

Principals' Technology Leadership Competence as Predictor of Teachers' Technology Integration in Public Secondary Schools in Anambra State

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Abstract

This study determined principals' technology leadership competence as predictor of teachers' technology integration in public secondary schools in Anambra State. Three research questions guided the study and three null hypotheses were tested at 0.05 level of significance. Correlational survey research design was adopted for the study. The proportionate stratified random sampling technique was used to draw a sample of 528 respondents from the population of 5,286 teachers of the 263 public secondary schools in Anambra state. Two sets of questionnaire titled "Principals Technology Leadership Questionnaire (PTLQ) and Teachers Technology Integration Questionnaire (TTIQ) were used to collect data for the study. Data collected were analyzed using simple regression analysis. Results show that principals' creation of ICT vision is a strong and significant predictor of teachers' technology integration. Results also revealed that principals' learning and teaching of ICT is a moderate and significant predictor of teachers' technology integration. It was recommended that principals should constantly develop the ability to inspire, lead, motivate and as well implement the integration of technology in the school in order to inspire teachers' integration of educational technology to accomplish intended learning outcome. To achieve this, government should train principals on the use of technology to impart knowledge.

Keywords: *Principal, Technology Leadership, Competence, Technology Integration*

Introduction

Leadership in education is an important concept in educational management. Some researchers in Nigeria have extensively discussed aspects of leadership such as instructional leadership which has to do with teaching and learning; democratic leadership which implies collaborating with subordinates to make decisions; autocratic leadership which is leading by coercion, laissez-faire leadership which has to do with subordinates making decisions without interference from their leaders (Adeyemi and Adu, 2013). Despite all these different aspects of leadership, a new leadership still emerges, that is technology leadership competence.

Technology leadership competence according to Okeke and Dike (2019) are the digital skills and behaviours needed by school principals to create, sustain and support ICT use and integration in schools. It is obvious that principals are to seek out additional funds to help meet schools technology needs and ensure that teachers and students have access to networked computers. Apart from providing support, principals are expected to know how to effectively use technologies available in their schools. That way, they will spearhead the use of the tools in their schools. Zhang (2017) argued that technology leadership competence is the use of digital devices, services, and resources, to inspire and lead school digital transformation, create and sustain digital learning culture, support and enhance technology-based professional development, provide and maintain digital organization management, and facilitate and manage digital citizenship.

However, it has been observed that Schools in the developed countries have been practicing technology leadership competence. The concept came in the 1980s with the introduction of ICT in schools. Shortly, this was followed by studies to assess the impact of information and communication technology (ICT) on teaching and learning activities (Okeke and Dike 2019). However, these studies gave rise to the need to train principals to become technology leaders for the effective integration of ICT in teaching and learning activities. Since then, the leadership in technology competence has been widely established in some developed countries. In Nigeria, especially in Anambra state, the case is not the same, even with the establishment of ICT policies by government and the availability of ICT in schools, school principals are yet to realize the importance of technology integration in the classrooms to effectively enhance teaching and learning in schools for the achievement of educational goals. Similarly, government has also made effort to advance information technology of secondary schools in Anambra State by provision of computers which has made significant impact on secondary schools' technology operations, teachers' activities as well as students' learning. Hence, a school principal's technology competence is progressively needed and valued to integrate teachers' technology knowledge to enhance teaching and learning in secondary schools in Anambra State. Supporting this, Kawade, (2018) stipulated that teachers' technology integration will help teachers to set up test and online assignments that can be automatically graded, which saves a lot of time for the marking and correction process. They can also generate the termly and annual results by using technology applications. At the same time, they can use technology application to set up website and online portals for students to access results and assignments.

However, it seems that some principals in Anambra State lack technology competence, in-service training, and interest, and such affect teachers' technology integration. During the covid-19 saga, in order to curtail the widespread of the virus, the Nigeria government rolled out measures

such as total lockdown and closure of schools in order to mitigate the effect of the disease. This global pandemic posed a lot of positive and negative challenges on the education management of the country. One of the challenges is how to access the technology. This lack of technology competence was observed when school administrators were asked to use technology facilities to connect students to teachers. Surprisingly, many secondary schools did not embark on the virtual learning either because there was no interest, principals were not ready, lack of technology competence or there were no technology facilities put on ground for the exercise. As a result some principals did not embark on this learning experience.

Nevertheless, when a principal does not have technology leadership competence and does not support the use of it in the schools, it is not surprising that teachers would show some degree of resistance to changes in their teaching practices as the process of technology integration requires teachers to modify what they have been doing for years to fit in with the trend in education system. To buttress this Dawson and Rake (2017) argued that it is still possible for teachers to accept the new ideas if they see the technology competence and support from the principal. This agrees with the view of Graves and Bowers (2018) who stated that teachers' attitude towards technology is considered to be a key factor in implementing the use of technology in classroom interaction. Therefore, implementation of technology depends on the positive attitude of teachers towards it rather than the state of technology at school. Hence, teachers' positive feelings towards the use of technology devices in classroom would reinforce their intentions to use it in teaching to achieve educational goals.

Similarly, Chang, (2012) argued that principals' work is more visible to central administration. As principals and teachers become more comfortable and competent in using technology, it is likely they will develop school wide instructional as well as administrative response to technology. While principals usually apply power point presentation to give an instruction and giving in-service training in a more interesting way, teachers have a more favorite attitude toward the instruction in this way enhancing teaching and learning.

The technology leadership competence of a school principal has the power of continuously enhancing the quality of education, the development of school and achievement of students' learning activities. In the words of Halverson (2018), the technology leadership competence of principals is a key component in guiding the teaching and learning processes necessary for preparing today's students with the knowledge and skills necessary in today's society to become productive citizens of the 21st century. However, principals have to play both traditional and technological roles, understanding the importance of and being prepared to support a change in school culture, to sustain the vision and facilitate the change process through the technology leadership competence that predicts teachers' technology integration in public secondary schools in Anambra State.

Again, Chang (2012) developed technology leadership components for school administrator. The dimensions are as follow; creation of ICT vision, learning and teaching ICT, staff development, technology infrastructural support and evaluation of ICT. However, only the first three components were used for the study. These dimensions are the principal's major tasks in dealing with teaching and learning that involves ICT in schools. Since the release of these

dimensions, schools have been using them to measure the level of a school administrators' technology leadership competence. These dimensions according to Chang cited in Okeke and Dike (2019) are the principals' core areas in dealing with teaching, learning and administrative operations in schools. These dimensions of technology leadership competence of a principal will be used in the study.

Creation of ICT vision according to Wang (2010) is the ability of the principal to inspire, lead, motivate, develop and implement a shared vision for integration of technology to promote excellence and support transformation in the school. A good plan begins with a vision outlining clearly stated achievable goals. Roles are mapped out for teachers and students, funding needs are identified and strategies for providing support described.

Learning and teaching ICT according to Chang (2012) is the ability of the principals to create, promote, and sustain a dynamic, digital age learning cultures that provide a rigorous, relevant, and engaging education for all students. Hence, principals are to ensure instructional innovation and provide learner-centred environments equipped with technology and learning resources.

Staff development practice is another dimension of technology leadership, it is the process of developing ICT skills in staff members. It includes giving support to teachers as they employ ICT into teaching exercise. In agreement with the above, Abosede (2015) opined that successful staff development programmes usually includes identifying the technological needs of the school which can be gleaned from assessing of situations on ground such as facilities and equipment available.

Technology integration could be defined as the effective implementation of educational technology to accomplish intended learning outcomes. Also it could be any piece of equipment or device- electronic or mechanical that can be used to help teachers-students accomplish specified goals. Besides, school principals are expected to lead teachers in mastering computer skills and knowledge by integrating every aspect of the curriculum with ICT (Papa, 2011). Explaining further, Papa, stated that effective ICT skill-based school leadership is important in determining whether technology use can improve teaching and learning in the school. This is because majority of school leaders are not sure if ICT can improve and enhance both effective teaching and learning. Would the proper technology leadership competence of principals in the administration of secondary schools in Anambra State not predict teachers' technology integration?

Purpose of the study

The purpose of the study is to ascertain principals' technology leadership competence as predictor of teachers' technological integration in public secondary schools in Anambra State. The study particularly sought to determine:

1. Predictive value of principals' creation of ICT on teachers' technology integration in public secondary schools in Anambra State.
2. Predictive value of principals' learning and teaching of ICT on teachers' technology integration in public secondary schools in Anambra State.
3. Predictive value of principals' staff development on teachers' technology integration in public secondary schools in Anambra State.

Research questions

The following research questions guided the study.

1. What is the predictive value of principals' creation of ICT vision on teachers' technology integration in public secondary schools in Anambra State?
2. What is the predictive value of principals' learning and teaching of ICT on teachers' technology integration in public secondary schools in Anambra State?
3. What is the predictive value of principals' staff development on teachers' technology integration in public secondary schools in Anambra State?

Hypotheses

The following formulated null hypotheses were tested at 0.05 level of significance.

1. Principals' creation of ICT vision will not significantly predict teachers' technology integration in public secondary schools in Anambra State.
2. Principals' learning and teaching of ICT will not significantly predict teachers' technology integration in public secondary schools in Anambra State.
3. Principals' staff development will not significantly predict teachers' technology integration in public secondary schools in Anambra State.

Method

The study adopted a correlation research design. The study used 526 teachers. Two measuring instruments titled Principals Technology Leadership Questionnaire (PTLQ) and Teachers Technology Integration Questionnaire (TTIQ) were used for data collection. The principals Technology Leadership Questionnaire (PTLQ) is 26-item instrument structure using liker scales of Strongly Agree, Agree, Strongly Disagree and Disagree. The PTLQ has three components that are collapsed. The first component was used to elicit the principals' creation of ICT vision responses of teachers and has five items. Second component has five items which was used to elicit information on the predictive value of principals' learning and teaching of ICT on teachers' technology integration. The third component elicited responses by teachers on principals' staff development and has 6 items. The second set of instrument (TTIQ) has 40 items and was structured using the same scales of Agree, Strongly Agree, Disagree and Strongly Disagree. The reliability indices for five components of principals' technology leadership are 0.89, 0.80, 0.89, 0.80 and 0.72 respectively. The reliability index for teachers' technology integration was 0.86. The internal consistency reliability coefficient of 0.82 and 0.86 was ascertained for PTLC and TTI using Cronbach's alpha statistical method. Simple regression was used to answer the research questions while t-test associated with simple regression was used to test the hypotheses at 0.05 level of significance.

Results

Research Question 1: What is the predictive value of principals' creation of ICT vision on teachers' technology integration in public secondary schools in Anambra State?

Table 1. Summary of Simple Regression Analysis with Principals' Creation of ICT Vision as Predictor of Teachers' Technology Integration

	R	R ²	Adj.R ²	B	SE B	β
Constant				58.37	2.10	
Creation of ICT vision	.73	.54	.54	3.54	.14	.73

The summary of the simple regression analysis as shown in the above table indicates that principals' creation of ICT vision is a strong predictor of teachers' technology integration in public secondary schools in Anambra State. This is shown by the regression coefficient ($R = .73$) and the coefficient of determination ($R^2 = .54$) which indicates that principals' creation of ICT vision explained 54% of the variance in teachers' technology integration.

Research Question 2: What is the predictive value of principals' learning and teaching of ICT on teachers' technology integration in public secondary schools in Anambra State?

Table 2. Summary of Simple Regression Analysis with Principals' Learning and Teaching of ICT as Predictor of Teachers' Technology Integration

	R	R ²	Adj.R ²	B	SE B	β
Constant				67.56	2.35	
Principals' Learning and Teaching of ICT	.62	.39	.39	2.39	.12	.62

Table 2 shows that the simple regression coefficient (R) is .62 while the coefficient of determination (R^2) is .39. This indicates that principals' learning and teaching of ICT is a moderate predictor of teachers' technology integration in public secondary schools in Anambra State.

Research Question 3: What is the predictive value of principals' staff development on teachers' technology integration in public secondary schools in Anambra State?

Table 3. Summary of Simple Regression Analysis with Principals' Staff Development as Predictor of Teachers' Technology Integration

	R	R ²	Adj.R ²	B	SE B	β
Constant				70.32	3.52	
Principals' Staff Development	.45	.20	.20	2.25	.19	.45

Table 3 indicates that principals' staff development is a modest predictor of teachers' technology integration in public secondary schools in Anambra State. This is shown by the regression coefficient ($R = .45$) and the coefficient of determination ($R^2 = .20$) which indicates that principals' staff development explained 20% of the variance in teachers' technology integration.

Hypotheses Testing

Hypothesis 1: Principals' creation of ICT vision does not significantly predict teachers' technology integration in public secondary schools in Anambra State.

Table 4. Test of Significance of Simple Regression Analysis with Principals' Creation of ICT Vision as Predictor of Teachers' Technology Integration

	R	R ²	Adj.R ²	B	SE B	B	t	F	p
Constant				58.37	2.10		27.68		.00
Principals' creation of ICT Vision	.73	.54	.54	3.54	.14	.73	25.07	628.64	.00

As shown in table 4 above, the simple regression coefficient (R) is .73 while the R² is .54. The F-ratio associated with these is 628.64 and the P-value = .00, since the P-value is less than the stipulated 0.05 level of significance, it was decided that Principals' creation of ICT vision is a significant predictor of teachers' technology integration in public secondary schools in Anambra State. The null hypothesis was therefore rejected.

Hypothesis 2: Principals' learning and teaching of ICT does not significantly predict teachers' technology integration in public secondary schools in Anambra State.

Table 5. Test of Significance of Simple Regression Analysis with Principals' Learning and Teaching of ICT as Predictor of Teachers' Technology Integration

	R	R ²	Adj.R ²	B	SE B	B	t	F	p
Constant				67.57	2.35		28.72		.00
Principals' learning and teaching of ICT	.62	.39	.39	2.39	.12	.62	18.54	344.04	.00

Analysis in Table 5 shows that the simple regression coefficient (R) is .62 while the R² is .39. The F-ratio associated with these is 344.04 and the P-value = .00, since the P-value is less than the stipulated 0.05 level of significance, it was decided that Principals' learning and teaching of ICT is a significant predictor of teachers' technology integration in public secondary schools in Anambra State. The null hypothesis was therefore rejected.

Hypothesis 3: Principals’ staff development does not significantly predict teachers’ technology integration in public secondary schools in Anambra State.

Table 6. Test of Significance of Simple Regression Analysis with Principals’ Staff Development as Predictor of Teachers’ Technology Integration

	R	R ²	Adj.R ²	B	SE B	B	t	F	p
Constant				70.34	3.52		19.97		.00
Principals’ staff development	.45	.20	.20	2.25	.19	.45	11.56	133.65	.00

Table 6 shows that the simple regression coefficient (R) is .45 while the R² is .20. The F-ratio associated with these is 133.65 and the P-value = .00, since the P-value is less than the stipulated 0.05 level of significance, it was decided that Principals’ staff development is a significant predictor of teachers’ technology integration in public secondary schools in Anambra State. The null hypothesis was therefore rejected.

Discussion of Findings

The finding shows that principals’ creation of ICT vision is a strong and significant predictor of teachers’ technology integration in public secondary schools in Anambra State. This implies that principals’ creation of ICT vision through inspiring and implementing a shared vision for integration of technology in the school has a strong influence on teachers’ effective implementation of educational technology in the school to accomplish intended learning outcomes. The finding of this study is in line with Raman and Shariff (2017) who found that the effectiveness of teachers’ teaching using ICT lies in the actual character of the principal as a technology leader. This is also in line with Tan (2010) and Fisher and Waller (2013) who found that there is a strong correlation between principals’ technology leadership and teachers’ technology integration in the classroom. This is in disagreement with the findings of Raman, Thannimalai and Ismail (2019). The difference in geographical location could account for the disagreement between both studies.

This study also found that principals’ learning and teaching of ICT is a moderate and significant predictor of teachers’ technology integration in public secondary schools in Anambra State. One possible explanation for the finding is fact that technological advancement in education has made digital citizenry an imperative to promote technology integration in classroom teaching and learning process. The school principal who exhibits digital citizenship practices regularly and effectively emphasize on the need to integrate digital devices in learning process and this may also account for this result. This finding supports that of Chang (2012), Chang, Chin and Hsu (2008). These studies found that technology leadership roles of school principals significantly influence teachers’ use of ICT in their classrooms. Thus, there is a significant relationship between technology leadership of principals and teachers computer literacy and usage for effective

teaching. The agreement between the findings could be explained by similarities in time span and school characteristics in the location where the two studies were conducted.

This study found that principals' staff development is a modest and significant predictor of teachers' technology integration in public secondary schools in Anambra State. This means that principals' development of Information and Communication Technology (ICT) skills in teachers, supporting teachers' employment of ICT in teaching exercise influences teachers' technology integration in the school. This finding is in line with that of Anderson and Dexter (2005) and Dexter (2011) who found that principals support for teachers development ICT helps encourage teachers' ICT integration. Other studies such as Greaves, Hayes, Wilson, Gielniak, and Peterson, (2010) also reported similar findings that principals' staff development has a positive and significant impact on teachers' integration of educational technology, which in turn has a positive impact on student achievement improvement.

Conclusion

Based on the findings of the study, the researcher concludes that principals' creation of ICT vision and principals' ICT evaluation are strong and significant predictors of teachers' technology integration. Principals' learning and teaching of ICT and principals' technology infrastructure support are moderate and significant predictors of teachers' technology integration. Principals' staff development is a modest and significant predictor of teachers' technology integration in public secondary schools in Anambra State.

Recommendation

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

1. Secondary school principals should constantly develop the ability to inspire, lead, motivate, develop as well as implement the integration of technology in the school in order to inspire teachers' implementation of educational technology to accomplish intended learning outcomes.
2. The study also recommends that principals should always imbibe, create, promote, and sustain a dynamic, digital age learning cultures that provide a relevant, and engaging education for all students. This will help inspire teachers' technology integration in the school.
3. Principals should at all times see to the development of Information and Communication Technology (ICT) skills in teachers by supporting teachers' employment of ICT into their teaching exercise. By doing this, principals will inspire teachers' technology integration in the school.

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