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The Impact of Social Media Use on Mathematics Student's Academic Performances in Tertiary Institution in Edo State Nigeria

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Abstract: *The study of mathematics demands substantial cognitive effort, and without appropriate support, students often struggle with poor academic performance. This research investigated the influence of social media on the academic performance of mathematics students in tertiary institutions in Edo State, Nigeria. A descriptive survey design was adopted, and data were collected from 375 undergraduates using a validated and reliable questionnaire. The study examined students' patterns of social media use, levels of engagement, and its effects on learning outcomes. Findings revealed that students actively engage with multiple platforms, including WhatsApp, Facebook, X (formerly Twitter), YouTube, and Snapchat. While messaging platforms such as WhatsApp and X were primarily used for brief interactions, YouTube emerged as the most relevant platform for academic purposes. The results further indicated that students were not addicted to social media, as their engagement generally remained moderate. The analysis confirmed that social media use significantly influences academic performance, both positively and negatively. Purposeful use was shown to enhance access to educational resources, promote collaboration, and support learning, whereas unregulated use may lead to distractions. The study concludes that adopting structured strategies can help maximize the educational benefits of social media while minimizing its negative effects on students' academic performance.*

Keywords: *social media, mathematics, academic performance, digital platforms*

Introduction

Learning mathematics requires significant cognitive engagement, and when this process is not effectively supported, students often experience poor performance. One of the key determinants of student success is the learning environment, which plays a vital role in shaping achievement outcomes. To address these challenges, students must be motivated and guided to cope with the cognitive demands of mathematics. The integration of technology into mathematics teaching has been shown to enhance students' understanding and achievement.

How to Cite

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According to Ebere and Abaver (2024), technology plays a crucial role in mathematics instruction, and both teachers and students should take advantage of modern digital tools to improve learning outcomes. Similarly, Ochonogor (2021) affirmed that meaningful learning occurs when students actively participate in social and interactive environments, such as online platforms.

The internet has evolved from a mere information resource to an interactive learning space that fosters collaboration, communication, and knowledge exchange. The rise of social media has further facilitated these interactions through user-friendly and accessible platforms that allow students to engage with diverse forms of content. In educational contexts, social media has become an essential communication tool, particularly in tertiary institutions, where it enables two-way interaction: students provide feedback to teachers, while teachers offer academic guidance and support.

Social media can be broadly defined as digital platforms that allow users to create, share, and interact with online content. Popular examples include Facebook, Instagram, X (formerly Twitter), and TikTok, which support communication, connection, and multimedia sharing (Nwazor & Godwin-Maduike, as cited in Ochonogor, 2021). These platforms enable real-time collaboration and promote the development of virtual learning communities. According to the Nigerian Communications Commission (NCC, 2024), mobile data penetration in Nigeria has reached approximately 59.8%, reflecting the rapid adoption of internet technologies. Within this context, this study examines the perceived influence of social media on the academic performance of mathematics students at the University of Benin.

Social media has also been described as a web-based technological system that facilitates information exchange, relationship building, and collaborative communication (Abirin & Obra, 2019). It allows users to generate and modify content, thus supporting the creation of interactive learning environments. Such systems encourage connectivity, knowledge-sharing, and community building among learners (Ogedegbe, 2024).

Recent research has emphasized the transformative potential of social media in education. It enhances student engagement, fosters collaboration, and provides access to a diverse range of learning resources. Within mathematics education, social media has proven effective in promoting discourse and problem-solving skills. For example, platforms such as X (Twitter) facilitate mathematical discussions, while Facebook groups enable peer learning and support beyond the traditional classroom setting (Barton & Lee, 2023).

Social Media Tools Students Use

Selwyn (2012) defined social media as applications that allow users to communicate, create, and share textual, visual, and audio content, as well as categorize and recommend existing material. Social media encompasses a broad range of internet-based and mobile technologies that promote communication, collaboration, and participation, and interaction— features associated with the emergence of Web 2.0 technologies.

Social networking sites play a central role in contemporary communication, socialization, and professional development. Facebook remains the most widely used platform; Sponcil and Gitimu (2013) reported that 88.5% of students preferred Facebook, while Quan-Haase and Young (2010) found that 82% of college students logged in multiple times daily (Kabilan et al., 2020). Twitter (X) functions as a microblogging platform for short messages and shared content, while LinkedIn provides professional networking opportunities. Snapchat, primarily a mobile-based platform, enables users to share temporary photos and videos. Barton and Smith (2018) found that 77% of college students use Snapchat daily—73% for creativity and 27% for social connection, with 23% reporting that it is easier to use than texting. Similarly, Instagram emphasizes visual sharing, Pinterest allows

users to curate digital boards, and YouTube remains the leading video-sharing platform globally. Collectively, these applications cater to diverse personal, educational, and professional needs.

Social media has increasingly been adopted in education to foster student engagement and innovative learning approaches. Student engagement reflects the time and effort students devote to educational activities. Wang (2021) observed that adolescents and young adults are among the most frequent users of computers and the Internet, with college students spending an average of eight hours daily online. However, excessive use has raised concerns: about 70% of students reported staying online longer than intended. While many students use social media to relieve academic stress, Junco et al. (2021) emphasized the importance of balancing social media engagement with academic responsibilities to achieve positive learning outcomes.

Like other media, social media is neither inherently beneficial nor harmful; its effects depend on how it is used (Al-Yafi et al., 2018). Adolescents, often early adopters of technology, face both the advantages and risks associated with social media, including exposure to peer influence and reduced study time. Isyaku et al. (2020**)** found that social media engagement frequently encroaches upon students' study time, while Fatokun (2019) observed that Nigerian students are often preoccupied with posting content, checking updates, and chatting online, activities that can detract from their academic focus.

Nevertheless, research also identifies positive outcomes**.** Seyyed et al. (2019) outlined four key benefits of social media in higher education: strengthening relationships, enhancing motivation, providing personalized learning materials, and fostering collaboration. Its accessibility, convenience, and affordability have contributed to its widespread adoption (Fatokun, 2019). Moreover, social media supports flexible learning by expanding choices related to what, when, and how students learn (Mensah & Nizam, 2016). The capacity of social media to promote collaboration and knowledge-sharing has been widely acknowledged (Abdulkareem, 2015; Ranaweera, 2015).

However, empirical findings remain mixed. Habes et al. (2018) and Isyaku et al. (2020) reported a positive correlation between social media use and academic performance, whereas Upadhayay and Guragain (2017) observed that excessive use negatively affects classroom concentration and achievement. Similarly, Al-Yafi et al. (2018) found that social media addiction is associated with lower grade point averages. In contrast, Sandeep et al. (2019) noted that social media can positively affect academic outcomes, while Mental Daily (2019) reported that excessive use particularly impairs performance among low achievers. Ahmad et al. (2016) found no significant relationship between gender and social media use, though Seyyed et al. (2019) observed higher addiction rates among male students.

Overall, the literature indicates that social media exerts both positive and negative influences on students' academic performance. The direction of its impact largely depends on students' ability to utilize these platforms constructively for learning and collaboration rather than as sources of distraction.

Statement of the Problem

Mathematics is widely perceived by students as a difficult and unengaging subject, leading to low motivation, poor comprehension, and weak performance in examinations. This perception contributes to declining interest and achievement levels. Educators are therefore exploring innovative strategies—such as the integration of social media—to make mathematics learning more interactive and accessible.

In Edo State, the application of social media in mathematics education presents both opportunities and challenges. While these platforms can enhance interactivity and collaboration, there is limited empirical evidence regarding their effectiveness in improving learning outcomes among mathematics students. This study seeks to bridge that gap by examining the influence of social media use on the academic performance of mathematics students in tertiary institutions in Edo State.

Purpose of the Study

The main purpose of this study is to examine the influence of social media use on the academic performance of mathematics students in tertiary institutions in Edo State. The specific objectives are to:

1. Determine the social media tools most frequently used by students.
2. Examine the social media platforms most frequently accessed by students.
3. Assess students' level of addiction to social media use.
4. Identify the social media platforms most suitable for educational learning among students.
5. Determine whether the use of social media influences the academic performance of students in tertiary institutions.

Research Questions

1. What are the most frequently accessed social media platforms among students?
2. What is the level of students' addiction to social media?
3. Which social media platform is most used for educational learning among students in tertiary institutions?
4. Does the use of social media influence the academic performance of students in tertiary institutions?

Here's your **refined and polished version** — grammatically corrected, styled in **academic prose**, and consistent with **APA (7th edition)** standards. The structure (Hypotheses → Methodology → Subsections) is maintained but presented in clear, continuous paragraphs suitable for a thesis or publication.

Hypotheses

The following null hypothesis was formulated to guide the study and tested at the 0.05 level of significance:

1. There is no significant influence of social media use on the academic performance of students in tertiary institutions.

Methodology

A descriptive survey research design was adopted for this study. The target population comprised all full-time undergraduate students enrolled during the 2019/2020 academic session in three selected tertiary institutions in Edo State. These institutions include the National Open University of Nigeria (NOUN), Benin Study Centre; Auchi Polytechnic, Auchi; and the College of Education, Igueben. A total sample of 375 students was selected from the population using a simple random sampling technique. The instrument used for data collection was a self-developed structured questionnaire titled "Influence of Social Media Use on the Academic Performance of Nigerian Students in Tertiary Institutions Questionnaire (ISMAPNSTIQ)". The instrument was designed to obtain relevant information from the respondents and was divided into two sections. Section A contained items that elicited respondents' demographic information such as gender, age, and institution. Section B consisted of items measuring students' patterns of social media use, level of engagement, addiction tendencies, and perceived impact on academic performance. The questionnaire was subjected to face validation by two senior lecturers in the Faculty of Education, who reviewed it for clarity, relevance, and content adequacy. To determine the instrument's reliability**,** a split-half method was employed. The odd- and even-numbered items formed two halves, and the scores were correlated, yielding a reliability coefficient of 0.78, indicating that the instrument was internally consistent and suitable for data collection. The researcher personally administered the questionnaire to the selected respondents across the three institutions to ensure proper guidance and accurate completion. A total of 375 copies of the questionnaire were distributed and retrieved on the spot to ensure a high response rate and minimize data loss. Respondents were assured of confidentiality and informed that their participation was voluntary. The data collected were analyzed using both descriptive and inferential statistical techniques. Frequency counts and percentages were used to analyze demographic variables and responses to the research questions. To test the formulated hypothesis, a paired t-test was employed at a 0.05 level of significance.

Table 1

Social Media Tools Frequently Used by Students

Tools	Frequency	Percentage %
WhatsApp	109	29.06
Facebook	85	22.66
YouTube	73	19.46
Twitter	51	13.6
Snapchat	57	15.2
Total	375	100

Table 1 revealed that when respondents were asked about their preferred social media platforms, the majority identified WhatsApp, Twitter, and Facebook as the most frequently used. On a five-point scale comprising WhatsApp, Twitter, Facebook, YouTube, and Snapchat, WhatsApp ranked the highest. Respondents explained that one of the main reasons for their preference is the platform's versatility. It enables users to send, receive, and forward messages that include images, GIFs, audio, and video files—all at no cost to either party. In addition, WhatsApp and other messaging applications now allow users to send short video messages that can even be edited before being shared. These features, offered free of charge, make WhatsApp highly attractive to users, who view its accessibility and functionality as key advantages. The increasing ownership of smartphones capable of supporting WhatsApp, coupled with the relatively affordable cost of internet data, has contributed significantly to the rapid growth of its user base in the country.

Table 2

Level of Student's Addictiveness to Social Media

Tools	Mean (hours)	SD
WhatsApp	3hrs	0.75
Facebook	6hrs	1.75
YouTube	5hrs	1.45
Twitter	3hrs	0.85
Snapchat	4hrs	1.25
Total		

The analysis in Table 2, revealed that Facebook recorded the highest average usage of approximately six hours per day**,** followed by YouTube with five hours and Snapchat with four hours**.** In contrast, WhatsApp and Twitter showed comparatively lower mean usage, averaging three hours each**.**

Table 3

Social Media That Can be Used as Platform for Educational Learning

Tools	Frequency	Percentage %
Facebook	67	17.9
Wikispace	40	10.7
YouTube	122	32.5
Blog	31	8.3
Twitter	39	10.4
Instagram	22	5.9
Moodle	12	3.2
WhatsApp	24	6.4

LinkedIn	18	4.8
Total	375	100.0

From the data presented in the Table 3, it can be inferred that YouTube recorded the highest frequency of use for educational purposes, with 122 respondents (32.5%) identifying it as their preferred platform. This was followed by Facebook with 67 respondents (17.9%)**,** Wikispace with 40 (10.7%)**,** Twitter with 39 (10.4%)**,** and Blogs with 31 (8.3%)**.** Other platforms such as WhatsApp (6.4%)**,** Instagram (5.9%)**,** LinkedIn (4.8%)**,** and Moodle (3.2%) were used less frequently**.** These findings indicate that YouTube is the most commonly utilized social media platform for educational purposes among the respondents.

Table 4:

Paired T-test of the Influence of Social Media Use on Students' Academic Performance in Tertiary Institutions

Variable	N	Means	SD	df	t-Value	Sig	Remark
100		54.10	12.97	240	-3.842	0.000	Significant
142		60.23	11.65				

From the table above, it can be deduced that there is a statistical difference in responses since $p = 0.0003$ is less than the significance level of $p < 0.05$. Consequently, the stated null hypothesis is rejected. Therefore, it is concluded that there is a significant influence of social media use on the academic performance of students in tertiary institutions**.**

Discussion of the Findings

The findings revealed that two-thirds of the students regularly used one or more social media platforms—such as Facebook, WhatsApp, Twitter, YouTube, and Snapchat—primarily to update their status, chat with friends, and send or receive messages. This aligns with Kabilan et al. (2020), who described social media as an interactive medium that enables individuals across different age groups to create, share, and exchange information and ideas within virtual communities and networks. The study further affirms that most Nigerian tertiary students actively engage with multiple social media platforms daily for communication and social interaction.

The results also showed that messaging-oriented platforms such as WhatsApp and Twitter are primarily used for shorter, frequent interactions, while multimedia and networking platforms such as Facebook and YouTube engage students for longer periods. This finding aligns with Ogedegbe (2024) and Wang (2021)**,** who both identified YouTube as the most widely used platform for educational and entertainment purposes. Collectively, these findings indicate that students frequently access multiple social media platforms, particularly WhatsApp, Facebook, and Twitter—with potential implications for academic focus and time management.

Furthermore, the findings suggest that Nigerian students in tertiary institutions are not addicted to social media, even though they log in and out of various platforms daily for chatting, texting, and updating their statuses. In contrast, Ebere and Abaver (2024) argued that students often spend excessive time on social networking sites to the detriment of their studies, exhibiting patterns that border on obsession. They noted that social media has become a top priority for many youths, leading to increased dependency. This differs from the present study, which indicates that while students visit social networking sites daily, their usage remains moderate and does not reflect addictive behavior.

The findings also revealed that respondents viewed YouTube as the most valuable educational platform compared to WhatsApp, Twitter, and Facebook. Although these other platforms also contain educational content, they are

not perceived to be as comprehensive or structured as YouTube. Respondents emphasized YouTube's ability to provide diverse educational videos that foster cooperative learning and enhance motivation.

Moreover, the study found that social media influences students' academic performance by providing access to useful information, connecting them with learning communities, and supporting educational systems that make learning more flexible and convenient. Ogedegbe (2024) asserted that social media provides students and institutions with multiple opportunities to enhance teaching methods while empowering teachers, parents, and learners alike. Similarly, Fatokun (2019) found that social media benefits students by facilitating collaboration on assignments and class projects, thereby promoting teamwork and communication skills.

Conclusion

Based on the findings, it is evident that social media plays a central role in the academic learning and performance of students. Students use social media not only for social interaction with friends and family but also for academic and informational purposes. Given that these students belong to a generation immersed in emerging technologies, many expressed that they could hardly function effectively without social media. They rely on it for research, maintaining relationships, and staying informed about events within and beyond their immediate environment.

Additionally, social media empowers students to take greater ownership of their learning, thereby shifting the teacher's role from a traditional instructor to a learning facilitator or partner. It provides students with multiple pathways for exploring curriculum content, thereby promoting deeper understanding and engagement. However, there is a need to maintain a balance between learner autonomy and structured guidance to ensure that learning objectives and deadlines are met. Importantly, the role of social media in enabling distance learning cannot be overstated, as it provides the foundation for remote communication and collaboration in modern education.

Recommendations

Based on the study's findings, it is recommended that:

1. Students should be trained on the productive use of social media as a tool for personal and academic growth. Efforts should be made to minimize time wasted on non-academic activities such as excessive chatting, cyberstalking, or irrelevant engagements.
2. Since social media technologies have become integral to students' lives, teachers in tertiary institutions should integrate social media tools and virtual classrooms into the teaching and learning process. These platforms can serve as valuable educational resources, promoting interaction between students and faculty.
3. Tertiary institutions should organize seminars and orientation programs to enlighten students about the positive and negative effects of social media. Students should be encouraged to use these platforms responsibly and strategically for self-development and academic advancement.
4. Institutions should also educate students on the importance of direct, in-person communication. While social media facilitates virtual connections, real-life interpersonal interactions remain essential for building strong communication and social skills.

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