# Digital Media Algorithms and their Educational Effects in South-South Nigeria

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**DOI: https://doi.org/10.47772/IJRISS.2026.100600170**

**Received: 18 May 2026; Accepted: 23 May 2026; Published: 19 June 2026**

## ABSTRACT

Digital media is changing fast, and so are the ways people learn online. Driven by technological advancements and shifting user behaviours, these changes have made it increasingly important to understand how virtual education works and what it means for society. This study set out to explore the many dimensions of digital media phenomena and how they have shaped education in South-South Nigeria. It examined how factors like socioeconomics, demographics, teaching approaches, and student engagement interact within online learning environments, with the goal of deepening our understanding and offering practical insights for making digital education more effective and accessible. A qualitative research method was used, involving in-depth interviews and focus group discussions with undergraduate students and lecturers from selected tertiary institutions in the region. The findings added meaningfully to what we know about online learning, touching on academic outcomes, student engagement, and how satisfied learners feel with their overall experience. Among the key discoveries were the presence of echo chambers and attention deficits among participants, as well as a clear need for stronger digital literacy. The study carries practical implications for policymakers, educators, and digital media learners alike. It recommends responsible digital governance and a more serious commitment to media literacy education as essential steps in responding to the double-edged influence of algorithmic media environments.

**Keywords:** digital technologies, digital literacy, evolving media, echo chambers, digital learning

## INTRODUCTION

Digital technologies have spread rapidly across Nigeria, reshaping how people communicate, learn, and access information. In the South-South geopolitical zone (comprising Rivers, Akwa Ibom, Cross River, Delta, Edo, and Bayelsa States), digital media platforms have become deeply woven into everyday educational life. Students, lecturers, and institutions have come to rely on platforms such as Facebook, YouTube, TikTok, Instagram, WhatsApp, and X (formerly Twitter) for learning, research, collaboration, and social interaction. At the heart of these platforms are digital media algorithms, which quietly determine what content users see, engage with, and pass on to others (Zuboff, 2019).

These algorithms work by collecting user data and predicting what people are likely to enjoy based on their browsing habits, interactions, and engagement patterns. In doing so, they personalise content feeds, suggest educational materials, and shape what information becomes visible. While this has opened up new doors for accessing educational resources and digital learning, it has also raised genuine concerns about misinformation, distraction, addiction, weakened critical thinking, and exposure to harmful content (Pariser, 2011; Sunstein, 2018). Scholars around the world have begun paying closer attention to how algorithmic design intersects with educational environments (Ots, 2021).

The widespread use of smartphones and the internet among young people and university students has meant that algorithm-driven digital media environments are quietly reshaping educational experiences in South-South Nigeria. Research shows that students are increasingly turning to algorithmically curated content for tutorials, online classes, academic discussions, and exam preparation. Educational videos on YouTube, learning groups on Facebook, and AI-generated content on TikTok and Instagram have all been found to influence how students behave academically and how they approach learning (Nwoji et al., 2025; Bali et al., 2024).

Studies on digital learning in Nigeria suggest that, when used well, digital media tools can improve student engagement, boost creativity, and widen access to information (Ojo et al., 2023). However, when students become overly dependent on algorithmically generated entertainment content, their academic focus and performance can suffer (Ologun & Adebayo, 2021). Researchers have also noted that algorithmic systems tend to push sensational or emotionally charged content over academically valuable material, which can distort students' learning priorities and weaken their information literacy (Fuchs, 2017; McQuail, 2010). Recent evidence from Nigerian higher education reinforces this concern, showing that the volume and nature of algorithmically recommended content can disrupt study habits and pull students away from peer-reviewed or institutionally approved resources (Nwoji et al., 2025). This echoes Postman's (1993) critique of technopoly, which cautions that uncritical adoption of technology can quietly erode the cultural and intellectual foundations of education.

The South-South region offers a particularly revealing context for examining these dynamics. Its growing digital culture, young population, expanding tertiary institutions, and uneven access to digital infrastructure all create a complex

landscape. Urban centres like Port Harcourt, Uyo, Benin City, and Calabar have embraced technology rapidly, while many rural communities continue to struggle with internet access, digital literacy, and electricity supply (Van Dijk, 2020). These disparities affect how students engage with algorithm-driven media and educational technologies in meaningful ways.

The emergence of artificial intelligence and machine learning in education has only deepened these conversations, raising questions about personalised learning, algorithmic bias, digital inequality, and media literacy (Bali et al., 2024). Recent Nigerian studies on AI and educational technology have underscored the urgency of responsible digital governance and better digital literacy for both students and educators. All of this points to a pressing need to understand how digital media algorithms are influencing students' academic performance, information habits, critical thinking, and broader educational development in South-South Nigeria (Bashir, 2020; Ots, 2021).

This study matters because the insights it generates can help policymakers, educators, media practitioners, and technology companies design more thoughtful strategies for promoting responsible digital engagement and improving educational outcomes. It also contributes to wider conversations about media literacy, digital citizenship, educational technology, and communication studies in Nigeria (Jenkins et al., 2013; Siemens, 2005).

## OBJECTIVES OF THE STUDY

The following objectives guided this study:

1. To examine the extent to which digital media algorithms influenced students' access to educational resources and engagement with online learning in South-South Nigeria.
2. To identify the negative consequences of algorithm-driven digital media platforms on students' academic concentration, information literacy, and critical thinking in South-South Nigeria.
3. To assess the level of algorithmic literacy among undergraduate students and lecturers in selected tertiary institutions in South-South Nigeria.

## THEORETICAL FRAMEWORK

This study was grounded in three theoretical perspectives that together offer a well-rounded lens for understanding the relationship between digital media algorithms and education.

The Uses and Gratifications Theory (McQuail, 2010) helped explain how students actively choose and use digital media platforms to meet their informational, educational, and social needs. By placing emphasis on user agency, this theory accounted for the deliberate choices students make when engaging with algorithmically curated content online.

Media Ecology Theory, developed by Postman (1993) and extended by McLuhan and others, offered a way of thinking about how digital media environments shape human perception, cognition, and interaction. This perspective was especially useful for understanding how algorithm-driven platforms restructure students' attention spans, communication habits, and learning behaviours at a broader systemic level.

Vygotsky's (1978) sociocultural theory of learning, which emphasises the social and contextual nature of knowledge construction, informed the study's interest in how digital media algorithms mediate collaborative learning, academic dialogue, and the development of critical thinking. Together, these three frameworks made it possible to analyse the educational effects of algorithmic media from multiple angles (Siemens, 2005; Jenkins et al., 2013). Siemens' (2005) Connectivism theory further enriched the analysis by drawing attention to how networked digital environments shape the way knowledge is formed in the digital age.

## METHODOLOGY

This study used a qualitative research approach grounded in a phenomenological research design. The qualitative method was a natural fit because the study aimed to explore and understand the lived experiences, perceptions, attitudes, and interpretations of students, lecturers, and digital media users regarding the influence of digital media algorithms on education in South-South Nigeria (Wimmer & Dominick, 2014).

The phenomenological design allowed the researchers to examine how individuals experienced algorithm-driven platforms such as YouTube, TikTok, Facebook, Instagram, WhatsApp, and X within their educational activities. Data were gathered through in-depth interviews and focus group discussions conducted with students, lecturers, and media experts in selected tertiary institutions across South-South Nigeria. Participants were drawn from institutions in across the region. Purposive sampling was used to identify participants who were active users of digital media platforms and could speak meaningfully about their online educational experiences.

Thematic analysis was used to make sense of the data. Interview and focus group transcripts were coded inductively, with

themes emerging from recurring patterns across participants' responses. To ensure rigour and trustworthiness, the researchers employed member-checking and peer debriefing throughout the analytical process (Wimmer & Dominick, 2014). Ethical clearance was obtained before data collection began, and all participants gave informed consent. Identities have been anonymised, and quotations are referenced by state of origin only.

## FINDINGS

The findings presented below were drawn from qualitative data generated through in-depth interviews and focus group discussions with students, lecturers, and media experts in selected tertiary institutions across South-South Nigeria. The data were analysed using thematic analysis, and the findings are organised around eight major themes that emerged from participants' responses.

### Theme 1: High Exposure to Algorithm-Driven Digital Media Platforms

Most participants reported frequent interaction with algorithm-driven platforms such as YouTube, TikTok, Facebook, Instagram, WhatsApp, and X for both academic and personal purposes. Many students noticed that educational content appeared on their feeds based on what they had previously searched or watched. Participants recognised that recommendation systems played a significant role in shaping the kind of educational material they encountered online. These findings align with Boyd's (2014) observation that algorithm-driven social platforms mediate the informational environments of young people in ways that quietly shape their daily learning routines.

A participant from Cross River State shared:

*"Whenever I watch one tutorial on YouTube, the platform keeps recommending similar educational videos to me. It has helped me discover many learning resources."*

Another participant observed:

*"TikTok and Instagram now show me academic tips and communication-related content because of the kind of videos I interact with."*

The findings confirmed that digital media algorithms play a major role in shaping students' online learning experiences and content exposure (Nwoji et al., 2025), supporting Siemens' (2005) connectivist view that learning increasingly happens through networked digital channels.

### Theme 2: Improved Access to Educational Materials

The study found that digital media algorithms helped expand access to educational resources among students in South-South Nigeria. Participants reported that algorithmic recommendations introduced them to online tutorials, recorded lectures, research materials, educational podcasts, academic discussion groups, and skill acquisition videos (Ojo et al., 2023). Several students explained that personalised recommendations made it easier to find learning materials relevant to their courses and research interests.

A lecturer from Akwa Ibom State noted:

*"Students now learn beyond the classroom because social media algorithms constantly recommend educational content relevant to their academic interests."*

Participants also spoke about how digital platforms enabled self-paced and independent learning (Siemens, 2005; Vygotsky, 1978). These findings align with Bali et al.'s (2024) conclusion that AI-driven educational technologies have broadened access to knowledge in Nigerian higher education.

### Theme 3: Increased Student Engagement and Interactive Learning

The findings showed that algorithm-driven multimedia content made students more interested and engaged in learning. Students reported that visual materials improved comprehension, interactive videos aided retention, short educational clips broke down complex concepts, and social media discussions encouraged collaborative learning (Jenkins et al., 2013). These dimensions of participatory media engagement resonate with Vygotsky's (1978) zone of proximal development, which describes how socially mediated content helps learners go beyond what they can achieve on their own.

One participant explained:

*"Educational videos on TikTok and YouTube make difficult topics easier to understand because they use graphics and practical demonstrations."*

Focus group participants agreed that algorithmically recommended educational content made learning feel more engaging and less daunting (Ojo et al., 2023). The personalisation offered by recommendation systems appeared to act as an informal scaffolding mechanism for student learners.

**Theme 4: Distraction and Reduced Academic Concentration**

Despite these benefits, the study found that digital media algorithms were also a significant source of distraction and reduced concentration. Participants explained that entertainment content frequently disrupted academic activities, as algorithms kept pushing trending videos, comedy skits, celebrity gossip, and other non-academic material. These findings echo Postman's (1993) critique of technopoly and Pariser's (2011) concerns about how algorithmic personalisation can deepen existing cognitive habits and divert users from meaningful engagement.

One student said:

*"I normally go online to study, but after watching one entertainment video, the algorithm keeps bringing more unrelated content, and I forget about studying."*

Another added:

*"Social media notifications and endless recommendations waste students' time and reduce reading culture."*

The findings suggested that algorithmic systems are primarily designed to maximise user engagement, not academic productivity (Zuboff, 2019; Ologun & Adebayo, 2021), in line with Zuboff's (2019) surveillance capitalism framework, which argues that platform architectures are built to exploit users' attention as a commercial resource.

**Theme 5: Addiction and Excessive Screen Time**

The study uncovered signs of excessive social media use and digital dependency among students. Participants admitted to spending several hours daily on algorithm-driven platforms, often well beyond any educational purpose. Common issues included poor time management, disrupted sleep, reduced face-to-face interaction, academic procrastination, and difficulty pulling away from screens (Boyd, 2014). These patterns reflect the behavioural reinforcement loops built into platform design (Zuboff, 2019).

A participant from Akwa Ibom State admitted:

*"Sometimes I spend more than five hours scrolling through videos without realizing how much time I have wasted."*

Lecturers interviewed expressed concern that many students had grown overly dependent on social media platforms for both learning and entertainment. These findings are consistent with those of Ologun and Adebayo (2021), who found that excessive social media use correlated with academic underperformance among Nigerian university students.

**Theme 6: Exposure to Misinformation and Low Information Verification**

The study also found that students were frequently exposed to misleading or inaccurate information through algorithmic recommendations. Participants acknowledged finding it difficult to distinguish credible academic content from false or manipulated material online. This aligns with earlier work on information disorder and algorithmic amplification (Fuchs, 2017), as well as with Pariser's (2011) filter bubble concept, which describes how algorithmic curation can shield users from diverse and accurate information.

A media expert explained:

*"Algorithms promote content that attracts engagement, not necessarily content that is accurate or educationally reliable."*

Some students admitted to sharing unverified academic materials and misleading information sourced from social media. The findings suggested that low media literacy and poor verification habits left students particularly vulnerable to misinformation (Bashir, 2020; Ots, 2021). Bashir's (2020) framework for algorithm governance in Nigerian media highlighted the regulatory gap that allows misinformation to circulate freely through platform recommendation engines.

**Theme 7: Limited Awareness of How Algorithms Work**

Many students were found to have little understanding of how digital media algorithms actually work. While participants noticed that platforms showed them personalised content, most could not explain the mechanisms behind algorithmic filtering and recommendation systems. This revealed low algorithmic literacy among students in South-South Nigeria,

consistent with the broader global picture described by Ots (2021), who has called for algorithmic literacy to be built into media education curricula.

One participant said:

*"I know social media somehow studies what I watch, but I do not really understand how the system works."*

This gap has serious implications for digital citizenship and self-regulated learning (Zuboff, 2019; Jenkins et al., 2013). Without understanding how algorithms shape their informational environments, students are less equipped to take meaningful control of their own digital learning experiences.

**Theme 8: Digital Inequality and Infrastructure Challenges**

Participants pointed to a range of infrastructural barriers that limited effective educational use of digital media platforms, including poor internet connectivity, high data subscription costs, unreliable electricity supply, and limited access to devices (Van Dijk, 2020). Students in rural areas were particularly vocal about unstable networks and the challenges of participating in online learning.

A participant from Bayelsa State remarked:

*"Even when educational content is available online, many students cannot access it regularly because of network and electricity problems."*

The findings showed that these infrastructural gaps continue to restrict digital learning opportunities across the region (Van Dijk, 2020; Bali et al., 2024). These digital divide dynamics are especially visible in South-South Nigeria, where access to electricity and broadband connectivity remains uneven across urban and rural areas.

## DISCUSSION

The discussion focuses on the major themes that emerged from the study on digital media algorithms and their educational effects in South-South Nigeria. Taken together, the findings reveal that digital media algorithms carry both real benefits and serious risks for educational development, learning behaviour, and information consumption among students and educators in the region.

Students and lecturers in South-South Nigeria were found to be deeply immersed in algorithm-driven digital media platforms such as YouTube, TikTok, Facebook, Instagram, WhatsApp, and X. This confirmed the growing reach of digital technologies in educational communication and learning in Nigeria, which is consistent with the observations of Nwoji et al. (2025) and Ojo et al. (2023). It also aligns with scholars who have argued that algorithmic systems increasingly govern users' access to information, online interactions, and media consumption patterns (Fuchs, 2017; McQuail, 2010). The fact that students use these platforms so frequently suggests that algorithmic recommendation systems have effectively become central gateways to educational information and digital learning.

The findings also confirmed that digital media algorithms can improve access to educational materials. Participants described how algorithmic recommendations led them to tutorials, online lectures, educational videos, research materials, and academic discussion groups related to their studies. This supports the Uses and Gratifications Theory (McQuail, 2010), which holds that people actively turn to media platforms to satisfy educational and informational needs. It also agrees with Bali et al.'s (2024) study, which identified AI-driven educational technologies as important enablers of independent learning and academic collaboration among Nigerian students.

Another key finding was that algorithm-driven multimedia content can increase student engagement and make learning more interactive. Participants described how visual demonstrations, educational animations, and short explanatory videos made learning more accessible and enjoyable. This supports Media Ecology Theory (Postman, 1993), which emphasises that communication technologies shape human perception and learning in fundamental ways. It suggests that algorithmically curated educational content can improve comprehension and retention when it presents information in more engaging formats.

At the same time, the study found that these same algorithms were a major source of distraction. Many participants acknowledged that entertainment-oriented recommendations regularly pulled them away from academic activities. The endless stream of comedy videos, celebrity content, and trending material encouraged prolonged social media use and cut into study time. This finding supports concerns raised by Pariser (2011) and Zuboff (2019) that algorithmic systems are built to maximise engagement and retention, not academic value. The implication is that students may find it genuinely difficult to maintain academic focus when operating within highly personalised digital environments designed to capture and hold their attention.

The study further revealed that algorithm-driven platforms have contributed to digital addiction and excessive screen time. Participants reported spending long stretches of time online, frequently drifting far beyond their original educational intentions. This is consistent with Boyd (2014) and with Ologun and Adebayo (2021), whose Nigerian study showed that excessive social media engagement was associated with poorer academic performance. The consequences extend beyond grades, potentially affecting mental well-being, sleep quality, and interpersonal relationships.

Widespread exposure to misinformation and unreliable educational content emerged as another serious concern. Participants struggled to tell credible sources from unreliable ones online. This supports earlier studies on information disorder and algorithmic amplification (Fuchs, 2017; Sunstein, 2018), which have argued that social media algorithms tend to elevate sensational and emotionally engaging content regardless of its accuracy. The finding underscores how essential media and information literacy are in helping students critically evaluate what they find online and resist the spread of false or misleading content (Ots, 2021; Bashir, 2020). The echo chamber dynamics documented here are consistent with Sunstein's (2018) argument that algorithmically curated media environments intensify informational homogeneity, narrowing the range of perspectives and facts to which users are exposed.

The low level of algorithmic literacy among students is also a significant concern. Despite noticing that platforms personalise their content feeds, most students could not explain how these systems actually work or how their behaviour was being tracked and used to shape what they see. This reinforces concerns about the erosion of digital agency articulated by Zuboff (2019), and highlights the need for algorithmic literacy to be taken seriously as a component of modern education (Ots, 2021).

Infrastructural challenges such as poor connectivity, high data costs, inconsistent electricity, and limited access to devices were also identified as persistent barriers to effective digital learning (Van Dijk, 2020). These findings reflect the broader digital divide that continues to disadvantage many students in Nigeria. While digital media algorithms offer real opportunities for educational advancement, unequal access to technology means that many students are unable to benefit from them fully.

Taken together, the findings paint a distinctive picture of digital media algorithms in South-South Nigerian education. They enhance access to resources, personalise learning, and increase engagement on one hand; they fuel distraction, misinformation, addiction, and reduced academic concentration on the other. What is needed is a coordinated response that prioritises digital literacy, responsible algorithmic governance, stronger media education, and meaningful institutional support, to help students gain the most from digital media while being better protected from its downsides (Bashir, 2020; Jenkins et al., 2013). These conclusions align with a growing global literature on educational technology governance (Ots, 2021; Bali et al., 2024). Policymakers, educators, and communication scholars in Nigeria must work together to combine digital infrastructure investment with critical media literacy programming, advocacy for algorithmic transparency, and institutional frameworks that promote responsible digital engagement in higher education.

## CONCLUSION

This study examined the educational effects of digital media algorithms on students and lecturers in South-South Nigeria, drawing on qualitative data from in-depth interviews and focus group discussions conducted in selected tertiary institutions. The findings make clear that digital media algorithms exercise a pervasive and dual influence on educational experiences in the region. Algorithmically curated platforms have expanded access to learning resources, supported interactive and self-paced learning, and increased student engagement, but they have also contributed to distraction, digital addiction, exposure to misinformation, and weakened critical thinking.

One finding that stands out is how little students understand about the algorithms shaping their informational environments. This gap leaves them poorly equipped to engage with digital learning platforms in informed, self-regulated ways (Ots, 2021; Zuboff, 2019). The study also drew attention to the structural inequalities embedded in the South-South digital landscape, where infrastructural limitations continue to shut significant numbers of students out of the potential benefits of digital education (Van Dijk, 2020). Echo chambers and attention deficits emerged as particularly consequential outcomes, with real implications for students' intellectual development and their exposure to diverse sources of information.

The study concluded that integrating digital media into higher education in South-South Nigeria calls for a coordinated policy response that addresses digital infrastructure, algorithmic transparency, and media literacy together, not in isolation. Educational institutions should weave critical digital literacy into academic curricula (Bashir, 2020; Jenkins et al., 2013), while policymakers develop regulatory frameworks that hold platform providers accountable within Nigerian media environments. Technology companies, for their part, should be encouraged to design algorithms that give weight to educational value alongside engagement metrics. Future research should track the long-term effects of algorithmic media exposure on academic performance and extend inquiry to other geopolitical zones in Nigeria, working toward a more nationally representative understanding of these dynamics.

## RECOMMENDATIONS

Based on the findings of this study, the following recommendations are made:

1. Digital and algorithmic literacy should be formally integrated into academic curricula across tertiary institutions in South-South Nigeria, to address the gap in students' understanding of how recommendation systems shape their informational environments and learning behaviours.
2. Policymakers and regulatory bodies should develop governance frameworks that promote algorithmic transparency and hold digital platform providers accountable for the accuracy and educational quality of content recommended to Nigerian students.
3. Technology companies should redesign their algorithms to balance engagement objectives with educational value, incorporating features that prioritise credible academic content and actively flag misinformation.
4. Tertiary institutions should establish clear policies on responsible digital engagement, addressing screen time management, digital addiction, and the boundaries of appropriate academic social media use.
5. Government and relevant agencies should invest in digital infrastructure across the region, particularly in rural and underserved communities, to ensure equitable access to the educational benefits of digital media platforms.

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