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Social Media Packages as Correlates of Academic Performance in Mathematics Among Students in Rivers State, Nigeria

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Abstract
The effect of social media as a correlate of the performance of students in Mathematics is a crucial aspect this study sought to investigate. The study adopted a correlational research design. The study's population consisted of 19,456 students in 181 upper secondary schools in the Obio/Akpor Local Government Area of Rivers State. The sample size had 901 respondents in 53 upper secondary schools using the multi-stage sampling procedure. Two instruments were used by the researcher for the study. The Social Media Packages and Mathematics Learning Questionnaire (SMPMLQ) with a reliability index of 0.76 using Cronbach Alpha and the Mathematics Performance Test (MPT) with a reliability index of 0.86 using Kuder Richardson's 20 Formula. Data was analyzed using the Pearson Product Moment Correlation Coefficient. The findings of the study revealed that a higher number of students (519) (57.6%) do not struggle with the learning of Mathematics. Also, the study revealed that the use of Facebook and YouTube combined enhances the academic performance of students in Mathematics. Conclusively, social media packages like Facebook and YouTube can reduce Mathematics phobia and enhance students' performance in Mathematics. The study recommended, among others, that Mathematics teachers should frequently expose students to more social media packages to enhance the performance of students in Mathematics in Obio/Akpor Local Government Area of Rivers State.

Keywords: Social media packages, students, academic performance and Mathematics.

Introduction

The use of artificial intelligence could be seen as a technique of technology to construct learning of Mathematics and the sciences, which could help students engage in creative thinking and enhance their academic performance. Communication between the user and the system could be the purpose of the use of Artificial Intelligence Systems (AIS), Information Communication Technology (ICT) and Social Media packages. According to Tirhajai (2024), Artificial Intelligence (AI) and Machine Learning (ML) are probably the most frequently used concepts in the technology world in the last few decades. AI could be considered a concept that helps a machine to be intelligent, meaning that a machine could perform various tasks that, if performed by a human being, would require intelligence. These technology machines of learning could enhance the learning of Mathematics. The data and ML models form the foundation for any machine learning; the ML model is fed with lots of data; the model in turn uses the data provided and makes intelligent decisions according to the programming of the model (Tirhajai, 2024). This is the same process that is featured in machine learning, such as the social media packages such as Facebook and YouTube. Social media packages could have an influence on students' Mathematics learning skills, such as their ability to read, understand, and interpret charts, graphs, Mathematics models, and solve equations, which could enable students to improve in their performance. Mathematics is the bedrock of creative thinking (Abaver & Ogor, 2023). Mathematics could be interactive in nature, and the use of social media packages could increase teacher-to-student interactive activities in Mathematics (Nabayra 2022).

The use of ICT could enable teachers to place more emphasis on problem-solving approaches rather than tedious rote learning and calculation. Its importance in the modern-day learning process cannot be overemphasized. Social media could be seen as one of the major influencers for all categories of individuals engaged in the learning process. From the first years of childhood, the current generation of learners is exposed to different kinds of social media packages and devices for learning. The following have been identified as the most common social media platforms currently in use that could be used for chatting and tutorial classes by teachers and students to aid meaningful learning (International Telecommunication Union, 2016), for example: Facebook, Instagram,

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telegram, Twitter, WhatsApp, YouTube, Google Classroom, Wikipedia, LinkedIn, Reddit, and Pinterest, among others.

Students can now go online and make use of multiple devices to access social media. Statistics suggest that students spend many hours per day engaging in media content, especially Facebook and YouTube (Mascheroni & Cuman, 2014). In this 21st century, students are well exposed to the internet and its usage. Moody (2010) as cited in Konlan and Patience (2018) argued that social media packages such as Facebook, YouTube, and WhatsApp can be potentially useful tools for learning. Facebook as a social media package could offer vast coverage and exposure for its users by its means of circulating information, which could immensely help in the search for jobs in aspects of health and education. Different types of information could be stored and communicated to the public on the Internet. According to Maheshwari and Mukherjee (2021), social media packages enhance the interaction and participation of students during the teaching-learning process. Mukhlif and Challob (2021) posit that the advantages of Facebook in education foster interaction and communication among students, and this extends the process of teaching and learning outside the classroom walls.

Social media packages are daily used and could be efficient in learning. Ramadan (2017) opines that Facebook enables the educational system conditions of teaching and learning with the watching of instructional videos. The trend of young teenagers spending a lot of time browsing networks, particularly Facebook, as it has become the best form of communication mode is alarming. Salas-Rueda (2021) reveals that creative activity-based education can be enhanced using Facebook; this can be done through the means of sending messages and watching instructional videos geared towards enhancing Mathematics performance. Also, Crompton and Burke's (2015) survey of mobile learning in Mathematics has shown a growing interest in mobile technology, with 75% of 48 studies reporting positive learning outcomes. Furthermore, the Biton and Segal (2021) study revealed that Facebook is among the social media packages that contribute positively to the educational environment.

Irrespective of these claims, other researchers have reported negative influences such as a decline in academic performance in Mathematics when a student spends too much time on Facebook. Students' academic performance faces issues due to the many hours students spend on social media, going through information that could be a distraction to their academics (Gaya et al., 2020). YouTube is another popular social media platform used in Nigeria. According to Subhi and Kosasih (2023), videos could be accessed and shared using YouTube with various internet quota-saving characteristics as a face-to-face learning substitute, which students need the most for explanations. In teaching and learning, YouTube can be used as a video repository to enhance teachers' and students' engagement in classroom learning and distance learning. During the Corona Virus Disease (COVID-19) pandemic, learning loss was a challenge in teaching and learning. Nabayra (2022) opined that with the swift shift from face-to-face learning to online learning, educational stakeholders have to innovate and initiate new effective and efficient instructional approaches that can be used online to ease some of the educational barriers the pandemic has caused.

This initiated distance learning as a result of the students' welfare at such precarious times, for which social media packages such as YouTube were used by teachers to produce Mathematics distance learning designs (Subhi & Kosasih, 2023). Nabayra's (2022) results reveal a significant difference in students' performance pre-and post the use of videos created and uploaded on YouTube by the instructor in order to enable the learning of Mathematics, which favoured the improvement of performance after the teaching-learning process. It concluded that the videos created and uploaded on YouTube by the teachers are indeed effective and efficient. These videos could enable students to maximize opportunities to learn Mathematics online. It also creates an interesting environment for the students to be actively engaged in the learning process (Fathi & Zarei, 2019). Sharma (2018) revealed that the performance of students receiving consistent exposure to videos and real-life activities in Mathematics was greater compared to those who received only some of the special instructional interventions. Nabayra (2020) revealed that students' understanding of Mathematics concepts is enhanced when teachers integrate YouTube videos into topics. The use of social media packages could be helpful to the students in mastering Mathematics course content. Social media packages such as Facebook, WhatsApp, and YouTube could enhance the performance of students in Mathematics. Social media packages could help expose students to other people's views of solving problems, and reasoning mathematically. Students could be entertained and stimulated as they watch YouTube and interact on Facebook and WhatsApp (Crompton & Burke, 2015; Subhi & Kosasih, 2023).

Nevertheless, limitations should be placed by teachers, especially by parents, on the length and type of programmes students watch and the groups and persons they interact with online daily. According to Wang (2021), the number of videos watched determines the measure of performance seen in standardized testing on the student's

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cognitive ability. Considering this reflection, the content and organization of videos should be adjusted to accommodate only key theorems and questions without overlapping materials. Capuno et al. (2019) result reveals no significant relationship between students' utilization of instructional media and their academic performance.

In Nigeria, Facebook and YouTube are among the frequently used social media packages in communication and could be used in the teaching and learning of Mathematics. The features of Facebook and YouTube videos of flexibility and user-friendly mode could suit the students' needs for comprehensive, efficient, and improved performance in Mathematics, hence the need for this study. This study is therefore geared towards investigating social media packages as a correlate of the academic performance of students in Mathematics in Obio/Akpor Local Government Area of Rivers State.

Statement of the Problem

The need to expose students to social media and provide guidance in the use of social media packages such as Facebook, YouTube, WhatsApp, Google Classroom, and Instagram, and the use of computers and smartphones in enhancing the academic performance of students in Mathematics cannot be overemphasised. With reference to John Lock's proposition of 'Tabular rasa' (that is, children's brains are empty and ready to retain whatever is deposited on them), social media can be used to motivate students interest in Mathematics, reduce Mathematics phobia, and equip students with Mathematics learning skills for improved academic performance. The performance of students in Mathematics is affected by Mathematics phobia, which makes them struggle in Mathematics. As such, social media and its packages could reduce phobia, motivate students learning, and enhance their performance in Mathematics. Hence, the study seeks to investigate social media packages as a correlate of the academic performance of students in Mathematics in the Obio/Akpor Local Government Area of Rivers State.

Aims and Objectives of the Study

The main purpose of this study is to investigate social media packages as a correlate of performance in Mathematics of students in Obio/Akpor Local Government Area of Rivers State. The objectives of this study are;

1. Identify the percentage of students struggling in Mathematics in the Obio/Akpor Local Government Area of Rivers State.
2. Find out the correlation between the use of Facebook and YouTube and the academic performance in Mathematics of students in Obio/Akpor Local Government Area of Rivers State.

Research Questions

1. What is the percentage of students struggling in Mathematics in the Obio/Akpor Local Government Area of Rivers State?
2. What is the correlation between the use of Facebook and YouTube and the academic performance in Mathematics of students in Obio/Akpor Local Government Area of Rivers State?

Methodology

A correlational research design was adopted for the study. The design was suitable for the study due to the fact that the researcher sought to establish a relationship among the variables: Facebook, YouTube, and the academic performance of students in Mathematics. The study population was 19,456 students from 181 upper secondary schools in the Obio/Akpor Local Government Area of Rivers State. The sample size was made up of 901 respondents in 53 upper secondary schools using the multi-stage sampling technique. Two research questions were formulated for the study. The researchers used two instruments for the study. The students' questionnaire was titled "Social Media Packages and Mathematics Learning Questionnaire (SMPMLQ) and Mathematics Performance Test (MPT). SMPMLQ was composed by the researcher, and it had 15 items and four-point Likert-scale ratings of strongly agree (SA), agree (A), disagree (D), and strongly disagree (SD), with ratings from 4-1. While MPT had 20 objective questions adopted from past WAEC question papers from the 2021–2022 session, each correct answer was given 5 marks, and incorrect answers were given a zero mark. The reliability index obtained for SMPMLQ using Cronbach Alpha was 0.76 and 0.86 for MPT using Kuder Richardson's 20 Formula. Cronbach Alpha was used in order to measure the internal consistency of the set of items in SMPMLQ. While Kuder Richardson's 20 Formula was used because the WAEC questions in MPT had varying difficulty levels. Both the SMPMLQ and MPT were converted to 100% to ensure that they were on the same scale of measurement before data analysis was done. The Pearson Product Moment Correlation Coefficient was used to find the relationship between Facebook and WhatsApp, usage and students' academic.

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Results

Research Question One: What is the percentage of students struggling in Mathematics in the Obio/Akpor Local Government Area of Rivers State?

Table 1. Percentage of Students Struggling in Mathematics and Those Not Struggling in Mathematics.

Variable	Group of Students	Frequency	Percent
SMPMLQ	Struggling in Maths	382	42.4
	Not Struggling in Maths	519	57.6
	Total	901	100.0

Table 1 presents the percentage of students struggling in Mathematics in the Obio/Akpor Local Government Area of Rivers State. It is evident from the data that out of 901 students, 382 (42.4%) struggle with Mathematics learning, while 519 (57.6%) do not struggle with Mathematics learning. This shows that a higher number of students do not struggle with the learning of Mathematics in Obio/Akpor Local Government Area of Rivers State. The proportion of 42.4% of struggling students implies Mathematics learning difficulties are common, and educational interventions or support systems such as the use of social media packages and the use of learner-centred strategies by teachers are necessary in reducing the percentage of struggling students in Mathematics.

Research Question Two: What is the correlation between the use of Facebook and YouTube and the academic performance in Mathematics of students in Obio/Akpor Local Government Area of Rivers State?

Table 2. The Correlation among the Use of Facebook, YouTube, and the Academic Performance in Mathematics of Students

		Facebook and YouTube	Performance
Facebook and YouTube	Pearson Correlation	1	.843**
	Sig. (2-tailed)		.000
	N	901	901
Performance	Pearson Correlation	.843**	1
	Sig. (2-tailed)	.000	
	N	901	901

Table 2 shows a computed r of.843, indicating that there is a high positive correlation between the use of Facebook and YouTube and the academic performance in Mathematics of students. The coefficient 0.843 is close to 1, indicating a significant relation. This suggests that students who use Facebook and WhatsApp tend to perform better academically. In this way, as students combined use of Facebook and YouTube media packages increases, there is a high improvement in their academic performance. This implies using two social media packages can enhance students' academic performance. This suggests a significant relationship between Facebook, WhatsApp, and students' academic performance. Therefore, students are more likely to display high performance in Mathematics when the two media packages are used.

Discussion

The findings of the study indicated that a higher number of students do not struggle with the learning of Mathematics in the Obio/Akpor Local Government Area of Rivers State. The frequency showed that the majority of the students (57.6%) did not struggle in Mathematics. The high number of students not struggling in Mathematics is indicative that the students would not have difficulty understanding the concepts they are taught, and this can affect academic performance. Furthermore, students who are not struggling in Mathematics pay more attention when studying tasks that are challenging and are able to answer questions on concepts in Mathematics involving comprehension, knowledge, and application more conveniently, including tasks involving conservation, reasoning, analysis, deduction, and evaluation, which the fewer students (42.4%) struggling in Mathematics can only handle.

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However, the proportion of 42.4% of struggling students in Mathematics signifies that learning difficulties exist in Mathematics of which even the misuse of information, communication, and technology could affect students' academic performance. Educational interventions or support systems, such as the use of social media packages to reduce the percentage of struggling students in Mathematics to a less significant value, can be employed. This finding agrees with Gaya et al.'s (2020) that students' academic performance faces issues due to the many hours students spend on social media, going through information that could be a distraction to their academics. This result shows that students' struggle in Mathematics could be dependent on other variables such as non-usage of learner-centred strategies, inadequate interaction of students and collaboration with their peers, and the non-usage of social media packages.

The findings from the present study revealed that there is a high positive correlation between the use of Facebook and YouTube and the academic performance in Mathematics of the students. This means that when Facebook and YouTube media packages are combined in learning Mathematics, this enhances high improvement in the performance in Mathematics of the students. The findings also reveal that there is no significant difference in the correlation between the use of Facebook and YouTube and the academic performance in Mathematics of students in Obio/Akpor Local Government Area of Rivers State. This finding agrees with Crompton and Burke's (2015) study and Subhi and Kosasih's (2023) study, which revealed that students could be entertained and stimulated as they watch YouTube, and interact on Facebook, and WhatsApp towards learning. This revelation is similar to Moody's (2010) argument, as cited in Konlan and Patience (2018) that Facebook, YouTube, and WhatsApp represent potentially useful tools in educational contexts. This shows that the combination of two or more social media packages enhances the performance of students in Mathematics. Fathi and Zarei's (2019) results revealed that YouTube creates an interesting environment for the students to be engaged in the learning process actively; Mukhlif and Challob's (2021) study revealed that the use of Facebook enhances the participation of students, which means the combination of YouTube and Facebook can enhance the academic performance in Mathematics of the students.

The findings also agree with the International Telecommunication Union (2016) which identified Facebook and YouTube, among other social media packages, as being commonly used for chatting and tutorial classes by teachers and students to aid meaningful learning. The underlying factors driving both Facebook and WhatsApp usage and students' academic performance could be factors such as increased connectivity and collaboration with peers, better time management skills, access to educational resources online, and improved digital literacy.

The findings of the present study agree with Mukhlif and Challob's (2021) results, which outline the effects of Facebook, which include fostering communication among participants, extending the teaching-learning process outside the classroom, and enhancing the participation of the students. It also agrees with Ramadan's (2017), Salas-Rueda's (2021) study, and Crompton and Burke's (2015) survey, which revealed that Facebook allows improvement of learning conditions through the watching of videos and innovative educational activities that eventually enhance positive learning outcomes such as performance in Mathematics. The present study is in agreement with Biton and Segal's (2021) study, which revealed that Facebook is among the social media packages that contribute positively to the educational environment. The findings are in agreement with Nabayra's (2022) results, which revealed a significant difference in the performance of the students before and after the use of videos uploaded on YouTube in learning Mathematics, which favoured the performance after the intervention. Also, it can be seen in students' understanding of Mathematics concepts, which is enhanced when teachers integrate YouTube videos into topics they teach their students. The present study is in line with Sharma's (2018) results, which revealed that the Mathematics achievement of the classes receiving consistent exposure to videos and real-life activities was greater than that of the classes receiving only some of the special instructional treatments.

However, the findings of this study do not corroborate with Gaya et al.'s (2020) research results, which have reported negative influences such as a decline in academic performance in Mathematics when a student spends too much time on Facebook. Reporting that one of the major issues facing students' academic performance is the result of their use of social media. The finding also disagrees with Wang's (2021) results that the higher the number of videos watched, the lower the degree of improvement in performance seen in standardized testing. Furthermore, the findings also align with Capuno et al.'s (2019) results that there is no significant relationship between instructional media utilization and the academic performance of the respondents. The disagreement of these findings may not be disconnected from the fact that these researchers compared only one social media package with the academic performance in Mathematics of the students. The present study combined two social media packages: Facebook and YouTube, which correlated with students' academic performance, which has

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given a positive effect as a result of a wider exposure to social media, thereby enhancing the academic performance of students in Mathematics.

Conclusion

Based on findings from the present study, the effect of social media packages as a correlate of the academic performance of students struggling in Mathematics was examined, and it can be concluded that the majority of the students do not struggle with the learning of Mathematics in Obio/Akpor Local Government Area of Rivers State. The findings of this study have brought to light the conclusion that the combination of Facebook and YouTube correlated with students' academic performance and revealed improvement in academic performance in Mathematics of the students. This means students display improved performance in Mathematics while using Facebook and YouTube social media packages. Hence, Facebook and YouTube enhance students' performance in Mathematics. This signifies that the use of social media packages reduces the phobia of students and enables improvement in their academic performance.

Recommendations

Based on the findings of the present study, the researchers recommended that:

1. Teachers should upload educational content in Mathematic online; this will enable the students to read and learn even during their spare time.
2. The Ministry of Education and Mathematics Association of Nigeria (MAN) should consider undertaking programs to enhance students' and Mathematics teachers' comprehension of social media use as an educational tool to create interactive learning outcomes for students in Mathematics.
3. Mathematics teachers should frequently expose students to more than one social media package to enhance the performance of students in Mathematics.

References

Abaver, S. M., & Ogor, C. E. (2023). Boosting students with special needs interest in geometry using guided - inquiry and coop-coop co-operative instructional strategies in Benue State, Nigeria. *Zamfera International Journal of Education (ZIJE),* 3(6), 132-141.

Biton, Y., & Segal, R. (2021). Learning and teaching Mathematics online social networks: the case of Facebook. Available at https://www.intechopen.com/onlinefirst/7118.

Capuno, R., Revalde, H., Etcuban, J., Aventuna, M., Medio, G., & Demeterio, R. (2019). Facilitating learning mathematics through the use of instructional media. *International Electronic Journal of Mathematics Education,* 14(3), 677–688

Crompton, H., & Burke, D. (2015). Research trends in the use of mobile learning in Mathematics. *Inter-national Journal of Mobile and Blended Learning*, 7(4), 1–15.

Fathi, K., & Zarei, N., (2019). Enhancing students' engagement in learning through YouTube based instruction. *International Journal of English and Studies.* SP Publication, 1 (4), 1-6.

Gaya, S. I., Bala, T., Lawan, I. A., & Ishaq, U. (2020). Effect of social media on academic performance among university Mathematics education students in Kano State, Nigeria. *Journal of Mathematical Sciences and Computational Mathematics*, 2(1), 181–193.

International Telecommunication Union (2016). Measuring the Information Society Report 2016.

Konlan, J. B., & Patience, E. D. (2018). Effects of Social Media on the Academic Performance of Students in Ghanaian Universities: A case Study of University of Ghana, Legon. Accra: University of Ghana.

Maheshwari, S., & Mukherjee, T. (2021). How does academic performance increase virtual popularity? A case of Facebook usage among Indian college students. *Contemporary Educational Technology,* 13(1), p284.

Mascheroni, G., & Cuman, K. (2014). Mobile internet access and use among European children. Initial findings of the Net Children Go Mobile project. Educate.

Mukhlif, M. I., & Challob, A. I. (2021). Enhancing vocabulary knowledge among secondary school EFL students by using Facebook. *Turkish Online Journal of Distance Education*, 22(3), 293–309

Nabayra, J. (2020). Video-based e-module for mathematics in nature and students' learning experiences in a flipped classroom. *Journal of Science and Mathematics Education in Southeast Asia,* 4(3)

Nabayra, J. N. (2022). YouTube-Based teacher-created videos for online Mathematics learning during the pandemic and its effect on students' Mathematics performance. *Webology*, 19 (2), 1380–1390.

Ramadan, R. (2017). Unraveling Facebook: A Pedagogical Tool during the Syrian Crisis Open Learning: *The Journal of Open, Distance, and e-Learning*, 32(3), 196-213.

Salas-Rueda, R. A. (2021). Analysis of Facebook in the teaching-learning process about Mathematics through data science. *Canadian Journal of Learning and Technology*, 47(2), 1–20.

Cite this article as:
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Sharma, K. (2018). Effects of instructional videos and real-life mathematics activity on student achievement and attitude in a community college transitional mathematics course. Doctoral Dissertation, Teachers College, Columbia University.
https://doi.org/10.7916/D84474DB

Subhi, M. A., & Kosasih, U. (2023). Mathematics Distance Learning with the Utilization of WhatsApp and YouTube Application for Vocational High School Students, *AHSSEH* 9, 114–125, 2023.

Tirhajai, S. (2024). Mathematical foundation for machine learning. *International Journal of Research in Electronics and Computer Engineering IJRECE*, 12(2). 1-12

Wang, H. (2021). What works and what does not: A reflective practice on an online Mathematics class. *Mathematics Teaching Research Journal*, 13(1), 16-29.

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