

Access to Technology and Classroom Management as Predictors of Students' Academic Engagement in Geography in Obubra, Cross River State, Nigeria: Implications for Economics Education**¹David Francis Ekpoto**ekpotodavid@gmail.com<https://orcid.org/0000-0002-9139-3414>**²Theresa Alorye Ukwayi**ukwayitheresa@gmail.com<https://orcid.org/0009-0009-6009-2254>**³Ejikepese, Victoria Andornimye**ejikepesevictoria@gmail.com**⁴Assoh, Eucharia Uyourbuo**euchariaassoh@gmail.com**⁵Ruth David Ekpoto**ruthekpoto@gmail.com

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Abstract

The purpose of this study was to investigate access to technology and classroom management as predictors of students' academic engagement in geography in Obubra, Cross River State, Nigeria: Implications for Economics Education. This study adopted a correlational survey research design. Three null hypotheses guided the study. The study population comprised 758 (382 girls and 376 boys) senior secondary two (SSII) geography students from all 19 state-owned secondary schools in Obubra in the 2024/2025 academic session. A sample of two hundred (200) respondents was randomly selected for the study using a simple random sampling technique. Two researcher-developed instruments, tagged 'Access to Technology and Classroom Management Questionnaire (ATCMQ)' and 'Students' Geography Engagement Scale (SGES)', were used for data collection. The instruments were subjected to face validity by an expert in Geography Education and two experts in measurement and evaluation in the College of Education, University of Calabar. The instruments' reliability estimates were established using Cronbach's alpha. Simple and multiple linear regression analyses were used to test the hypotheses at the .05 level of significance. The analysis, among others, revealed that access to technology significantly predicts students' academic engagement in Geography. Based on the study's findings, it was recommended that governments and school management ensure sustainable, equitable access to reliable internet, electricity, and up-to-date devices, especially in rural and underserved areas.

Keywords: Access to Technology, Classroom Management, Students' Academic Engagement, Economics Education, Geography.

Introduction

The current educational environment in Nigeria is also severely affected by the collision of technological incorporation and the eternal necessity of proper classroom management (CM). Digital resources have the potential to transform the secondary Geography field, especially given this subject's reliance on visual-spatial aids and fieldwork. Nevertheless, equitable access to and strategic pedagogical implementation of these resources are critical to their actual effect (Adams et al., 2025; Olatunde-Aiyedun & Daniels, 2024).

The issues of resource scarcity, infrastructure deficiencies, and the high student-to-class ratio in Nigeria are particularly relevant to Cross River State, where these factors frequently hinder effective teaching and learning (Adams et al., 2024; Angwaomaodoko, 2024; Ekpoto & Adie, 2025). In this regard, a reflective examination of the conditions that lead to Students' Academic Engagement in Geography (SAEG), a key antecedent to academic outcomes that entail behavioural engagement, emotional commitment, and cognitive effort, is necessary. Practices in classroom management are in interaction with technology to meet the three basic needs, namely, autonomy, sense of volition and self-endorsement of the learning activity, competence, experience of mastery and efficacy in academic tasks, and relatedness, experience of belonging and mutual respect in the learning community, proposed by Self-Determination Theory (SDT). According to SDT, the three primary psychological needs should be fulfilled to achieve intrinsic motivation and engagement (Chiu, 2021; Kelly et al., 2022).

With its direct competence improvement, in particular Geography through the visualisation of spatial data, technology directly promotes competence through immediate feedback, interactive simulations, and adaptive pacing (Stroud, 2019; Olatunde-Aiyedun & Daniels, 2024). It also promotes autonomy, allowing students to choose their learning paths (David & Weinstein, 2023). On the other hand, a classroom that is carried out effectively promotes relatedness through quality interactions and competence through specific expectations, routine, and positive directions. More importantly, the moderating effect of classroom management is emphasised, with inadequate organisation of technology use posing a threat of distraction and disengagement (Cambay & Paglinawan, 2024; Consoli et al., 2024).

The personal importance of these two variables is supported by substantial research on access to digital tools, including Geographic Information Systems (GIS), remote sensing, and mobile applications (mLearning), which play a significant role in enhancing conceptual knowledge, map literacy, and environmental awareness in Geography. In particular, technologies such as GIS positively affect spatial thinking and geographic reasoning, leading to greater engagement and higher-order thinking (Olatunde-Aiyedun & Daniels, 2024; Bello, 2022; Ukwaiyi et al., 2024). Nevertheless, a combination of barriers, including inefficient light bulbs, a lack of devices, teacher education, and the urban-rural digital divide, prevents the successful implementation of these tools in the Nigerian context. It is not enough to offer access; instructional design and classroom practices are required to mediate the effects of technology.

Classroom Management (CM) is one of the pillars of quality instruction, the minimisation of disruptions, the maximisation of instructional time, and the building of a supportive climate that facilitates participation. In Geography, where interactive and exploratory approaches are crucial, setting clear expectations, using active learning techniques, organising the physical space/resources, and managing proactive behaviour are core CM aspects. Good management habits are always associated with better concentration, self-control, and schoolwork. Higher behavioural and cognitive engagement in lessons is closely linked with effective CM, especially when lessons are combined with active, inquiry-based activities (such as fieldwork or GIS) (Achor, 2024; Angwaomaodoko, 2024; Asiegbu et al., 2022; Chalak & Fallah, 2019; Ekpoto et al., 2022; Mustafa et al., 2024; Umaha et al., 2025). It means that the efficiency of classroom management eventually mediates the predictive value of access to technology on cognitive engagement practices it incorporates and leverages (Ussenov et al., 2020; Johnson et al., 2024; Nkanu et al., 2024; Nkanu et al., 2025; Nwafor et al., 2024; Chukwuemeka et al., 2020; Addo et al., 2025).

Statement of the problem

Although the roles of individual contributions to technological access and classroom management are well established, there is a significant gap in understanding their joint predictive value for the

multidimensional concept of academic engagement (behavioural, emotional, and cognitive) in Geography. Previous studies have frequently considered motivation, teaching methods, and the use of technology separately. The literature indicates that the best way to cognitive engagement is when access to technology is matched with pedagogical practices, such as effective classroom management, that use these tools to foster active participation and critical thinking. Notwithstanding that the personal advantages of access to technology and successful classroom management have been identified, and a theoretical statement (through SDT) has been made that students must simultaneously meet psychological needs for deep engagement, a critical empirical gap remains. Namely, no prospective resource-constrained environment, such as Obubra Local Government Area, Cross River State, has tried to systematically model the interactive and joint impacts of the factors of access to technology on one hand and classroom management practices of teachers on the other hand on the engagement of students (behavioural, emotional, and cognitive) in Geography in secondary school. Unless this is understood, interventions may be compartmentalised, partial, or even out of step with local realities.

Therefore, the study necessarily sets out to empirically examine the extent to which access to technology and classroom management practices, individually and together, predict academic engagement in Geography among secondary school students. Among others, one key question that comes to mind is: do access to technology and classroom management jointly predict students' academic engagement in Geography in Obubra Local Government Area (LGA) of Cross River State?

Purpose of the study

The primary purpose of this study is to investigate the extent to which access to technology and classroom management predict students' academic engagement in Geography in Obubra Local Government Area, Cross River State, Nigeria. Specifically, this study sought to:

1. Assess whether access to technology predicts students' academic engagement in Geography.
2. Examine how classroom management predicts students' academic engagement in Geography.
3. Determine how access to technology and classroom management jointly predict students' academic engagement in Geography.

Research hypotheses

1. Access to technology does not significantly predict students' academic engagement in Geography.
2. Classroom management does not significantly predict students' academic engagement in Geography.
3. Access to technology and classroom management do not significantly predict students' academic engagement in Geography.

Method

The research design applied in the study was correlational survey research. The study was guided by three research questions and hypotheses, designed to align with the study's goals. The study population included 758 (382 girls and 376 boys) senior secondary two (SSII) geography students from all 19 state-owned secondary schools in Obubra in the 2024/2025 academic year (Planning, Research and Statistics Department, Cross River State Ministry of Education, 2025). The students selected to undertake the study are in this group because they have attended two or more geography sessions. A sample of 200 students from 10 of 19 public secondary schools within the study area was selected using simple random sampling. In the study, data were collected using the 10-item Access to Technology and Classroom Management Questionnaire (ATCMQ) and the 10-item Students' Geography Engagement Scale (SGES). Reliability of the instrument was evaluated through trial testing and the Cronbach alpha technique, and the reliability was found to be between 0.80 and 0.87. Data analysis was performed using simple linear regression at the 0.05 significance level.

Results

Hypothesis 1: Access to technology does not significantly predict students' academic engagement in Geography in Obubra LGA, Cross River State. The independent variable in this hypothesis is access to technology, while the dependent variable is students' academic engagement in Geography. To test this hypothesis, simple linear regression analysis was used. The result of the analysis is presented in Table 1.

Table 1: Simple regression result of the relationship between access to technology and students' academic engagement in Geography in Obubra LGA, Cross River State (n = 200).

Model	R	R. square	Adjusted R-squared	Std error of the estimate	
1	.545 ^a	.297	.293	2.263	
Model	Sum of squares	df	Mean square	F-ratio	p-value
Regression	428.088	1	428.088	83.609 *	.000 ^b
Residual	1013.787	198	5.120		
Total	1441.875	199			
Variables	Unstandardized regression weight B	Standardized regression weight	Beta weight	t	p-value
(Constant)	8.444	.828		10.195	.000
Access to Technology	.520	.057	.545	9.144*	.000

*Significant ($p < .05$).

a. Dependent Variable: students' academic engagement in Geography (SAEG)

b. Predictors: (Constant), Access to Technology (AT).

Table 1 shows that the F-value is statistically significant ($F = 83.609_{(1, 198)}$; $p < 0.05$). This result indicates that access to technology has a significant predictive effect on students' academic engagement in geography in the study area. Table 1 also reports the correlation coefficient ($R = .545$) and the explained variance ($R^2 = .297$) associated with the predictor variable. The model R-square indicates that 29.7% of the total variation in students' academic engagement in geography around its mean is explained by variations in access to technology.

Hence, the null hypothesis was rejected. This decision means access to technology significantly predicts students' academic engagement in geography in Obubra LGA, Cross River State. A further implication of this result is that the greater the access to technology, the more positive the students' academic engagement in geography, and vice versa. The identified equation to understand this relationship was presented thus:

$$SAEG = 8.444 + 0.545AT$$

The simple linear regression model above shows that students' academic engagement in geography is a function of access to technology (AT). The positive sign of the SAEG coefficient indicates a positive or direct relationship between SAEG and AT, such that a one standard deviation increase in SAEG from its mean will lead to an increase in AT by 0.545 standard deviations from its own mean, and vice versa.

Hypothesis Two: Classroom management does not significantly predict students' academic engagement in Geography in Obubra LGA, Cross River State. The independent variable in this hypothesis is classroom management, while the dependent variable is students' academic engagement in Geography. To test this hypothesis, simple linear regression analysis was used. The result of the analysis is presented in Table 2.

Table 2: Simple regression result of the relationship between classroom management and students' academic engagement in Geography in Obubra LGA, Cross River State (n = 200).

Model	R	R. square	Adjusted R-squared	Std error of the estimate	
1	.514 ^a	.265	.261	2.314	
Model	Sum of squares	df	Mean square	F-ratio*	p-value
Regression	381.556	1	381.556	71.250	.000 ^b
Residual	1060.319	198	5.355		
Total	1441.875	199			
Variables	Unstandardized regression weight B	Standardized regression weight	Beta weight	t	p-value
(Constant)	8.460	.894		9.467	.000
Classroom management	.493	.058	.514	8.441*	.000

*Significant (p<.05).

a. Dependent Variable: students' academic engagement in Geography (SAEG).

b. Predictors: (Constant), Classroom management (CM).

Table 2 displays that the F-value is statistically significant ($F = 71.250_{(1, 198)}$; $p < 0.05$). This result shows that classroom management has a significant predictive effect on students' academic engagement in Geography in the study area. Table 2 also shows the correlation coefficient ($R = .514$) and the explained variance or R-square ($R^2 = .265$) associated with the predictor variable. The model R-square indicates that 26.5% of the total variation in students' academic engagement in Geography around its mean is explained by variations in classroom management.

Hence, the null hypothesis was rejected. This position means that classroom management significantly predicts students' academic engagement in Geography in Obubra LGA, Cross River State. A further implication of this result is that the better the classroom management, the more positive the students' academic engagement in Geography, and vice versa. The identified equation to understand this relationship was presented thus:

$$SAEG = 8.460 + 0.514CM$$

The simple linear regression model above shows that students' academic engagement in Geography is a function of classroom management (CM). The positive sign of the SAEG coefficient shows a positive or direct relationship between SAEG and CM, such that a one standard deviation increase in SAEG from its mean will lead to an increase in CM by 0.514 standard deviations from its own mean, and vice versa.

Hypothesis Three: 3. Access to technology and classroom management do not significantly predict students' academic engagement in Geography in Obubra LGA, Cross River State. The independent variables in this hypothesis are access to technology and classroom management, while the dependent variable is students' academic engagement in Geography. To test this hypothesis, multiple regression analysis was used. The result of the analysis is presented in Table 3.

Table 3: Multiple regression results for the joint relationship between access to technology, classroom management, and students' academic engagement in Geography in Obubra LGA, Cross River State (n = 200).

Model	R	R. square	Adjusted R. square	Std error of the estimate	
1	.615 ^a	.378	.372	2.134	
Model	Sum of squares	df	Mean square	F-ratio	p-value
Regression	545.001	2	272.501	59.855*	.000 ^b
Residual	896.874	197	4.553		
Total	1441.875	199			
Variables	Unstandardized regression weight B	Standardized regression weight	Beta weight	t	p-value
(Constant)	5.912	.927		6.377	.000
Access to technology	.368	.061	.386	5.992*	.000
Classroom management	.313	.062	.326	5.068*	.000

*Significant (p<.05).

a. Dependent Variable: students' academic engagement in Geography (SAEG).

b. Predictors: (Constant), access to technology (AT), classroom management (CM).

Table 3 shows that the combination of access to technology and classroom management produced a coefficient of multiple determination (R) of .615, an R-square (R²) of .378, and an adjusted R² of .372. The result also indicates that the proportion of variation in students' academic engagement in Geography (SAEG) was jointly predicted by access to technology and classroom management (F = 59.855_(2, 197); p < 0.05). Thus, when these variables are combined, they significantly predict students' academic engagement in Geography (SAEG). This result implies that access to technology and classroom management, when taken together, are significant predictors of students' academic engagement in Geography. The R² of .378 implies that the independent variables (access to technology and classroom management) jointly account for 37.8% of the variance in students' academic engagement in Geography.

To determine the relative contributions of the individual factors, a test of regression weights was conducted. The results show that the standardized regression weights (Beta) ranged from .326 to .386, and t-ratios ranged from 5.068 to 5.992. The Beta weights of the two independent variables (access to technology and classroom management) were significant at the .05 level.

The results further showed that access to technology (t = 5.992) made the most significant contribution to students' academic engagement in Geography, followed by classroom management (t = 5.068). The equation that best describes this relationship is: SAEG = .368AT + .313CM + 5.912.

The above regression model can be interpreted to mean that a one-unit change in AT will contribute a .368-unit change in SAEG. In the same vein, a 1-unit change in CM will produce a .313-unit change in SAEG; while 5.912 is the level of SAEG without the influence of access to technology and classroom management.

Discussion

The first finding of this study shows that access to technology significantly predicts students' academic engagement in Geography in Obubra LGA, Cross River State. This finding suggests that the ease of doing things that technology generally offers could have contributed to this result. Like in every other walk of life, access to technology is an important factor that contributes in no small measure to attracting

students' interest towards active participation in classrooms, leading to deep academic engagement and rewarding academic achievement. Another contributory factor to this result may be the capacity of regular access to technology to serve as a strong motivator for both teachers and students in the teaching and learning of Geography. This motivation, driven by access to technology in the classroom, could foster a deep sense of commitment among teachers and students to make the most of every period set aside for teaching-learning in Geography. This finding corroborates several authors who, in related but separate studies, reported that access to learning resources significantly affects students' engagement (Ussenov et al., 2020; Nwafor et al., 2024; Nkanu et al., 2024; Nkanu et al., 2025; Johnson et al., 2024).

The second finding reveals that classroom management significantly predicts students' academic engagement in Geography in Obubra LGA, Cross River State. This finding suggests that a teacher with innovative, student-friendly classroom management skills is likely to keep students actively engaged in Geography lessons. Students would be more enthusiastic about lessons led by competent teachers at their school. One possible explanation for this finding is that a well-managed classroom reduces the stress and challenges often associated with boredom and other distractions that abound in an ill-managed classroom. Students who are privileged to learn in well-managed classrooms under competent teachers can easily get the relevant attention that stirs up the best in them to manifestation. Such would lead to enhanced academic engagement, which, in turn, would yield desirable academic outcomes. This finding validates the study by Chalak and Fallah (2019), which found that classroom management is an instructional lever across subjects, including Geography.

Implications for Economics Education

The findings of this study demonstrate that access to technology and classroom management (CM) practices are significant predictors of academic engagement in Geography. These findings have profound and transferable implications for Economics education, another core discipline within the Social Sciences.

1. Enhancing content comprehension and data literacy

- i. *Modelling complex concepts*: Economics, like Geography, relies on modelling abstract concepts (e.g., supply and demand, fiscal policy, scarcity). Technology integration, such as using Virtual Reality (VR) for virtual field trips to financial institutions or markets, and simulations/interactive platforms, moves students beyond abstract theory.
- ii. *Data analysis competencies*: The core of modern Economics is data-driven analysis. Access to technology enables educators to cultivate data analytics competencies by integrating tools such as spreadsheets, statistical software, and real-time newsfeeds to analyse economic indicators, making the subject immediately relevant and professionally pertinent.

2. Fostering multidimensional engagement (SDT Perspective)

- i. *Cognitive and behavioural engagement*: Effective CM in an Economics class translates into establishing clear rules for technology use and addressing the risk of distraction inherent in digital tools. This strict but supportive framework ensures that technology is used for active learning (e.g., online collaborative projects, Edmodo assignments) rather than displacement activities. This practice enhances behavioural engagement (focused effort) and cognitive engagement (investment in critical thinking).
- ii. *Autonomy and competence*: Technology, such as online recorded lectures or adaptive learning platforms, supports the Self-Determination Theory (SDT) needs for autonomy by allowing students to review material at their own pace and for competence through immediate, personalised feedback. A positive, well-managed classroom environment complements this by fulfilling the need for relatedness, a key driver of engagement.

3. Addressing equity and the digital divide

- i. The study's focus on access highlights a significant challenge: the digital divide exacerbated by socioeconomic status (SES). In Economics, this means students from higher-SES backgrounds often have superior access to digital resources (devices, reliable internet) that significantly predict academic success.

- ii. The implication is that policymakers and educators must ensure equitable resource allocation and access policies; otherwise, the integration of technology, while beneficial for some, will ultimately exacerbate existing inequalities in educational outcomes.

Conclusion

The primary aim of this research was to investigate the extent to which access to technology and classroom management (CM) practices, individually and jointly, predict students' academic engagement in Geography in a specific, resource-constrained context of Obubra, Cross River State, Nigeria. In line with the principles of Self-Determination Theory (SDT), which emphasise that engagement is maximised when students feel competent, autonomous, and related to their learning environment, the study's theoretical premise posits a significant positive relationship among all three variables. Technology supports a sense of competence by providing interactive resources. Effective CM creates the structure and climate necessary for relatedness and minimises distraction, thereby enhancing engagement. Crucially, the expectation is that their joint effect provides a more powerful prediction of engagement (behavioural, emotional, and cognitive) than either factor in isolation. Ultimately, the study confirms that the efficacy of digital investments hinges not just on resource provision (access) but on the pedagogical skill (CM) employed to leverage them for meaningful learning outcomes.

Recommendations

Based on the study's purpose and the critical relationship between technology access and classroom management, the following state-of-the-art recommendations are advised:

1. Governments and school management should move beyond merely providing devices. The focus must be on ensuring sustainable, equitable access to reliable internet, electricity, and up-to-date devices, particularly for schools in rural and underserved areas such as Obubra LGA. This addresses the foundational issue of access.
2. Educational boards must provide continuous professional development for teachers that focuses not just on technical skills but on pedagogical content knowledge for technology integration (TPACK). Training should emphasise how to use technology to meet students' needs for autonomy and competence, and how to implement effective CM strategies (e.g., establishing clear digital citizenship rules and managing student devices) in a technology-rich environment.
3. Allocate funds to procure and create engaging, locally relevant digital content (e.g., GIS data for Geography, virtual market simulations for Economics) and Learning Management Systems (LMS). This content must support interactive and differentiated instruction to cater to diverse learning styles and optimise cognitive engagement.

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