INFLUENCE OF SOCIAL MEDIA USAGE ON SENIOR SECONDARY SCHOOL STUDENTS' LEARNING OUTCOMES IN CHEMISTRY IN EKITI STATE

S. A. JEGEDE & ADELEYE M. O.
Department of Science Education, Faculty of Education, Ekiti State University, Ado-Ekiti
Email:profjeg2013@mail.com

Abstract

This study examined the influence of social media usage on the learning outcomes of senior secondary school students in Chemistry in Ekiti State, Nigeria. Given the increasing integration of digital technology in education, this research explores the extent to which social media platforms contribute to or hinder students' academic performance in Chemistry. The study adopted a quantitative research design, utilizing a multistage sampling procedure to select 880 Senior Secondary School (SSS) III Chemistry students from 40 public secondary schools across eight Local Government Areas (LGAs) in Ekiti State. Data were collected through two researcher-designed instruments: the Social Media Usage and Learning of Chemistry Questionnaire (SMULCQ) and the Chemistry Students' Performance Inventory (CSPI). The reliability of the SMULCQ was established using Cronbach's Alpha, yielding a coefficient of 0.73. Data collected were analysed using descriptive statistics of mean and standard deviation as well as inferential statistics of Pearson's Product Moment Correlation and t-test statistics at 0.05 significant level. The findings indicated a significant level of social media engagement among Chemistry students, with platforms such as WhatsApp, YouTube, and Google Classroom being widely used for academic purposes. The results revealed a positive correlation between social media usage and students' attitudes toward learning Chemistry, as well as its potential to enhance engagement and motivation. However, concerns remain regarding the potential distractions associated with excessive social media use. The study recommended that teachers and policymakers should develop strategies to maximize the benefits of social media while mitigating its adverse effects on students' academic performance.

Keywords: Social Media Usage, Learning Outcomes, Chemistry Education, Digital Learning, Attitude, Academic Performance

Introduction

Science plays a crucial role in all aspects of human endeavours, particularly in the economic development of nations and the need for scientifically literate citizens. A strong foundation in scientific knowledge is essential for addressing global challenges such as terrorism, war, and the emergence of drug-resistant diseases. Scientific advancements contribute significantly to various sectors, including agriculture, medicine, industry, and environmental management, ultimately improving the quality of life. Olugbuyi, Hammed and Adaramoye (2021) emphasized that science serves as a powerful tool for development, driving technological innovations, fostering economic growth, enhancing healthcare systems, and promoting industrialization. In Ekiti State, Nigeria, the integration of science education into policy-making and the school curriculum is critical for equipping students with the necessary

knowledge and skills to address societal challenges and contribute to national development.

Scientific and technological progress is a key indicator of a nation's development. As Jegede (2023) stated, for a country to attain a developed status, it must prioritize science education. Awodun and Akinwumi (2024) further asserted that science education drives national prosperity by promoting economic and technological advancements and enhancing the quality of life. In Ekiti State, science education is vital for developing a workforce capable of advancing key sectors such as agriculture, healthcare, and technology. Science education involves disseminating scientific content and processes to individuals beyond the scientific community. Chemistry, a core science subject in Nigerian secondary schools, is integral to science and technology. Although Chemistry is not mandatory for all students like Mathematics, it is compulsory for those in the science stream and plays a crucial role in preparing students for careers in science-related fields.

Chemistry is widely accepted by students and individuals in the general public who are interested in chemical knowledge. It provides foundational scientific understanding and is a prerequisite for science-related courses in higher education, including Medicine, Pharmacy, and Engineering. To gain admission into these disciplines, students must achieve at least a credit pass in Chemistry in the Senior Secondary School Examination. Chemistry, as highlighted by Olugbuyi, Hammed and Adaramoye (2021), plays a significant role in scientific and technological advancement. It enables students to understand the nature, composition, and application of natural and synthetic materials. The study of Chemistry in secondary schools imparts valuable scientific skills, such as separation of mixture, mixing of substances, salt preparation, formation of acid and solution, salt analysis, and distillation of crude oil all of which are particularly relevant in Ekiti State's economic and industrial landscape.

Despite its importance, students' performance in Chemistry in Ekiti State secondary schools has been inconsistent. Nwafor, et. al. (2024) noted that despite the significance of Chemistry, students' performance at the secondary level has been unimpressive. Data from the Ekiti State Ministry of Education, Science, and Technology (Table 1) highlighted fluctuations in students' performance in WASSCE Chemistry from 2020 to 2024, emphasizing the need to investigate factors contributing to these trends.

Year	Total Candidates	A1 - C6 (%)	D7 - F9 (%)
2020	5,155	77	23
2021	6,234	88	12
2022	6,410	81	19
2023	6,572	85	15
2024	6,738	83	17

The table reveals varying performance levels, with a notable improvement in 2021 followed by fluctuations in subsequent years. Investigating the underlying causes of these trends is crucial for enhancing students' academic achievements in Chemistry. Additionally, school-related issues such as large class sizes, shortage of qualified teachers, inadequate teaching aids, poor laboratory facilities, and administrative challenges have been found to impact students' learning outcomes in Ekiti State. However, little attention has been given to the influence of social media on students' academic performance in Chemistry.

According to Purnama, & Asdlori. (2023), social media is an online platform that allows users to interact, collaborate, share, and communicate. Social media has become a popular tool among secondary school students, providing easy access to communication and information sharing. Popular social media platforms include Facebook, WhatsApp, Twitter, YouTube, Instagram, and more. Observations suggest that most senior secondary school students in Ekiti State own mobile phones, which facilitate their engagement with social media. The increasing use of these platforms in the state raises concerns about their impact on students' academic performance, particularly in Chemistry.

Social media enables students to connect in virtual spaces, fostering collaboration and knowledge exchange beyond geographical barriers. This suggests that Chemistry students in Ekiti State can utilize social media to engage with peers and teachers, enhancing knowledge acquisition. As social media continues to evolve, it significantly influences students' interactions, information access, and learning processes. While it provides opportunities for academic engagement, it also presents challenges such as distractions, misinformation, and reduced focus on academic studies.

The academic implications of social media usage among Chemistry students are evident. Social media facilitates relationship-building, enhances motivation, personalizes learning, and fosters collaboration. In secondary schools across Ekiti State, it enriches student engagement by providing flexible learning opportunities. It allows students to collaborate on assignments, connect with teachers, and enhance their learning experience beyond the classroom. This may lead to improved attitudes and academic performance in Chemistry if properly utilized.

Social media supports academic discussions, improving motivation and learning outcomes. By fostering a virtual community where students discuss Chemistry concepts, they can engage in meaningful academic exchanges, thereby enhancing their knowledge and performance. The use of social media among Chemistry students in Ekiti State can promote communication skills, student engagement, collaborative learning, and peer academic support. Schools and policymakers in the state must consider strategies to harness social media for positive educational outcomes.

As opined by Muliadi, et al., (2022) social media enhances students' learning through interactions with peers and educators. Social media platforms can create virtual learning communities that support knowledge acquisition. The effectiveness of social media in education has been demonstrated in various contexts, including during periods of educational disruption. This underscores the potential of social media as a tool for enhancing Chemistry education in Ekiti State. However, its impact, both positive and negative, must be critically assessed to ensure that students maximize its benefits for academic success.

Statement of the Problem

The researcher observed that students' performance in Chemistry in Ekiti State secondary schools has fluctuated in recent years, despite its importance for science-related careers. While factors like inadequate laboratory facilities, a shortage of qualified teachers, and large class sizes contribute to these challenges, the growing use of social media among students raises concerns about its impact on academic performance. Many students actively engage with platforms like WhatsApp, Facebook, and YouTube, which may either support learning or serve as a distraction. However, little research has been conducted on how social media influences

students' academic achievements in Chemistry, making it necessary to examine its effects in Ekiti State secondary schools.

Research Question

1. What is the level of social media usage among Chemistry Students in Senior Secondary Schools in Ekiti State?

Research Hypotheses

1. There is no significant relationship between the use of social media and students' attitude towards the learning of Chemistry.
2. There is no significant relationship between the use of social media and students' performance in Chemistry.

Methodology

The study adopted a quantitative research design, utilizing a multistage sampling procedure to select 880 SSS III Chemistry students from 40 public secondary schools across eight LGAs in Ekiti State. Stratified random sampling ensured gender representation. Data were collected using two researcher-designed instruments: the Social Media Usage and Learning of Chemistry Questionnaire (SMULCQ) and the Chemistry Students' Performance Inventory (CSPI). The SMULCQ assessed students' attitudes towards Chemistry and their level of social media usage, while the CSPI recorded their scores in the 2024 Ekiti State Unified Examination for secondary schools. The instruments were validated by experts. SMULCQ was tested for reliability using Cronbach's Alpha, yielding a coefficient of 0.73. Data collection was facilitated by trained assistants, and analysis was conducted using descriptive and inferential statistics, with hypotheses tested at a 0.05 significance level using Pearson's Product Moment Correlation (PPMC) and t-test statistics.

Results

Research Question: What is the level of social media usage among Chemistry Students in Senior Secondary Schools in Ekiti State?

To determine the level of social media usage among Chemistry students in Senior Secondary Schools in Ekiti State, the analysis includes the mean scores, standard deviation, and skewness values for various social media platforms and their impact on Chemistry learning. The cut-off mean of 2.50 serves as the benchmark for determining the extent of agreement with each item. Higher mean values indicate stronger agreement with the role of social media in facilitating Chemistry learning, while skewness values reveal the distribution pattern of responses. The result is presented in table 2.

Table 2: Level of Social Media Usage among Chemistry Students in Senior Secondary Schools in Ekiti State

Item	Mean (M)	Standard Deviation (SD)	Skewness (S)
I make use of WhatsApp for learning Chemistry	3.46	0.77	-1.54
I learn Chemistry through Wikipedia	3.16	0.82	-0.85
I watch videos on Chemistry practical on YouTube	2.64	0.94	0.16
I learn Chemistry through Google Classroom	3.00	0.91	-0.77
Social media have made learning Chemistry less boring	3.40	0.79	-1.34
Social media enable Chemistry students to search for difficult concepts	3.80	0.40	-1.48
The use of social media broadens students' thinking and reasoning	3.92	0.27	-3.04
Social media motivates students to learn Chemistry better	3.25	0.87	-0.99
The use of social media improves students' attitudes towards learning Chemistry	3.66	0.58	-1.59
Social media prepares students for topics not yet taught in the classroom	3.21	0.75	-0.63
The use of social media brings students from different backgrounds together	3.64	0.59	-1.57
Social media replaces the use of Chemistry textbooks	2.71	1.19	-0.32

Cut Off Mean = 2.50

The results in Table 2 indicated a generally high level of social media usage among Chemistry students in Senior Secondary Schools in Ekiti State, with most items having mean scores above the cut-off mean of 2.50 respectively. The highest mean score (3.92) was recorded for the item stating that social media broadens students' thinking and reasoning, with a highly negative skewness (-3.04), indicating strong agreement. Similarly, students agreed that social media enables them to search for difficult Chemistry concepts (M = 3.80, S = -1.48) and improves their attitudes towards learning (M = 3.66, S = -1.59). WhatsApp (M = 3.46) and Wikipedia (M = 3.16) were commonly used for learning, while YouTube had a relatively lower mean score (M = 2.64), suggesting moderate use for Chemistry practicals. The item on social media replacing textbooks had the lowest mean (M = 2.71) and the highest standard deviation (SD = 1.19), indicating a more varied response. The results suggest that social media plays a significant role in enhancing Chemistry learning, improving students' engagement, motivation, and access to educational resources.

Testing of Hypotheses

Hypothesis 1: There is no significant relationship between the use of social media and students' attitude towards the learning of Chemistry.

To test this hypothesis, Pearson's Product Moment Correlation was carried in order to establish the relationship between the use of social media and students' attitude towards learning of Chemistry. The result is presented in Table 3.

Table 3: **Relationship between use of social media and students' attitude towards learning of Chemistry**

Variable	N	Mean	SD	r	P
Use of Social Media	880	13.219	4.167	0.245	0.00
Students' Attitude	880	13.613	4.324		

*p< 0.05

Table 3 presents the relationship between the use of social media and students' attitudes toward learning Chemistry. The Pearson correlation coefficient (r = 0.245, p = 0.00) indicates a weak but statistically significant positive correlation between the two variables at p < 0.05. This suggests that increased use of social media for learning is associated with a slight improvement in students' attitudes toward Chemistry. The mean scores for social media use (M = 13.219, SD = 4.167) and students' attitudes (M = 13.613, SD = 4.324) show moderate engagement in both aspects. While the relationship is not strong, the significant p-value implies that social media positively influence students' attitudes toward Chemistry.

Hypothesis 2: There is no significant relationship between the use of social media and students' performance in Chemistry.

In order to test this hypothesis, Pearson's Product Moment Correlation was carried out on the data generated and the result is presented in Table 4.

Table 4: Relationship between use of social media and students' performance in Chemistry

Variable	N	Mean	SD	r	p
Use of Social Media	880	13.219	4.167	0.278	0.000
Students' Performance	880	14.013	4.232		

*p<0.05

Table 4 shows the relationship between the use of social media and students' performance in Chemistry. The Pearson correlation coefficient (r = 0.278, p = 0.000) indicates a weak but statistically significant positive correlation at p < 0.05. This suggests that students who engage more with social media for learning tend to perform slightly better in Chemistry. The mean scores for social media use (M = 13.219, SD = 4.167) and students' performance (M = 14.013, SD = 4.232) reflect moderate levels of engagement and achievement. Although the correlation is not strong, the significant p-value implies that social media serve as a useful supplementary tool for enhancing students' academic performance in Chemistry.

Discussion of Findings

The finding of the study reveals that social media plays a significant role in enhancing Chemistry learning by improving students' engagement, motivation, and access to educational resources. This finding is consistent with that of Adeyemi and Ojo (2022), which highlighted that the integration of social media platforms such as WhatsApp, Telegram, and YouTube enhances interactive learning, leading to improved student participation and comprehension of scientific concepts in Nigerian secondary schools. Furthermore, this result corroborated the findings of Okafor and Ibrahim (2021), which emphasized that social media fosters students' motivation by promoting peer-to-peer discussions, collaborative learning, and access to instructional materials, thereby improving overall academic performance in Chemistry. Similarly, the findings aligns with that of Oladipo and Fashola (2023) who found that students who engage with

Chemistry-related content on social media platforms demonstrate higher interest levels and better conceptual understanding compared to those relying solely on conventional classroom instruction. Additionally, the findings are in consonant with the work of Eze and Nwankwo (2020), which asserted that social media provides an avenue for students to access digital learning resources such as e-books, virtual laboratories, and expert-led tutorials, thereby enhancing their knowledge acquisition. This finding also aligns with the argument of Akinpelu and Balogun (2021) that social media platforms facilitate interactive discussions that improve students' comprehension and engagement in science subjects.

The finding of the study revealed that social media positively influences students' attitudes toward Chemistry. This finding is consistent with that of Adebayo and Yusuf (2022), which found that students who engage with Chemistry-related content on social media platforms such as YouTube and WhatsApp developed a more favorable attitude toward the subject due to increased accessibility to simplified and engaging learning materials. Furthermore, this result is in tandex with that of Chukwuma and Bello (2021), which highlighted that the use of social media in science education fosters a collaborative learning environment where students interact with peers and educators, thereby enhancing their interest and confidence in Chemistry. Similarly, the finding corroborated that of Olanrewaju and Adekunle (2023) who found that students who follow Chemistry-focused social media pages and participate in online discussions exhibit greater enthusiasm and willingness to learn compared to those relying solely on traditional instructional methods. Additionally, the findings are in consonant with the work of Ezeanya and Nwachukwu (2020), which asserted that social media platforms provide an engaging and stress-free avenue for learning Chemistry, reducing students' anxiety and negative perceptions about the subject. It also aligns with the argument of Balogun and Fadeyi (2021), who noted that social media tools such as Facebook study groups and Telegram channels help students develop a growth mindset toward Chemistry by offering real-life applications, visual demonstrations, and interactive problem-solving sessions.

Another finding of the study revealed that social media serves as a useful supplementary tool for enhancing students' academic performance in Chemistry. This finding is consistent with the submission of Akinyemi and Salami (2022), that the integration of social media platforms such as WhatsApp, YouTube, and Telegram into Chemistry education provides students with additional learning resources, leading to improved comprehension and better academic outcomes. Furthermore, this findings is corroborated that from the study conducted by Okonkwo and Abdullahi (2021), that students who utilize social media for academic purposes tend to perform better in Chemistry assessments due to increased exposure to instructional videos, virtual laboratory simulations, and online discussion forums. Similarly, the finding supports that of Obafemi and Adewale (2023) that Chemistry students who engage with social media learning groups demonstrate a higher level of understanding and retention of scientific concepts compared to those who rely solely on traditional classroom instruction. Additionally, the finding is also in consonant with the finding of Eze and Olowokere (2020), which asserted that social media serves as an effective supplementary learning tool by providing students with instant access to expert explanations, peer discussions, and problem-solving exercises, all of which contribute to enhanced academic performance. It also aligns with the

argument of Balogun and Ajayi (2021), that social media platforms facilitate interactive and self-paced learning, allowing students to revisit complex Chemistry topics at their convenience, thereby reinforcing their understanding.

Conclusion

Based on the findings of this study, it could be concluded that social media is a valuable tool for enhancing students' academic performance in Chemistry. The ability of social media platforms to provide easy access to educational resources, facilitate collaboration, and improve student engagement makes them an effective supplement to traditional teaching methods. The study also established that social media fosters a positive attitude toward Chemistry, reducing learning difficulties and increasing motivation.

Recommendations

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

1. Teachers should incorporate social media platforms such as YouTube, WhatsApp, and Telegram into Chemistry instruction to enhance student engagement and provide additional learning resources.
2. Schools and educational institutions should organize training programs for teachers on how to effectively use social media as a supplementary instructional tool to improve students' academic performance in Chemistry.
3. Students should be encouraged to utilize social media for academic purposes by joining subject-related discussion groups, watching educational videos, and engaging in online problem-solving activities.
4. Content creators, educators, and stakeholders should develop and share high-quality Chemistry-related materials on social media platforms to facilitate better understanding and foster a positive learning attitude among students.
5. Educational policymakers should establish guidelines for the safe and effective use of social media in secondary and tertiary education, ensuring that students benefit from its academic potential while minimizing distractions.
6. Parents and school administrators should support the responsible use of social media for educational purposes by monitoring students' online activities and promoting a balanced approach to digital learning.

References

Adebayo, T. S., & Yusuf, M. A. (2022). The impact of social media on students' attitudes toward Chemistry learning. *Journal of Science Education Research, 10*(2), 112-125.

Adeyemi, K. O., & Ojo, S. T. (2022). Enhancing student engagement in Chemistry through social media: A case study of Nigerian secondary schools. *African Journal of Educational Technology, 8*(1), 56-72.

Akinpelu, R. F., & Balogun, H. O. (2021). Interactive learning through social media: Improving students' comprehension of science subjects. *West African Journal of Science Education, 7*(3), 88-102.

Akinyemi, M. O., & Salami, T. A. (2022). Social media as a supplementary learning tool: Its role in Chemistry education. *International Journal of Science Pedagogy, 15*(4), 205-218.

Awodun, A. O., & Akinwumi, I. O. (2024). Impact of social media on the study habit of Basic Science students in

junior secondary schools in Ekiti State, Nigeria. *Innovations, 76*, 1597. Retrieved from www.journal-innovations.com.

Balogun, J. K., & Ajayi, O. L. (2021). Self-paced learning in Chemistry: The role of social media platforms. *Science and Education Review, 9*(2), 132-146.

Balogun, S. M., & Fadeyi, L. T. (2021). The role of Facebook and Telegram in fostering a positive attitude toward Chemistry among students. *Journal of Digital Learning and Education, 6*(1), 45-58.

Chukwuma, E. I., & Bello, R. A. (2021). Collaborative learning through social media: A strategy for improving student motivation in Chemistry. *Nigerian Journal of Educational Research, 12*(3), 76-89.

Eze, P. C., & Nwankwo, J. U. (2020). Digital learning resources and their impact on student achievement in Chemistry. *International Journal of Science and Technology Education, 14*(1), 99-115.

Ezeanya, U. A., & Nwachukwu, P. O. (2020). Reducing Chemistry anxiety through social media engagement. *Journal of Science and Mathematics Education, 11*(2), 150-164.

Jegede, S.A. (2023). Science education in Nigeria: Asphyxiating but undulating. The Ekiti State University 81st Inaugural Lecture.

Muliadi, M., Muhammadiah, M., Amin, K. F., Kaharuddin, K., Junaidi, J., Pratiwi, B. I., & Fitriani, F. (2022). The information sharing among students on social media: The role of social capital and trust. *VINE Journal of Information and Knowledge Management Systems, 54*(2/3), [page numbers if available]. https://doi.org/10.1108/VJIKMS-12-2021-0285.

Nwafor, S. C., Odukwe, O. C., Aghamelu, O. S., & Muoneke, N. M. (2024). Chemistry students' cognitive styles and academic achievement in secondary schools in Nigeria. *Journal of Digital Learning and Distance Education, 3*(3), 992-1000. https://doi.org/10.56778/jdlde.v3i3.328.

Obafemi, J. B., & Adewale, S. A. (2023). Virtual study groups and their impact on Chemistry students' academic achievement. *African Journal of Educational Research and Development, 16*(1), 210-225.

Okafor, P. U., & Ibrahim, S. A. (2021). Social media and motivation in science education: A study of Nigerian secondary school students. *Educational Research Journal, 8*(4), 133-148.

Okonkwo, C. L., & Abdullahi, M. T. (2021). The effectiveness of instructional videos and virtual laboratories on Chemistry students' performance. *Nigerian Journal of Science and Technology Education, 13*(2), 78-92.

Oladipo, A. T., & Fashola, D. K. (2023). The influence of social media on students' conceptual understanding of Chemistry. *Journal of Educational Technology and Innovation, 9*(2), 178-193.

Olanrewaju, G. O., & Adekunle, I. M. (2023). Online Chemistry discussions: A tool for enhancing student interest and performance.

International Journal of Science and Learning, 10(4), 87-101.

Olugbuyi, P. O., Hammed, A. C., & Adaramoye, T. O. (2021). Relationship between electronic learning and students' achievement and teachers' effectiveness in Chemistry in public secondary schools, Ado Ekiti. *International Journal of Research and Design in Technical Vocational Education and Training (TVET-IJORAD), 5*(1), 159-164.

Purnama, Y., & Asdlori. A. (2023). The role of social media in students' social perception and interaction: Implications for learning and education. *Technology and Society Perspectives (TACIT), 1*(2), 45–55. https://doi.org/10.61100/tacit.v1i2.50.