



COMPARATIVE ANALYSIS OF THE ADOPTION AND USE OF EMERGING TECHNOLOGIES IN SCHOOLS SUPERVISION AND INSPECTION OF PUBLIC AND PRIVATE PRIMARY AND SECONDARY SCHOOLS IN ENUGU STATE, NIGERIA



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Abstract

Emerging technologies, like digitalization and models are often hailed as transformative technologies that will help to increase the quality of education and learning and bear significance to educational development. Hence this study examined the adoption, and use of technology through public private partnership in primary and secondary schools in Enugu state, Nigeria. The government of Enugu state alone cannot accomplish the gigantic task of providing quality education and meeting the targets of sustainable development goals (SDGs) and Education for ALL (EFA), but policy makers are optimistic since they think that public-private partnership (PPP) programmes could bring better educational outcomes which help in educational sustenance (Mason, R. 2018). Two objectives with two corresponding research questions and hypotheses were posed for the study. The study adopted both descriptive and cross sectional design to examine the primary and secondary schools owned by the government, and d the ones in joint ownership in terms of use of technology in supervision and inspection since the use of electronic supervision enhances teaching and quality educational outcome. The study used 561 sample drawn from 54 education zones and seventeen L.G.As samples that were used includes purposive, stratification and simple random sample technique. Questionnaire was used to collected data from principals, head teachers and other educational stake holders in Enugu state. Face and content validity was ensured for the instrument by two experts. Cronbach Alpha was used to test the reliability and the result is 0.794. Result of the research questions were analyzed using means score and standard deviation. ANOVA (F-Statistic) was used to determine if there existed significant used to determine if there existed significant variance in the respondents responses based on their school category. Hypotheses was analyzed using t-test. The result revealed that respondents from schools under partnership had a higher mean responses in most of the items than from respondents from school not under partnership. The hypothesis was tested of < 0.05 level of significance. School under partnership had a higher mean score of 4.34 while school not under partnership had a mean rating of 4.02. It was found that the use of technology in schools supervision through public private partnership can significantly predict educational development enhances quality teaching and educational outcome. It was recommended among others that digital supervisory measures must be put in place, implemented well monitored and activities of the teachers checked by all educational stakeholders.

Keywords: Emerging technologies, school supervision and public private partnership



Background of the Study

Emerging technologies like the use of computers in supervision and inspection of schools are often hailed as a transformative technologies that will not only help in academic achievements but will also help educational development. Mason (2018) suggests that although many articles, case studies and conference have discussed the studies and conferences have discussed the value of new technologies for best practice, very little evidence has emerged from these studies. Problems have been the ongoing changes in technology in a substantive way. There is no universal definition of emerging technologies, however, they can be described as technologies that have fast and recent growth, transition to something new, have prominent impact and based on scientific innovation and breakthrough (Cozzen et al 2018). Emerging technologies are important in educational development because they overthrow status quo technologies with time saving devices create new educational opportunities and rived educational decline and dying economic (Avila and Miyazaki 2011). Because new emerging technologies are so central to educational development and economic growth national, state governments and universities invest a lot of resources in Research and development for emerging technologies.

Public Private Partnership (PPP) refers to contractual agreement between the government and the private sector for the delivery of goods and services normally provided by government and rewards which may include financial risk and responsibilities (The World Bank 2018). Hence, this means the co-operation of the government and the private sector with each party contributing its quota to the delivery of educational services. At this juncture, the role of the state in partnership becomes that of a promoter, animator and a regulator, fixing standards, distributing funds according to different criteria including performance, promoting equality of opportunities and results. (Abdourahmane in Ogakwu, 2021, Leydesdorff and Bornmann, 2018).

However, Public-Private Partnership is not just limited to finance, it includes participation in terms of technical, use of technologies, legal and managerial inputs which may result in change of public private interface, for instance, expansion of educational infrastructures. In order to meet for expansion of infrastructure for effective supervision and inspection of schools. There is the need for Public-Private Partnership in conceptualization, development, monitoring and delivery of educational services and facilities. PPP studies had expressed that ppp contributes to sustainable development in education and others sectors (Wang, Gong, Liu and Thompson, 2020)

Digitalization of supervision and inspection of school through Public and Private Sectors are a cornerstone of this government modernization programme. They are delivering better quality public services by bringing in new investment and improved management and helping state-owned schools achieve their full potential (Hodge & Greeve, 2018).

Public and Private sectors have distinctive, but potentially complementary part to play. In our rapid changing world, in which our schools need to meet the rising expectations of the students, pupils, parents and the wider community, and in which our state-owned schools increasing have to compete in fast moving educational development. Digitalization of supervision and inspection in primary and secondary schools can lead to increased enrolments and increased inputs, such as physical facilities, teacher training, supervisory control measures and better monitoring of attendance. (Hassan, Ahmad & Abdurrashidi, 2022)

Education

Education is the major instrument that can be used to develop the human person. It is the instrument that transforms the totality of the individual into a functional citizen. To Amaechina (2020), education is a means of societal survival and perfection, which entails process that support acquisition of relevant knowledge and skill for functional living. Education can be seen as a formal activity that translates the yearnings of the society into reality.

Education has often been described as the bedrock for national development (TSafe, 2013). It is globally a vital element for social development and economic growth. This explains why nations have expended a lot of resources on technologies on education. Education is fundamental to the construction of a knowledge economy and the society generally (Okonkwo 2021).



Educational development is essential for economic growth of any nation because no economic political and others development in Africa can truly eventuate without educational development (Uma and Tubosun 2016). Education is the fulcrum and pivot upon which other development rests and rotates around (Aneke, 2020).

Supervision through the use of technology is generally considered as a service help to teachers or a process of giving and receiving help in an effort to improve instruction, this is concerned with what to teach, when it should be taught, to whom and by whom and how. Supervision in all its ramifications serves to help to make teachers efficient in their profession. Supervisors are not only expected to teach, advice and direct but also to inculcate values, attitude and skills (Kwaghbo, 2018). Supervisory control measures through technologies therefore are related to everything done by the school management in order to active at the set goals (Onuoha-Chidiebere, 2014).

Digital inclusion on the other hand, seek to close this gap and ensure that all individuals, have equal opportunities to participate fully in the digital society (Sunkel et al, 2013). Also digital inclusion refers to the removal of barriers to accessing, using and benefitting from ICTs, with the aim of promoting the full participation of all supervisors in the digital society. (OECD, 2023). It involves providing opportunities for access to ICTs as well as developing digital skills and promoting meaningful use of technologies to improve people's quality of life which must be addressed and guided by those in charge of educational processes and projects. It is therefore important for teachers to be trained in digital competences that technological advances and the rise of digital tools have transformed the way teaching and learning takes place. Therefore, it is essential that teachers acquired the necessary skills to effectively use technology in their pedagogical practices (Pinto Gantos et al, 2023).

It is also recognized that the need for digital supervision forced teachers to adapt quickly to new methodologies and digital tools in order to continue distance education and the importance of teachers adapting to new methodologies and digital tools. It highlights the need to develop digital skills and pedagogical competences specific to online education. (Oguguo et al 2023). Hence this work is a comparative analysis of the adoption and use of emerging technologies in schools supervision and inspection of public and private primary and secondary schools in Enugu state.

Statement of the problem

The standard of education in primary and secondary schools in Enugu state has generally been on the decline which could be as a result of negligence by the public sector to adequately fund schools tools needed for the necessary technologies and tools a needed for the advancement of education. This could also be the reason for the private sector to come into the school teaching, training and providing the necessary tools for effective supervision and inspection of schools. Pursuant to these initiatives in recognition of the fact that government investment in primary and secondary schools is dwindling, thereby giving rise to public-private partnership (Ogakwu V.N. 2021).

Inequalities in ICT access persist between urban and rural areas, as well as between different socio-economic strata (Quizhpe and Ponce, 2022). The lack of access is due to the lack of infrastructure in rural marginalized areas, as well as economic barriers that make it difficult to acquire devices and connect to the internet Matinez et al, 2020 ECLAC, 2021). Skill, limited digital skills development and low technological literacy amongst supervisors also contribute to digital exclusion. Many supervisors do not have the skills to use technologies effectively and take advantages of their benefits. This is due to limitations in digital skills education and training especially among marginalized and disadvantaged groups. Socio-economic inequalities, lack of economic resources prevents many supervisor from accessing modern technological devices and for paying for internet services. Content and usage, scarcity of relevant content and low use of technology in every day actives are also factors to consider despite these limitations over the last decade digital inclusion has become a fundamental aspect of ensuring equity, quality educational outcome and development.

The digital divide has become a global challenge in the age of information and communications technology (ICT) Wilson 2021). As schools and societies move towards digitalization, inequalities in access to and use of ICTs are becoming more acute- lack of supervisory control measures due to lack

of technologies has been a major challenges, thereby creating difficulties in monitoring and supervising teaching in primary and secondary schools in Enugu state (Ogakwu. V.N. 2021).

The government of Enugu state has been partially successfully in providing access to education to school - age children but there are doubts regarding the quality of instruction in public schools system thus prompting parents to seek better educational opportunities for the children elsewhere (Enyia and Epilefa, 2022) and Adams 2018).

The problem now is what would be a desirable system of co-operation synergy, linkages maximization of resources amongst educational stakeholders will raise more innovation through the use of technology in supervision and inspection in improving educational development in primary and secondary schools in Enugu state. Hence this work is a comparative analysis of the adoption and us of emerging technologies in schools supervision and inspection of public and private primary and secondary schools in Enugu state.

Objectives of the study

The overall aim of this study is to compare the analysis of the adoption and use of emerging technologies in schools supervision and inspection of public and private and primary schools in Enugu state, Nigeria.

To ascertain the strategies for supervisory control measures based on school category

To ascertain the influence of supervision on efficiency in primary and secondary schools in Enugu State

Research Questions

Two research questions guided the study.

What are the Strategies for Supervisory Control Measures based on School Category?

What are the influence of supervision on efficiency in primary and secondary schools in Enugu State?

Hypotheses

HO₁: There is no significant difference between the responses of government and voluntary agency schools on Strategies for Supervisory Control Measures

HO₂: There is no significant difference (0.05) between the mean ratings of the influence of supervision on efficiency in primary and secondary schools in Enugu State

Methodology

The descriptive survey research design was used for the study. Also purposive and stratification sample size were used.

Table 1: Population Distribution of Respondents

Education Zone	ESUBE B	ZLE	LGE A	ALE	PPSMB	Officials of Voluntary Agencies		
						Catholic	Anglican	Methodist
Agbani	5	1	9	6		5	5	5
Awgu		1	9	6				
Enugu North		1	9	6	5			
Nsukka		1	9	6				
Obollo Afor		1	9	6				
Udi		1	6	4				
Total	5	6	51	34	5	5	5	5

Source: Ministry of Education Statistics Division, 2023, ESUBEB Quality Assurance Unit 2023 and PPSMB, Secretariat Boards of Catholic, Anglican & Methodists 2023



Table 2: Population Distribution of Schools

EDUCATION ZONES	PUBLIC PRIMARY SCHOOLS	PRIMARY MISSION CHALLENGED SCHOOLS	PUBLIC SECONDARY SCHOOLS	SECONDARY SCHOOLS UNDER PARTNERSHIP		
	PRIMARY SCHOOLS		SECONDARY SCHOOLS	Catholic	Anglican	Methodist
Agbani Educational	157	12	31	2	3	4
Awgu Educational	201	-	46	5	1	
Enugu Educational	188	10	26	2		1
Nsukka	232	-	49	3	3	
Obollo-Afor Educational	227	-	43	1	3	
Udi Educational	174	8	44	4	4	
Total	1179	30	239	17	14	5

Source: Secretariats of Catholic, Anglican and Methodist Education Board: 2023 Ministry of Education, ESUBEB Quality Assurance Unity and PPSMB, 2023

Sample

Principals 87 head teachers 64 zonal led educator (ZLE) 51 local government education authority (LGEA) 4 Area led educator (ALE) 5 post primary school management board (PPSMB) 5 Enugu state universal basic education board (ESUBEB) 52 officials of catholic (5) Anglican 5 Methodist 5 9 item questionnaire was used for the collection of the data.

School base management committee (SBMC) 302. The nine item had a reliability score of 0.896 analysis of the data, the research question was analyzed using means score and standard deviation while hypotheses was analyzed using t-test. ANOVA was used to check if there is a variation in the school types.

Table 3: Sample of population to be used for the study

Education Zone	Primary Schools	Head Teacher	SBMC	Mission Challenge Schools	SBMC	Secondary Schools Public	Principals of Public secondary schools	SBMC	Secondary schools under partnership	SBMC
Agbani	6	6	12	12	24	9	9	18	9	18
Awgu	6	6	12	-	-	9	9	18	5	10
Enugu North	6	6	12	10	20	9	9	18	3	6
Nsukka	6	6	12	-	-	9	9	18	7	14
Obollo Afor	6	6	12	-	-	9	9	18	4	8
Udi	4	4	8	8	16	6	6	12	8	16
Total	34	34	68	30	60	51	51	102	36	72

Instrument for Data Collection

The instrument that was used for this study is questionnaire. The questionnaire was designed by the researcher to elicit supervisory digital information on Public Private Partnership Practices of Primary



and Secondary Schools in Enugu State. It has 9 items. The items were structured on a five point scale of “Strongly Agree” (SA), “Agree” “Undecided” (UD) (A), “Disagree” (D) and “Strongly Disagree” (SD).

Validation of the Instrument

The instrument for data collection was subjected to face and content validation by lecturers in faculties of development studies and education of the universality of Nigeria Nsukka.

Reliability of the instrument

The reliability and internal consistency scores were achieved using Cronbach Alpha method. The reliability of the instrument was checked using pilot testing on a sample of 17 public schools for secondary and 25 for primary schools. The use of the Cronbach Alpha method is informed by (Cronbach 1951).

Administration of the instrument

The research administered the instrument to the respondents with the help of research assistants. The no of questionnaire that was distributed was (569) five hundred and sixty nine-out of the number that were distributed, correctly filled and returned while copies were not returned and one copy through returned was not correctly filled. The percentage return of the correctly filled copies is 98.6%

Method of Data Analysis

The responses to research questions 1 and 2 were analyzed using means score and standard deviation. ANOVA (F-statistic) was used to determine if there existed significant variation in the school. Hypotheses also were analyzed using t-test,

Data Presentation and Analysis

Influence of digital Supervision through PPP on Efficiency of Primary and Secondary Schools in Enugu State

The perceived influence of digital supervision through PPP on efficiency of primary and secondary schools in Enugu State is presented in this sub-section. The presentation is based on the decision rule stated below.

Decision Rule

If Mean ≥ 3.5 , respondents are in agreement

If Mean < 3.5 and ≥ 2.5 , respondents are undecided

If Mean < 2.5 , respondents are not in agreement

Table: 4 Strategies for Supervisory Control Measures

Statement	SA (%)	A (%)	U (%)	D (%)	SD (%)	Mean	Std. Dev.
Using electronic academic records in schools by supervisors from both government and voluntary agency schools for evaluation for effective services delivery	301 (53.7)	221 (39.4)	19 (3.4)	7 (1.2)	13 (2.3)	4.41	0.81
Training of instructional supervisors electronic resources to organize Ministry of Education programmes for supervisors from government and voluntary agency schools to enhance learning	281 (50.1)	213 (38.0)	27 (4.8)	33 (5.9)	7 (1.2)	4.30	0.90
Encouraging Government officials and voluntary agencies to use online resources for instructional supervision to make teachers efficient	234 (41.7)	246 (43.9)	33 (5.9)	38 (6.8)	10 (1.8)	4.17	0.94



The government should bear funding e-instructional supervision in both schools for effective teaching	251 (44.7)	203 (36.2)	45 (8.0)	52 (9.3)	10 (1.8)	4.13	1.02
Annual comparison of e-supervisory records obtained from both government and voluntary agency schools by a joint team from both schools to promote learning	239 (42.6)	250 (44.6)	24 (4.3)	41 (7.3)	7 (1.2)	4.20	0.91
Drafting online Time-table that will connect different supervisors in Government and voluntary agency schools for efficiency in school	198 (35.2)	263 (46.9)	37 (6.6)	43 (7.7)	20 (3.6)	4.03	1.02
Regular pre and post-supervisory online meetings that will be organized by the Ministry of Education between post-primary and school management board, voluntary agency officials and ESUBEB for effective management of schools	226 (40.3)	254 (45.3)	37 (6.6)	36 (6.4)	8 (1.4)	4.17	0.91
Promoting electronic supervision by voluntary agencies and the government to ensure regular teachers' attendance.	266 (47.4)	214 (38.1)	29 (5.2)	24 (4.3)	28 (5.0)	4.19	1.06
Conferences and seminars should be jointly organized for teachers by voluntary agencies and government official of ministry of education to enhance teaching practice	301 (53.7)	177 (31.6)	30 (5.3)	40 (7.1)	13 (2.3)	4.27	1.01

Key: The figures in brackets are the percentages

AS = strongly agree A= agree U = undecided D= Disagree SD Strongly disagree

Table 5: Mean Response on Strategies for Supervisory Control Measures based on School Category

Statement	Schools under partnership (n = 316)		Schools not under partnership (n = 245)		ANOVA	
	Mean	Std. Dev.	Mean	Std. Dev.	F	Sig.
Using electronic academic records in schools by supervisors from both government and voluntary agency schools for evaluation for effective services delivery	4.47	0.75	4.32	0.88	4.854	0.028
Training of instructional supervisors electronic resources to organize Ministry of Education programmes for supervisors from government and voluntary agency schools to enhance learning	4.44	0.80	4.11	0.98	18.643	0.000
Encouraging Government officials and voluntary agencies to use online resources for instructional supervision to make teachers efficient	4.35	0.80	3.93	1.05	28.546	0.000
The government should bear funding e-instructional supervision in both schools for effective teaching	4.23	0.99	4.00	1.05	7.388	0.007
Annual comparison of e-supervisory records obtained from both government and voluntary agency schools by a joint team from both schools to promote learning	4.34	0.83	4.02	0.99	17.217	0.000



Drafting online Time-table that will connect different supervisors in Government and voluntary agency schools for efficiency in school	4.16	0.98	3.86	1.05	11.590	0.001
Regular pre and post-supervisory online meetings that will be organized by the Ministry of Education between post-primary and school management board, voluntary agency officials and ESUBEB for effective management of schools	4.32	0.82	3.97	0.98	20.538	0.000
Promoting electronic supervision by voluntary agencies and the government to ensure regular teachers' attendance.	4.41	0.83	3.90	1.24	34.848	0.000
Conferences and seminars should be jointly organized for teachers by voluntary agencies and government official of ministry of education to enhance teaching practice	4.37	0.96	4.14	1.06	7.127	0.008

Test of Hypothesis

There is no significant difference (0.05) between the mean ratings of the influence of supervision on efficiency in primary and secondary schools in Enugu State

Table 6: T-Test Result for Hypothesis

Category	N	Mean	Std. Dev.	Std. Mean	Error-value	Sig. (2-tailed)
Schools under partnership	316	4.3432	0.60417	0.03399	5.351	0.000
Schools not under partnership	245	4.0290	0.78642	0.05024		

The result presented in Table 6 shows that the mean ratings of influence of supervision on efficiency in schools under partnership is 4.34 while that of those not under partnership is 4.02. With the t-calculated value of 5.351 > t-critical of 1.960 and the significance value of 0.000 < 0.05, this observed difference is significant. Hence, the null hypothesis is rejected. There is significant difference (0.05) between the mean ratings of the influence of supervision on efficiency in primary and secondary schools in Enugu State.

Discussion of Findings

The result of the research question shows that the influence of digital influence of supervision on efficiency in schools under partnership is 4.34 while that of those not under partnership is 4.02 with the t-calculated value of 5.351 > t-critical of 1.960 and the significant value of 0.000 < 0.05, this observed difference is significant. Hence the null hypothesis is rejected. There is significant difference (0.05) between the means ratings of the influence of digital supervision on efficiency in primary and secondary schools in Enugu state.

As can see in the table 4 it is the determination of sampled respondents that using electronic academic records in school by supervisors from both government and voluntary agency schools for evaluation for effective services delivery ($\bar{x} = 4.41$) training of instructional supervisors electronic resources to organize ministry of education programmes for supervisors from government and voluntary agency school to enhance leaning ($\bar{x} = 4.30$) encouraging government officials and voluntary agencies to use online resources for instrumental supervision to make teachers efficient ($\bar{x} = 4.17$) supervision in both schools for efficient teaching ($\bar{x} = 4.13$). the respondent also agreed that there should be animal comparison of e-supervisory records obtained from both government and voluntary schools by a joint team from both school to promote learning ($\bar{x} = 4.20$) drafting online timetable that will connect different supervisors in government and voluntary agency schools for efficiency in school



($\bar{x} = 4.03$) regular pre and post supervisory online meetings that will be organized by the ministry of education between post primary and school management board, voluntary agency officials and ESUBEB for effective management of schools ($\bar{x} = 4.17$) promoting electronic supervision by voluntary agencies and the government to ensure regular teachers attendance ($\bar{x} = 4.19$) conference and seminars should be jointly organized for teachers by voluntary agencies and government official of ministry agencies and government officials of ministry of education to enhance teaching practice ($\bar{x} = 4.27$) these are in agreement with kwaghbo (2018) Hassan et al (2020) and OECD (2023).

Further analysis is carried out to determine if there is a variation in the respondents responses based on the categories of their respective schools. Table 5 captures the mean responses of the schools that are under partnership those not under partnership, and the f-value indicating if a variation exist in opinions. the table 5 reveals that respondent under partnership are more inclined towards better strategies of supervisory control measures in ensuring the efficiency in their schools such as providing quality training provision of digital tools and infrastructure and funds management than the schools under the partnership have higher mean score than those not under partnership and the difference are significant (p-value (0.05)

Digital supervision plays vital role in ensuring that policies, plan and set goals are strictly adhered to could achieved. Digital supervision plays activities through PPP enhances efficiency of primary and secondary schools in Enugu state to ensure the objectiveness of digital supervision on efficiency of schools, various strategies of supervisory control measures are implemented. these strategies include draft long online timetable that will connect different supervisors in government and voluntary agency schools, having pre and post online meetings encouraging use of online resources for instrumental supervision using electronic academic records in schools by supervisors in government and voluntary agency school ensuring that both government and voluntary agencies are undertake digital in structural supervision and finding by government on instructional supervision in schools this is in line with (Oguguo et al, 2023).

There should be the practice of annual comparison of supervisory records by a joint team to promote learning promoting electronics supervision try both schools to ensure regular teachers attendance. Conference and seminars should be jointly organized for teachers by voluntary agencies and government officials of ministry of education to enhance teaching practice. These are in accordance with the findings of the study of the Nwite and Onele (2018) which revealed that regular and lack of proper digital supervision was the bane of government owned secondary schools which in turn affected their efficiency hence from the result the schools under PPP are better in digital supervision because of the commitment of the managing partners, discipline work ethics and return on investment.

Conclusions

The result from the findings shows that irregular and lack of digital supervision was the bane of government owned primary and secondary school which in turn affected their efficiency unlike schools under partnership. Conclusively teachers should be open to supervisors through digitalization from both government and voluntary agency schools for education for effective service delivery.

Recommendations

Digital supervisory measure must be put in place, implemented, well monitored and activities of the teachers checked by all educational stakeholders.

There should be the practice of annual comparison of digital supervisory records by the joint team of government and voluntary agencies official to promote bearing.

Properly drawn out time-table on inter-supervisory visits, conducting regular pre and post supervisory meeting between various educational stakeholders, this will bring about qualitative education.



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