination of school information than on interactive functions such as receiving student feedback, monitoring participation and communicating academic information. This finding indicates a gap between availability and meaningful administrative utilisation of digital communication technologies. Inference from TAM suggests that the low utilisation may reflect limitations in perceived usefulness, ease of use, institutional support or the conditions necessary for sustained technology use. The finding is also consistent with the broader digital-education literature, which cautions that the presence of digital technologies does not necessarily result in meaningful engagement or effective educational use (Nkomo et al., 2021).

The study also found a significant positive influence of digital communication channels on student engagement ($R = .428$, $R^2 = .183$, $F(1,416) = 93.18$, $p < .001$), leading to the rejection of the null hypothesis. The result indicates that increased utilisation of digital communication channels was associated with increased student engagement, although the relatively modest R^2 of 18.3% suggests that other factors also contribute substantially to student engagement. This finding agrees with Nkomo et al. (2021), whose systematic review established that digital technologies, including social media and collaborative technologies, can support different dimensions of student engagement, while also noting that the nature and extent of engagement vary according to technology and context. The finding therefore extends the literature by showing that, within the North-West Nigerian secondary-school context, digital communication is not merely an administrative mechanism but can also contribute to students' engagement with school activities.

Finally, the study identified infrastructural, financial and human-related factors as challenges to effective digital communication. This finding is consistent with Asuquo et al. (2024), who reported inadequate digital knowledge, high Internet costs, unstable connectivity and unreliable electricity among challenges affecting Nigerian secondary-school students' engagement with digital technologies. The implication is that improving digital communication in secondary-school administration requires more than providing communication platforms; schools also need reliable connectivity and electricity, appropriate digital skills and institutional support. Overall, the findings support the study's theoretical position that technology utilisation is shaped by users' perceptions and contextual conditions, while the significant relationship with student engagement demonstrates the potential educational value of integrating digital communication more systematically into school administration.

Conceptual Framework of the Study

The conceptual framework was developed from the study objectives, the findings and the Technology Acceptance Model (TAM). It proposes that the types of digital communication channels available and, more importantly, the extent to which they are utilised for educational administrative activities, constitute the principal independent variables. These are expected to influence student engagement, the dependent variable. The framework also recognises contextual challenges—such as inadequate digital skills, poor Internet connectivity, unreliable electricity, cost and limited access to digital devices—as factors that may constrain the effective use of the channels and consequently weaken their potential influence on student engagement.

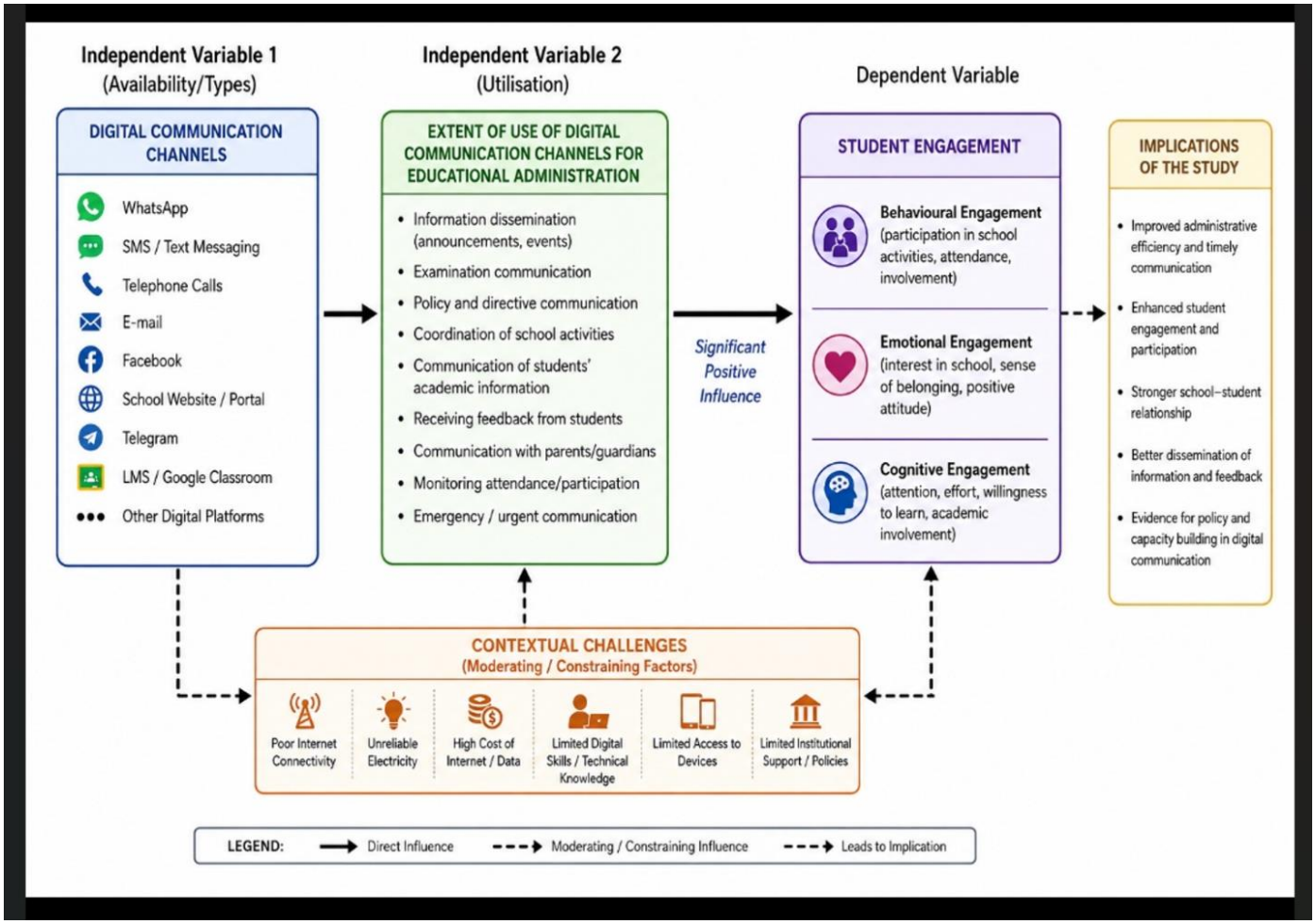

Figure 1: Conceptual Framework

Explanation of the Framework

The framework indicates that digital communication channels constitute the technological means, while their extent of utilisation for educational administration represents the principal process through which they can affect student engagement. The findings showed that WhatsApp, SMS and telephone calls were the most commonly used channels, but the overall extent of their utilisation for administrative activities was low (M = 1.99). Despite this low utilisation, the study found a significant positive influence on student engagement ($R = .428$, $R^2 = .183$, $p < .001$). Thus, the framework suggests that greater and more systematic utilisation of digital communication channels could potentially strengthen students' behavioural, emotional and cognitive engagement.

The contextual challenges are positioned as constraining factors rather than as the principal independent variable. Their presence may limit administrators' ability to use digital channels consistently and effectively. This interpretation is consistent with TAM, which emphasises the importance of perceived usefulness and perceived ease of use in technology acceptance and utilisation. In practical terms, even where administrators recognise the usefulness of digital communication, poor connectivity, inadequate skills, unreliable electricity and limited access to devices may prevent effective use.

Implication of the Conceptual Framework

The framework implies that secondary schools in North-West Nigeria should move beyond merely having digital communication channels to systematically integrating them into educational administration. The low utilisation found in the study, alongside the significant positive influence on student engagement, suggests an opportunity for schools to strengthen digital communication as an administrative and engagement strategy. This requires prioritising accessible platforms such as WhatsApp and SMS while progressively developing institutional platforms, improving digital competencies, strengthening Internet and electricity infrastructure, establishing appropriate communication policies, and encouraging two-way communication and feedback. If these conditions are addressed, digital communication can become a more effective mechanism for connecting school administration with students and improving their engagement.

Conclusion

The study concluded that secondary schools in North-West Nigeria used a variety of digital communication channels for educational administration, although their use was

concentrated mainly on accessible and familiar platforms such as WhatsApp, SMS/text messaging, telephone calls, e-mail and Facebook, while specialised platforms such as learning-management systems, Google Classroom and X/Twitter were less commonly used. Despite the availability of these channels, they were not extensively integrated into educational administrative activities, as their use was more prominent for basic information dissemination and urgent communication than for interactive and systematic functions such as receiving student feedback, monitoring participation, coordinating activities and communicating academic information.

The study further concluded that the use of digital communication channels had a significant positive influence on student engagement, indicating that their purposeful use could contribute to students' awareness, participation and interaction with school activities. However, the finding also suggests that digital communication is only one of several factors that determine student engagement. The study also concluded that effective utilisation of digital communication channels was constrained by infrastructural, financial and human-related challenges, particularly poor Internet connectivity, unreliable electricity, cost, limited access to digital devices and inadequate digital competence. Consequently, the availability of digital communication channels alone was insufficient to ensure their effective integration into educational administration.

Finally, the study concluded that there was a significant influence of the use of digital communication channels on student engagement in secondary schools in North-West Nigeria. Consequently, the null hypothesis, which stated that there was no significant influence of the use of digital communication channels on student engagement, was rejected. The finding establishes that digital communication constitutes a significant factor associated with student engagement in the study setting.

Recommendations

Based on the findings, the study recommends that:

1. Secondary-school administrators should systematically integrate digital communication channels, particularly widely accessible platforms such as WhatsApp, SMS and telephone communication, into routine administrative activities rather than limiting their use mainly to urgent information dissemination.
2. School authorities and relevant education agencies should provide regular digital-skills training for administrators, teachers and students to improve their capacity to use digital communication channels for information sharing, feedback, coordination and student engagement.
3. Government and school management should strengthen digital infrastructure, particularly Internet connectivity, electricity supply and access to appropriate digital devices, while reducing the financial barriers associated with Internet and digital technology use.
4. Schools should establish clear policies and procedures for digital communication that promote timely two-way communication, student feedback, privacy, responsible use and appropriate integration of digital channels into administrative and student-engagement activities.

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