



VillageMath Educational Review

An International/Multidisciplinary Journal of
Network for Grassroots Science and Mathematics
Education (The VillageMath Network)

A publication of VillageMath Educational Services
(CAC RC: 4097888)

Volume 6, Issue 1

October, 2024

CODEN: VERIAU

Impact of Application Software on Economic Status and Academic Performance of Secondary Physics Students in Makurdi Local Government Area in Benue State, Nigeria

Benjamin Akura TAANGAHAR and Michael Ikeke OGAH

Benue State University, Makurdi, Nigeria

DOI: <https://doi.org/10.5281/zenodo.13893043>

Article History: Received 9th September, 2024; Revised 4th October, 2024; Published 5th October, 2024.

Copyright © 2024 by Author(s) and The VillageMath Network

This work is licensed under Creative Commons Attribution 4.0 International (CC BY 4.0)

<https://creativecommons.org/licenses/by/4.0/>



How to Cite this Article:

Taangahar, B. A. & Ogah, M. I. (2024). Impact of Application Software on Economic Status and Academic Performance of Secondary Physics Students in Makurdi Local Government Area in Benue State, Nigeria. *VillageMath Educational Review (VER)*, 6(1), 156-165. <https://ngsme.villagemath.net/journals/ver/v6i1/taangahar-ogah>

Abstract

This study investigated the impact of application software on economic status and academic performance of secondary physics students in Makurdi Local Government Area, Benue State, Nigeria. Five research questions and hypotheses guided the study. Descriptive survey design was adopted for the study. Self-structured questionnaire titled Impact of Application Software on Economic Status and Academic Performance Questionnaire (IASESAPQ) was used to collect data for the study. Descriptive statistics of mean and standard deviation were used to answer the research questions while the t-test was used to test the null hypotheses at 0.05 level of significance. The findings revealed that application software has an impact on both economic status and academic performance of secondary school physics students. The results also showed that the extent to which secondary physics students are able to identify application software used to improve their economic status in schools was low and

that for performance was high. There was also a significant difference in the extent to which secondary physics students who are able to identify application software between those used to improve their economic status and those used to improve their academic performance. There was also an impact of identified application software between those used to improve students' economic status and those used to improve students' academic performance in school. It was concluded that students were able identify software that would improve their academic performance more than those used in improving their economic status and that application software has more impact on software used to improve performance than in those used for economic gain. It was recommended that schools should work out measures that enable students to better identify software that would improve their academic performance and economic status.

Keywords: Physics Education, Application Software, Academic Performance, Socio-Economic Status, Secondary Education

Introduction

The use of Information and Communication Technology (ICT) devices appear to have permeated a substantial part of the education sector. These digital devices, such as desktops, smartphones, palm and laptops could be found in school ICT laboratories for teaching ICT as a subject and as an aid to teaching by different teachers. These devices use hardware and software to carry out required tasks. Application Software is prominent among the Software. Application Software consists the programs, written by experts, that allow users to get specific task done through digital devices (Svetsky, Moravcik, Ruskova, Vaskova, Cervenanska & Mikulowski, 2023). Examples of application software include media player, flight simulator, console game, photo-shop, word processor and spreadsheet. Others are Team, Snapchat, TikTok, Firefox, Facebook, Opera mini, YouTube, WhatsApp, Chrome, E-mail, Telegram, Palm pay, Play store, Instagram and Opera News. Students need to be able to identify and use these software icons before using them.

Although students are believed to use these applications, they are usually not permitted to use ICT laboratory on their own except when they have assignments to do after school. It has been observed that when students are on their own, they could be distracted by undesirable pop-ups or websites, impacting negatively on their performance (Ifeyanyi & Ebere, 2018; Yilmaz & Yilmaz, 2023).

Academic performance has been described as the scholastic standing of a student within a specified period. This scholastic standing could be explained in terms of grades obtained in a subject or group of subjects (Taangahar, Fatoki, & Joshua, 2022). Word software, for instance, could be used in grammar, spelling and language-check provide synonyms and do other tasks which can improve students' academic performance in English (Oranburg, 2020). To handle large numerical data, spreadsheets, for example, allow users to manage datasheets and help in computations. Lueck, Harpster, Hartmann, Tracy, Jones, Legge and Bauer (2023) found that Application Software enables learners to be more independent, reflective and self-regulated in their learning process.

Economic status may be described in categories of salaries and wages, income from property and other sources. It could also be an occupational prestige or index of wealth. It

is usually measured by low, medium and high. People within the low socio-economic strata usually have less access to financial, educational and health status than those within the higher levels. A study by Jogendra (2018) and Hawkins, Charles & Mehaffey (2020) posit that application software such as Youtube, Facebook, BetNaija and Jumia, among others could lead to better employment opportunities, higher earnings and could generate income for students.

Even though it is believed that students who use application software could earn income and feel more comfortable in school than students who do not, poor economic status appears to have led to many students dropping out of school due to lack of funds to pay fees. The situation is more critical now that there is a hike in the prices of goods and services. The financial hardship is compounded by the fall of the Naira against the Dollar as well as the sudden fuel subsidy removal. Despite Benue State Government's intervention to pay examination fees of graduating students in government schools in the state, the impact remains to be seen. Some studies (Hawkins, Charles & Mehaffey, 2020) have shown that students' use of digital skills could augment students' economic statuses and reduce their dependence on parents. If nothing is done to allow students to develop digital skills to improve on their finances, the much-desired national goals of 'literacy for all' will be a far cry. This might also lead to increased insecurity and criminality in society from the many dropouts. It is lamentable that many students are not able to identify application software let alone its use for economic gain and enhancing their academic performance. As to whether the use of application software has helped to improve both economic status and academic performance has not been ascertained in any single study from Makurdi. This study is therefore to determine the impact of application software on economic status and academic performance of secondary physics students in Makurdi Local Government Area of Benue State, Nigeria.

Research Questions

The following research questions were addressed:

- i. To what extent are secondary physics students able to identify application software used to improve their economic status in schools?
- ii. To what extent are secondary physics students able to identify application software used to improve students' performance in school?
- iii. What is the impact of secondary physics students who use application software to improve their economic status?
- iv. What is the impact of secondary physics students who use application software to improve their academic performance?

Research Hypotheses

The following hypotheses were tested at 0.05 level of significance.

- i. There is no significant difference between the extent to which secondary physics students are able to identify application software to improve their economic status and to improve their academic performance.

- ii. There is no significant difference between the impact of application software on secondary physics students who use application software to improve their economic status and those who use them to improve their academic performance.

Methodology

Descriptive survey research design was considered used for this study because the data was collected from a representative sample for generalization. The population of this study comprises 250 students from secondary schools in Makurdi Local Government Area (Benue State Teaching Service Board, 2024). Purposive sampling was used to select the 2 private and 2 public secondary schools with equipped ICT laboratories which yielded the sample size of 250 students. A researcher-developed questionnaire titled: Impact of Application Software on Students' Economic Status and Academic Performance Questionnaire (IASESAPQ) was used. The questionnaire was divided into Sections A and B respectively. Section A contained demographic data of respondents while Section B contained questionnaire items in two parts. Part one was on students' ability to identify application software used to improve student's economic status and those used to improve their academic performance. Part two was on the impact of secondary physics students who use application software to improve their economic status and those who use them to improve their academic performance.

Two experts validated the instrument, one Senior Lecturer and the other a Professor, both of the Department of Science and Mathematics Education, Benue State University, Makurdi, Nigeria, did face and content validation. The researchers requested the experts to respond to whether or not the items conform with the subject matter, they measured what they were supposed to measure, whether or not the items were free of ambiguity or could provide the relevant data with respect to research questions and hypotheses. The experts scrutinized the instrument to ensure that the items measure the variables of the study. Their input helped in the rephrasing as well as rewording some items to ensure that there was no ambiguity. Permission was obtained from school principals to administer the questionnaire. Respondents were allowed to complete the questionnaires on the spot and return to research assistants who were the teachers in the school

Mean and standard deviation were used to answer the research questions. A 4-point Likert scale was used. The scale of VHE=Very High Extent (4), HE=High Extent (3), LE=Low Extent (2), VLE=Very Low Extent (1) was used in determining the extent to which students were able to identify application software used to improve students' economic status and academic performance. It also sought to determine the impact of secondary physics students who use application software to improve their economic status and those who use them to improve their academic performance. The scale of VHI=Very High Impact (4), HI=High Impact (3), LI=Low Impact (2), VLI=Very Low Impact (1) was used. Any response with a mean rating of 2.50 and above was accepted as having a high impact, while any response below 2.50 was not accepted. This was arrived at by taking the average of the weighted scale. A t-test statistic was used to test the null hypotheses at 0.05 level of significance. P-value equal to or less than 0.05 was used for accepting the null

hypotheses. While a result with p-value more than 0.05 led to not accepting the null hypotheses. The analyzed data were presented in tables and interpreted.

Results

Results of the study are presented according to research questions posed and the hypotheses formulated.

Research Question One

To what extent are secondary physics students able to identify application software used to improve their economic status in school?

Table 1: Mean of Extent to which Students Are Able to Identify Application Software Used to Improve their Economic Status

S/No.	Software	\bar{x}	δ	Remarks
1.	Team software	1.58	0.766	VLE
2.	Snapchat	3.20	0.880	VHE
3.	TikTok	2.76	1.064	HE
4.	Firefox	1.31	0.781	VLE
5.	Facebook	3.55	0.628	VHE
6.	Opera mini	1.33	0.717	VLE
7.	YouTube	3.34	0.864	VHE
8.	WhatsApp	3.53	0.667	VHE
9.	Chrome	1.51	0.676	VLE
10.	E-mail	1.44	0.549	VLE
11.	Telegram	1.36	0.771	VLE
12.	Palm pay	1.21	0.799	VLE
13.	Play store	3.68	0.518	VHE
14.	Instagram	2.73	1.071	HE
15.	Opera News	2.65	1.128	HE
	Cluster mean	2.35	-	LE

Data from Table 1 indicates that 5 application software have a very high mean of extent to which secondary physics students were able to identify application software used to improve their economic status in school. Also, three software have a high mean, while 7 software have very low mean. This implies that the application software were identified as not used to enhance economic status in school. The cluster mean of 2.35 below the criterion reference mean of 2.50 implies that the extent to which students are able to identify application software used to improve students' economic status in school was low.

Research Question Two

To what extent are secondary physics students able to identify application software used to improve their academic performance in school?

Table 2: Mean of Extent to which Students Are Able to Identify Application Software Used to Improve their Academic Performance in School

S/NO	Software	\bar{x}	δ	Remarks
1.	Team software	2.58	0.166	HE
2.	Snapchat	1.31	0.210	VLE
3.	TikTok	2.76	0.034	HE
4.	Firefox	3.20	1.021	VHE
5.	Facebook	3.65	1.408	VHE
6.	Opera mini	3.68	0.310	VHE
7.	YouTube	3.34	1.610	VHE
8.	WhatsApp	3.53	0.930	VHE
9.	Chrome	3.51	0.016	VHE
10.	E-mail	3.44	0.809	VHE
11.	Telegram	3.36	0.291	VHE
12.	Palm pay	1.21	0.152	VLE
13.	Play store	1.33	0.518	VLE
14.	Instagram	3.73	1.083	VHE
15.	Opera News	3.65	0.204	VHE
	Cluster mean	2.95	-	HE

Data from Table 2 indicates that 10 application software have a very high mean of extent to which secondary physics students were able to identify application software used to improve their academic performance in school. Also, 2 software have a high mean, while 3 software have very low mean. This implies that the application software were identified as not used to enhance academic performance in school. The cluster mean of 2.95 above the criterion reference mean of 2.50 implies that the extent to which students are able to identify application software used to improve students' academic performance in school is high.

Research Question Three

What is the impact of application software on secondary physics students' economic status?

Table 3: Mean Rating of Impact of Application Software on Economic Status of Secondary Physics Students

S/No	Item Description	\bar{x}	SD	Remark
1.	Team has...on students' academic performance	3.02	1.141	VHI
2.	Snap Chart has... on students' academic performance	2.14	0.963	LI
3.	TikTok has ... on students' academic performance	2.76	1.064	HI
4.	Firefox has ... on students' academic performance	3.20	1.021	VHI
5.	Facebook has ... on students' academic performance	3.65	1.408	VHI
6.	Opera mini has ...on students' academic performance	3.68	0.310	VHI
7.	YouTube has ... on students' academic performance	3.34	1.610	VHI
8.	WhatsApp has ... on students' academic performance	2.54	1.094	HI
9.	Palm Pay has ... on students' academic performance	2.64	1.218	HI
10.	Instagram has ... on students' academic performance	2.36	1.151	LI
11.	Chrome has ...on students' academic performance	2.50	1.080	HI

Impact of Application Software on Economic Status and Academic Performance of Secondary Physics Students in Makurdi Local Government Area in Benue State, Nigeria

12.	Play Store has ... on students' academic performance	2.22	1.067	LI
13.	Opera News has ... on students' academic performance	2.70	1.128	HI
14.	Google Search has... on students' academic performance	2.47	1.193	LI
15.	E-mail has ... on students' academic performance	2.79	1.150	HI
	Cluster mean	2.80		HI

Data from Table 3 indicates that out of the 15 application software identified, 5 have very high impact mean, 6 have high impact mean both above the 2.50 criterion mean. This implies that these applications software have impact on students' economic status. Also, 4 have low impact. This implies that these software do not have impact on students' economic status. The cluster mean of 2.80 implies that the impact of applications software have on students' economic status was high.

Research Question Four

What is the impact of the application software on secondary physics students' academic performance?

Table 4: Mean Rating of Impact of Application Software on Academic Performance of Secondary Physics Students

S/No	Item Description	\bar{x}	δ	Remark
1.	Team has...on students' academic performance	1.03	0.218	VLI
2.	Snap Chart has... on students' academic performance	1.24	0.201	VLI
3.	TikTok has ... on students' academic performance	2.02	0.126	LI
4.	Firefox has ... on students' academic performance	2.30	1.083	LI
5.	Facebook has ... on students' academic performance	2.26	1.164	LI
6.	Opera mini has ...on students' academic performance	3.19	1.043	VHI
7.	YouTube has ... on students' academic performance	3.34	1.127	VHI
8.	WhatsApp has ... on students' academic performance	2.83	1.073	HI
9.	Palm pay has ... on students' academic performance	2.64	1.218	HI
10.	Instagram has ... on students' academic performance	2.79	0.162	HI
11.	Chrome has ...on students' academic performance	3.01	0.961	VHI
12.	Play Store has ... on students' academic performance	2.18	1.050	LI
13.	Opera News has ... on students' academic performance	3.56	1.758	VHI
14.	Google Search has... on students' academic performance	3.18	0.974	VHI
15.	E-mail has ... on students' academic performance	2.78	1.065	HI
	Cluster mean	2.56		HI

Data from Table 4 indicates that out of the 15 application software identified, 5 have very high impact mean, 4 have high impact mean both above the 2.50 criterion mean. This implies that the applications software have impact on students' academic performance in school. while, 4 have low impact and 2 have very low impact mean of below 2.50 criterion reference mean. This implies that these software do not have impact on students' academic

performance in schools. The cluster mean of 2.80 implies that the impact of application software have on students' academic performance was high.

Research Hypothesis One

There is no significant difference between the extent to which secondary physics students are able to identify application software to improve their economic status and to improve their academic performance.

Table 5: t-test Analysis on Extent to which Students are Able to Identify Application Software between those Used to Improve Students' Economic Status and Those Use to Improve Academic Performance in School

Variable	N	\bar{x}	δ	t-Cal.	t-Crit.	d f	Level of Sig.	P
Economic status	250	2.35	0.29	2.18	1.68	249	0.05	0.000
Academic performance	250	2.95	0.14					

Data from Table 5 shows that the t-calculated value of 2.18 is more than the critical value of 1.68 with a degree of freedom of 249, at 0.05 level of significance and P=0.000. Therefore, the null hypothesis is rejected. This implies that there is a significant difference between application software identified as used to improve students' economic status in school and those use to improve academic performance.

Research Hypothesis Two

There is no significant difference between the impact of application software on secondary physics students who use application software to improve their economic status and those who use them to improve their academic performance.

Table 6: t-Analysis on the impact of Identified Application Software Between Those Used to Improve Students' Economic Status and Those Used to Improve Students' Academic Performance

Variable	N	\bar{x}	δ	t-Cal.	t-Crit.	d f	Level of Sig.	P
Economic status	250	2.80	1.21	3.24	1.68	249	0.05	0.000
Academic performance	250	2.56	1.73					

Data from Table 6 shows that the t-test calculated value of 3.24 is more than the critical value of 1.68 at degree of freedom of 249, at 0.05 level of significance. Therefore, the null hypothesis is rejected. This implies that there is a significant difference on the impact of identified application software for the students' economic status and students' academic performance in school.

Discussion

The result presented showed that the extent to which secondary physics students are able to identify application software used to improve their economic status in schools was low. There was also a significant difference in the extent to which secondary physics students who are able to identify application software between those used to improve their economic status and those used to improve their academic performance with a t -calculate of 2.18 and t -critical of 1.68. Application software such as Team software, Snapchat, Chrome, Opera News and WhatsApp were identified as used to improve economic status by the students in school. This is in line with the study of Shang-Yu, Chung-Ying, Taiwan and Jer-Hao (2017) and Jogendra (2018) who found that smartphones enable students to have improved economic status in school.

The findings further revealed that the extent to which secondary physics students are able to identify application software used to improve their academic performance in schools was high. There was also a significant difference in the extent to which secondary physics students are able to identify application software between those used to improve their economic status and those used to improve their academic performance with a t -calculated of 3.24 and t -critical of 1.68. Application software such as Chrome, Whatsapp, Opera mini, Browser, Google Search, and Facebook among others were identified as used to improve students' academic performance in school. This is in line with the findings of Twum (2017) who revealed that there are basic application software that if students use well can improve their academic performance in school. This is, however, contrary to the findings of Ifeanyi and Ebere (2018) who discovered that using smartphone software distracts students from their studies. This might be so when they are left on their own and not guided by the teachers.

Conclusion

From the findings, it was concluded that students identified software that would improve their academic performance more than those used in improving their economic status and that application software has more impact on software used to improve performance than in those used for economic gain.

Recommendations

Based on the findings of this study, the researcher recommends that:

- i. Schools should enable students to better identify software that would improve their academic performance and economic status.
- ii. Students should be guided by their teachers on the use the application software to impact on their academic performance and on economic status without distraction.

REFERENCES

Banda, H. J., & Nzabanimana, J. (2023). The impact of physics education technology (PhET) interactive simulation-based learning on motivation and academic achievement among Malawian physics students. *Journal of Science Education and Technology*, 32(1), 127-141.

- Bansal, S., & Kumar, D. (2020). IoT ecosystem: A survey on devices, gateways, operating systems, middleware and communication. *International Journal of Wireless Information Networks*, 27, 340-364.
- Fidan, M. & Tuncel, M. (2019). Integrating augmented reality into problem-based learning: The effects on learning achievement and attitude in physics education. *Computers & Education*, 142, 103635.
- Hawkins, R. B., Charles, E. J. & Mehaffey, J. H. (2020). Socio-economic status and COVID-19-related cases and fatalities. *Public health*, 189, 129-134.
- Ifeanyi, I. P. & Ebere, J. E. (2018). The impact of using smartphones on the academic performance of undergraduate students. *Knowledge Management & E-Learning*, 10(3), 290-308.
- Jogendra, J. K. (2018). smartphone usage has been measured with the help of amount of time spent on the phone and monthly bill: A study of higher education students in India. *Computers & Education*, 123, 164-173.
- Lueck, A., Harpster, K., Hartmann, E., Tracy, H. S. C., Jones, M., Legge, R. & Bauer, C. M. (2023). Toward Removing Barriers in the Evaluation, Diagnosis and Care of Individuals with Cerebral Visual Impairments. *Policy Insights from the Behavioral and Brain Sciences*, 10(2), 296-307.
- Navarro-Carrillo, G., Alonso-Ferres, M., Moya, M., & Valor-Segura, I. (2020). Socioeconomic status and psychological well-being: Revisiting the role of subjective socioeconomic status. *Frontiers in Psychology*, 11, 1303.
- Oranburg, S. (2020). Distance education in the time of coronavirus: quick and easy strategies for professors. *Duquesne University School of Law Research Paper*, 2 (2), 28-29.
- Shang-Yu, Chung-Ying, A. & Taiwanand Jer-Hao, H. C. (2022). The variations in the degree of smartphone use behavior among male and female adolescents as well as the association between various degrees of smartphone use behavior and the vitality and mental health of each gender: What is the role of awareness? *Plus one*, 17(3), 60-63
- Svetsky, S., Moravcik, O., Ruskova, D., Vaskova, L., Cervenanska, Z., & Mikulowski, D. (2023, October). Universal Personal Hybrid e-Learning Design System for University Teachers and Students. In Procreative Students' Mathematical Problem-Solving Ability and Metacognition Ability. *International Electronic Journal of Mathematics Education*, 14(2), 331-340.
- Taangahar, B. A., Fatoki, J. O. & Joshua, J. D. (2021). Students' academic performance in physics as a correlate of their academic performance in Mathematics in Makurdi local government area, Benue State. *International Journal of Multidisciplinary Research and Growth Evaluation*, 2(6), 16-19
- Twum, R. (2017). Utilization of Smartphones in Science Teaching and Learning in Selected Universities in Ghana. *Journal of Education and Practice*, 8(7), 216-228.
- Yilmaz, R. & Yilmaz, F. G. K. (2023). Augmented intelligence in programming learning: Examining student views on the use of ChatGPT for programming learning. *Computers in Human Behavior: Artificial Humans*, 1(2), 100-105.