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## An Investigation of Contextual Factors for ICT Adoption and Utilization by Administrators and Managers of Basic Schools

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### To cite this article:

Teye, E. Q., & Duah, B. (2022). An investigation of contextual factors for ICT adoption and utilization by administrators and managers of basic schools. *International Journal of Technology in Education (IJTE)*, 5(2), 351-368. <https://doi.org/10.46328/ijte.224>

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# An Investigation of Contextual Factors for ICT Adoption and Utilization by Administrators and Managers of Basic Schools

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## Article Info

### Article History

Received:

24 September 2021

Accepted:

12 May 2022

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### Keywords

ICT adoption

ICT utilization

School administrators

Basic schools

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## Abstract

This quantitative study was carried out to find out the contextual factors that relate to ICT adoption and utilization by school administrators in a school district in Ghana. The study adopted the cross-sectional survey design, and used the census sampling technique to collect data from 69 participants, and analyzed using multiple linear regression. The study found that five out of the six factors – Attitude towards ICT; Perceived Usefulness of ICT tools; Access and Availability of ICT tools; Training and Technical Support; and Motivation and Incentives for using ICT tools – were the major contextual factors that relate to ICT adoption and utilization. Also, Motivation and Incentives for using ICT tools made the strongest unique contribution (Beta = .496) to predicting ICT adoption and utilization, when the variance explained by all other factors is controlled for. The study also found that Perceived Ease of Use was not a significant factor for predicting ICT adoption and utilization by school and administrators. It was recommended that school administrators should be given the necessary training and support, and particularly be adequately motivated, in order to concretize their ICT adoption and utilization decisions.

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## Introduction

The ICT revolution has undoubtedly changed school administration and management practices in the 21<sup>st</sup> century. In fact, the use of ICT has become one of the basic building blocks of modern society and educational institutions (Daniels, 2002). As a result, many developing countries are integrating ICT into their educational systems. The adoption and use of ICT in schools has changed from the acquisition of basic computer skills, to the use of ICT tools as an aid to enhance teaching and learning (Ahmed, 2016) and also for performing management and administrative functions such as word-processing, preparation of class lists, maintaining databases of student records, examination processing, preparation of timetable, preparation of report cards, keeping of inventory records, and budgeting and processing of finance records (Menjo & Boit, 2010). This has significantly underscored the importance of ICT for school administrators.

It is therefore important that investments in ICT are focused not only on the provision of equipment for teachers and students, but also for the provision of necessary complementary resources for school administrators. But according to Laudon and Laudon (2010), significant investment in ICT does not necessarily guarantee higher

returns. As noted by Gulbahar (2007), despite huge investments in ICT for educational purposes, there is little evidence of their adoption and use by school administrators. Farrell (2007) and Tedla (2012) have outlined some factors that could be responsible for the seemingly slow rate of ICT adoption and utilization by school administrators. These include the attitudes toward ICT, the perceived ease of use of ICT, the perceived usefulness of ICT, lack of technological competence, lack of training and technical support, technical difficulties, cost, as well as low levels of motivation and incentives. It is therefore important to investigate the contextual factors that relate to ICT adoption and utilization by school administrators, with the purpose of conscientizing them about the importance of adopting ICT, as well as to promote ICT use to enhance their school administrative functions. This exploratory study therefore sought to examine the factors that relate to the adoption and utilization of ICT by school administrators of basic schools in a school district in Ghana.

## **Literature Review**

### **Attitude towards ICT**

Attitude is a pre-determining factor in predicting people's behavior towards an object or phenomenon. This indicates that an understanding of a person's attitude towards an object can help in predicting the person's pattern of behavior towards the object (Yushau, 2006). According to Yushau, attitude is a learned predisposition to respond positively or negatively to a specific object, situation, institution, or person, which reflects what they are, and how they form behavioral patterns. In relation to ICT, studies have highlighted the influence of attitude on users' decision to adopt ICT for work-related activities. For instance, Cazares (2010) suggests that attitude towards ICT is significantly related to users' performance in the use of ICT for work-related activities. Abedalaziz, Jamaluddin, and Hai leong, (2013) also reports that the students largely used computers for their academic work due to their positive attitudes toward computers. In similar fashion, Teo (2008) revealed that pre-service teachers in Singapore held positive attitudes towards computers and therefore formed positive behavioral intention to use computers in their professional practice. In another study, Larbi-Apau and Moseley (2012) reported that teaching staff in three public universities in Ghana had positive attitudes toward ICT because it helped them to organize their work in a more efficient and productive manner. These findings support the notion that individuals normally develop positive attitudes towards things or events they perceive to be useful, and thereby make use of such things.

From the above-mentioned studies, it can be observed that attitude towards ICT plays a key role in adoption decisions for work-related activities. However, whereas evidence abound on the role of attitude in ICT adoption and utilization within the educational sector, very little is known about the influence of attitude on ICT adoption and utilization among school administrators. This study is therefore necessary, with respect to the nature of the study participants and the specific work-related activities involved.

### **Perceived Usefulness of ICT Tools**

The perception of the usefulness of ICT is the intuitive recognition, understanding or insight of the value of ICT adoption (Bluff, 2011). It is also expressed as the ability of potential ICT users to conceive, realize or understand the value, relevance, and impact (or otherwise) of ICT tools in enhancing the job performance (Akinde &

Adetimirin, 2017). In the education sector, research have shown that the perceived usefulness of technology is influential in determining its acceptance, adoption and use (Aypay, Çelik, Aypay & Sever, 2012; Ke, Sun & Yang, 2012). For instance, Hu, Clark and Ma (2003) investigated the impact of perceived usefulness on the use of educational technologies by teachers in Hong Kong and reported that there is a significant positive correlation between perceived usefulness and use of educational technologies.

Similarly, Kumar, Che and D'Silva (2008) investigated the effects of technology acceptance constructs on actual usage of computer among teachers in Malaysia and reported a significant positive correlation between perceived usefulness and actual use of computers by the teachers. This implied that as teachers find the application of computer technology to be more useful, they would be more determined to make actual use of it. However, other studies have reported negative attitudes towards ICT tools in schools. For instance, Hennessy, Harrison and Wamakote (2010) reported that educators in sub-saharan Africa saw ICT tools as dehumanizing, isolating, prone to error and data loss, and possibly as a violation of their right to privacy. Similarly, Phelps and Maddison (2008) submitted that teachers in Australia feel that technology makes their jobs so much more demanding and at times, stifled student creativity or take away their natural ability. These reports indicate that not everybody in the education sector perceives ICT to be useful in their job performance. It is instructive to note that very little is known about the perceived usefulness of ICT tools among school administrators and its influence on their decision to adopt and use the technology. Therefore, it is relevant to find out what the perceptions of school administrators are, relative to the adoption and utilization of ICT for their job performance.

### **Perceived Ease of Use of ICT Tools**

Defined within the context of ease of use, perception is a person's belief that using a technology will not require so much effort (Davis, 1989). Buabeng-Andoh (2012) defines perceived ease of use to mean the simplicity of procedures for completing a service requirement with a technological tool. Therefore, perceived ease of use can be viewed as a determinant for ICT adoption and utilization. Teeroovengadam, Heeraman and Jugurnath (2017) states that perceived ease of use of ICT tools is the users' ability, skills and competencies in using computer technology for ICT-related tasks that render its usage much easier.

Some researchers suggest that if a system is relatively easy to use, individuals are more willing to learn about its features and continuous usage (Chui & Wang, 2008; Hamid, Razak, Bakar & Abdullah, 2016). For example, Chong, Sharaf and Jacob (2005) reports that perceived ease of use of ICT tools among teachers directly lead to the adoption of technology in the teaching process. A similar study by Askar, Usluel and Mumcu (2006) indicated that Turkish tutors' perceived ease of use of ICT was a highly determining factor in respect to their adoption and use of ICT tools for preparation of teaching materials. Other researchers, including Buabeng-Andoh (2012), and Franklin (2007) have also argued that educators must first of all perceive ICT as being easy to use in order to successfully integrate it in performing work-related functions.

These conclusions support the idea that perceived ease of use of ICT is positively correlated with users' behavioral intention to adopt and continuously use ICT for their job performance. However, there is a dearth of research on

the relationship between perceived ease of use of ICT and ICT adoption and utilization by school administrators. It is therefore important to determine and understand the effect of perceived ease of use on ICT adoption and utilization for school administration functions.

### **Access and Availability of ICT Tools**

One of the important factors for ICT adoption and utilization in schools is the availability of ICT tools. For instance, access and availability of ICT tools such as hardware and software are critical to ensure effective adoption of ICT tools for school administration (Mbatia, 2014). As Ottesen (2006) revealed, the lack of computing facilities is a fundamental problem that hinders ICT integration in schools. This is a major inhibiting factor for ICT adoption and utilization in basic schools in developing countries.

In Ghana for instance, evidence suggests that there is an inadequacy of ICT tools for school administration purposes. Specifically, it is reported that only 4% of ICT facilities in basic schools are dedicated for administrative purposes (Connect for Change Education Ghana Alliance, 2014). This significantly slows down ICT communication between schools and the outside world, and eventually affects decision making and implementation of education related activities at schools. Meanwhile, the Ministry of Education acknowledges in its ICT in education policy that “the expected impact on end-users (learners, teachers, managers and administrators) will very much depend on affordable and continuous access to hardware, software and connectivity.” (Ministry of Education, Ghana, 2015, p. 21).

It is obvious that issues of access and availability of ICT tools for school administration must be addressed to promote the adoption and use of ICT in school administration. This is because the evidence shows that the success of any ICT adoption and integration policy depends on the access and availability of ICT tools. Therefore, this study focused on the impact of access and availability of ICT tools on school administrators’ decision to adopt and use ICT tools.

### **Training and Technical Support**

The availability of training and technical support in the use of ICT refers to the provision of knowledge and competences by an expert, to users who may lack the necessary soft skills for using ICT tools. These soft skills may include typing of documents, admission processing, keeping a database of staff and students’ records, preparation of terminal reports, keeping of inventory and disciplinary records, budgeting and processing of finance records, communication, announcement of upcoming events, and many more.

Studies have stated that importance of training for ICT adoption and utilization (Ozden, 2007; Ghavifekr & Wan Athirah, 2015). However, the effectiveness of the training program is very important in influencing the decision to adopt and use ICT tools. In this regard, Ghavifekr, Kunjappan, Ramasamy, and Anthony (2016) opined that the time of training, nature of training, and skills training are important components that must be considered.

Similarly, technical support is a major factor that significantly impacts ICT adoption and use (Moses, Khambari, & Luan, 2008). Haslaman, Mumcu, and Usluel (2008) notes that it is critical to promoting ICT adoption and utilization, and is required in order to overcome the several challenges that school administrators encounter (Resta, 2002), especially in developing countries like Ghana. Therefore, it is necessary to understanding and determine the relationship between the availability of training and technical support and ICT adoption and utilization by school administrators for their job performance.

### **Motivation and Incentives for using ICT Tools**

Motivation refers to reasons that inspire a particular behaviour, and is characterized by willingness and volition, and tends to vary across subject areas among individuals (Lai, 2011). According to the George Washington University Center on Education Policy (2012), motivation is a complex concept that helps in understanding factors that can diminish or strengthen the behaviour of an individual. Researchers have outlined and distinguished between two types of motivation – intrinsic and extrinsic. For instance, Pintrich (2003) states that intrinsic motivation is the desire to do or achieve something because the individual truly wants to, and takes pleasure or sees value in doing so, while extrinsic motivation is the desire to do or achieve something not for the enjoyment of the thing itself, but because doing so leads to a certain result.

However, there are contrasting views on which of the two forms of motivation has significant influence on ICT adoption and utilization. For example, Gasaymeh, Al-Hassanat, Kraishan and Abutayeh (2017) reported that the most significant motivational factors for ICT adoption in education were intrinsic and relates to improving job satisfaction. They argue that external factors such as support systems, and encouragement or incentives had a moderate influence on ICT adoption for educational purposes.

In contrast, Fung and Yuen (2012) indicated that extrinsic factors encourage technology adoption and use decisions. Similarly, Fisher (2003) opined that there is no job excellence without offering some motivation and incentives. Fisher suggests that for school administrators to adopt and use ICT tools for their job, they must be offered some form of incentives and recognition, if excellence in the performance of such functions is expected. Also, Gautreau (2011) noted that among the most important forms of motivation for ICT adoption are performance recognition and financial incentives. This suggests that proper incentive packages for school administrators would be necessary for ICT adoption decisions. It is therefore important to study the effect of motivation and incentives on the decision of school administrators to adopt and use ICT for their job.

## **Method**

### **Research Approach and Design**

The quantitative approach of inquiry was followed with the aim of validating and confirming relationships, and to develop generalizations that contribute to theory (Gay, Mills & Airasian, 2009; Singh, 2007). The cross-sectional survey design was adopted for the study, bearing in mind that the data collected from the study participants could change at a later date in the future (Cohen, Manion & Morrison, 2007).

### **Sample Size and Sampling Technique**

The census sampling technique was adopted for the study. This is because the population size was relatively small (less than 100). Although the target population was 78, only 69 participants accepted to be involved in the study. It is important to indicate that although the sample size was very small for a quantitative enquiry, we decided to use the quantitative approach because we were of the view that a study of this nature must provide accurate and precise data by eliminating the possibility of researcher biases and prejudices which are characteristic of most qualitative studies (Sincero, 2012).

### **Instrumentation**

Data was collected using a close-ended questionnaire in the form of a Likert scale. The questionnaire was in two sections. The first section was designed to collect demographic data while the second section was designed based on the contextual factors of interest in the study. Prior to collecting the data, the questionnaire was pilot-tested with data from 16 school administrators from an adjoining school district, to ascertain its validity and reliability. Face validity, content validity and construct validity were ensured by developing the questionnaire following established frameworks for designing questionnaires, and consulting experts in research and instrument development to determine the suitability of the questionnaire to measure what it intends to measure (Seidu, 2006).

Also, the test-retest technique was used to determine the reliability of the instrument. Data was collected on two occasions in a space of seven days and the reliability coefficient was calculated for the two sets of data. The first test yielded a Cronbach's alpha value of .860 while the second test also resulted in a score of .791. Since both scores were greater than the accepted standard value of .70 for social science research (Field, 2009; Hof, 2012), the instrument was deemed to be reliable for the study.

### **Procedure for Data Collection**

A consent letter was presented to the participants and the purpose and the nature of the study was explained to them. Those who accepted to participate in the study were assured of their confidentiality and anonymity, and their right to withdraw from the study at any point in time, if they deemed it necessary. The questionnaires were administered to the participants and were collected after a period of one week, for data analysis.

### **Data Analysis**

The dataset was screened to ensure that all entries – values, labels, and measurement levels – were valid and error-free. Frequencies and percentages were computed to describe the demographic information, while the standard multiple linear regression was conducted to test the null hypothesis ( $\alpha p < 0.05$ ) that the factors of interest in the study (Attitude towards ICT (A); Perceived Usefulness of ICT tools (PUE); Perceived Ease of Use of ICT tools (PEU); Access and Availability of ICT tools (AA); Training and Technical Support (TTS); and Motivation and Incentives for using ICT tools (MI)) do not relate to ICT adoption and utilization, individually and in linear

combination.

## Results

### Demographic Information of Participants

The demographic information of the participants covered the age; gender; highest educational qualification; and level of ICT usage. The data is shown in Table 1. The data shows that of the 69 participants, 44.9% were between age 40 and 49 and formed the majority, while 5.8% were between age 20 and 29 years, and formed the minority. Also, 69.6% were male, and 79.7% had a bachelor's degree. Furthermore, a majority of 55.1% were medium users of ICT tools.

Table 1. Demographic Data of Participants (n=69)

Variable		Frequency	Percentage
Age	20 – 29 years	4	5.8
	30 – 39 years	28	40.6
	40 – 49 years	31	44.9
	50+ years	6	8.7
Gender	Male	48	69.6
	Female	21	30.4
Highest Education Qualification	HND/Diploma	0	0.0
	Bachelor's Degree	55	79.7
	Master's Degree	14	20.3
Level of ICT Usage	Low User	18	26.1
	Medium User	38	55.1
	High User	13	18.8
Total		69	100.0

Source: Field Data (2021).

### Contextual Factors for ICT Adoption and Utilization by School Administrators

Six contextual factors were analyzed in this study, including Attitude towards ICT; Perceived Usefulness of ICT tools; Perceived Ease of Use of ICT tools; Access and Availability of ICT tools; Training and Technical Support; and Motivation and Incentives for using ICT tools. Prior to the analysis of these factors, some assumptions were tested, including homoscedasticity, multivariate normality, and multicollinearity.

#### *Test of Homoscedasticity*

The assumption of homoscedasticity requires that there should be no clear pattern in the distribution. This was tested by generating a scatterplot (see Figure 1).

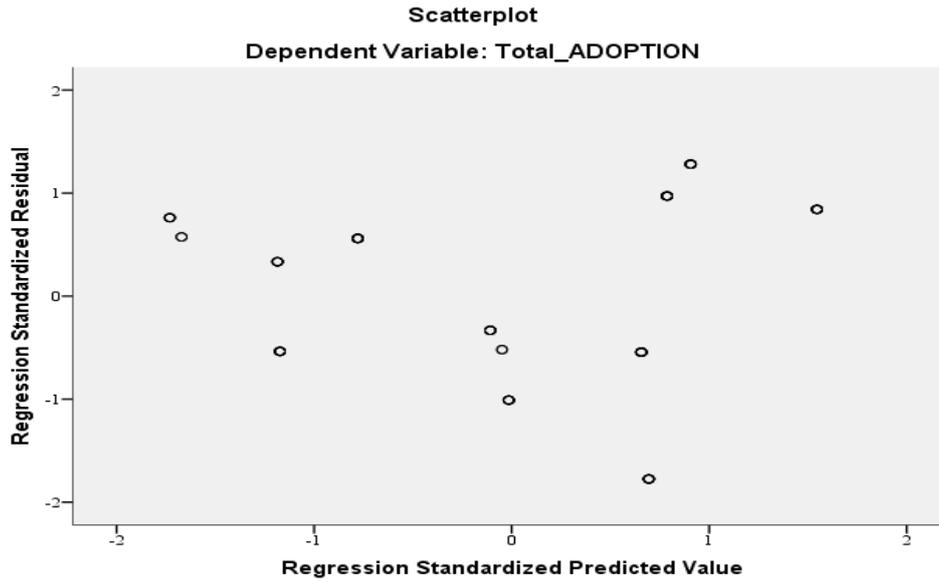


Figure 1. Scatterplot for Testing the Assumption of Homoscedasticity

The scatterplot diagram shows that the residuals are roughly distributed, which satisfies the assumption of homoscedasticity (Pallant, 2005).

*Test of Multivariate Normality*

Also, multiple linear regression analysis requires that the residuals of the regression, that is, the errors between the predicted values and the observed values should be normally distributed. The normal probability plot (Normal Q-Q Plot) was generated to test for multivariate normality. The result showed that the residuals were normally distributed, hence the assumption of multivariate normality was satisfied (see Figure 2).

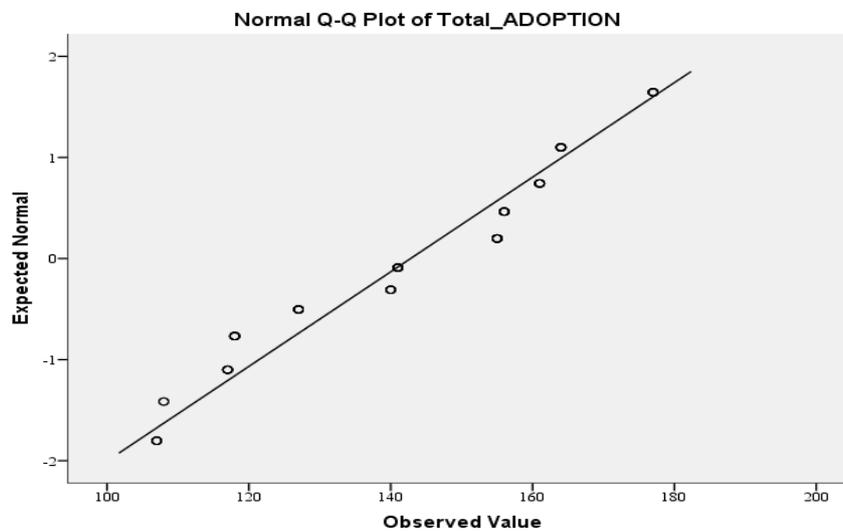


Figure 2. Normal Probability Plot Testing the Assumption of Normality

*Test of Multicollinearity*

Multicollinearity exists when the independent variables are highly correlated with each other ( $r = .90$ ). The Pearson correlation analysis was conducted to check for multicollinearity in the data. The result is presented in Table 2.

Table 2. Pearson Bivariate Correlation among Independent Variables

	Factor 1 (A)	Factor 2 (PU)	Factor 3 (PEU)	Factor 4 (AA)	Factor 5 (TTS)	Factor 6 (MI)
Factor 1 (A)	1	.706**	.904**	.694**	-.075	.809**
Factor 2 (PU)		1	.821**	.611**	.365**	.733**
Factor 3 (PEU)			1	.737**	.007	.906**
Factor 4 (AA)				1	.016	.757**
Factor 5 (TTS)					1	.227
Factor 6 (MI)						1

\*\* . Correlation is significant at the 0.01 level (2-tailed). **Source: Field Data (2021).**

The result showed that the pairwise correlational coefficients of the independent variables were less than .90. This indicates a weak correlation, as required in the assumption of multicollinearity (Pallant, 2005). Therefore, the assumption of multicollinearity was not violated. Overall, all the three assumptions were not violated.

**Results of Multiple Linear Regression Analysis**

In what now follows, we present the multiple linear regression results ( $\alpha = .05$ ) which was conducted to evaluate the relationship of the independent factors (Attitude towards ICT; Perceived Usefulness of ICT tools; Perceived Ease of Use of ICT tools; Access and Availability of ICT tools; Training and Technical Support; Motivation and Incentives for using ICT tools) in linear combination and individually, with the dependent factor (ICT Adoption and Utilization).

*Test of Significance of the Combined Factors*

Using the Enter method to determine the relationship of a linear combination of the independent factors with ICT adoption and utilization, it was found that the test was statistically significant ( $F(6, 62) = 2398.83, p = .000$  ( $p <$

.05);  $R^2 = .996$ ; Adjusted  $R^2 = .995$ ) at  $\alpha = .05$ . The value of the multiple correlation,  $R$ , which indicates how well the combination of the independent factors relate with the dependent factor (ICT Adoption and Utilization), was  $R = .996$ . The adjusted  $R^2 = .995$  implies that all the factors, in linear combination, accounted for 99.5% of the variance in the dependent factor (ICT Adoption and Utilization). The results are presented in the standard regression model summary table (see Table 3) and the Analysis of Variance (ANOVA) table (see Table 4).

Table 3. Standard Regression Model Summary<sup>b</sup>

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.998 <sup>a</sup>	.996	.995	1.466

a. Predictors: (Constant), MI, TTS, PU, AA, A, PEU

b. Dependent Variable: ICT Adoption and Utilization

Table 4. Analysis of Variance (ANOVA<sup>a</sup>): Regression Significance

Model	Sum of Squares	df	Mean Square	F	Sig.
1					
Regression	30923.950	6	5153.992	2398.838	.000 <sup>b</sup>
Residual	133.209	62	2.149		
Total	31057.159	68			

a. Dependent Variable: ICT Adoption and Utilization

b. Predictors: (Constant), MI, TTS, PU, AA, A, PEU

**Source: Field Data (2021).**

#### *Test of Significance of the Individual Factors*

The significance of the regression coefficients of the individual factors (Beta values) were used to test the null hypothesis that each of the factors was not significantly related to ICT adoption and utilization by school administrators of basic schools. The results are presented by Table 5, which gives a breakdown of the coefficient and the significant values. For *Attitude towards ICT*, the test found that this factor was statistically significant ( $t = 7.407$ ,  $Beta = .148$ ;  $p = .000$ ). Therefore, the null hypothesis that attitude towards ICT does not significantly relate to ICT adoption and utilization was rejected. For *Perceived Usefulness of ICT tools*, it was revealed that the factor was statistically significant ( $t = 9.191$ ,  $Beta = .216$ ;  $p = .000$ ). As a result, the null hypothesis that perceived usefulness of ICT tools does not significantly relate to ICT adoption and utilization was rejected. However, for *Perceived Ease of Use of ICT tools*, the test revealed that it was not statistically significant ( $t = -.519$ ,  $Beta = -.023$ ;  $p = .605$ ). Therefore, we fail to reject the null hypothesis that perceived ease of use of ICT tools does not significantly relate to ICT adoption and utilization. This means that the ICT adoption and utilization by school administrators was not significantly related to perceived ease of use of ICT tools. Also, it was found that perceived ease of use of ICT tools related negatively to ICT adoption and utilization.

Next, it was found that *Access and Availability of ICT tools* was statistically significant ( $t = 16.925$ ,  $B = .233$ ;  $p = .000$ ). The null hypothesis that, access and availability of ICT tools does not significantly relate to ICT adoption

and utilization was therefore rejected. This means that school administrators' ICT adoption and utilization was significantly related to access and availability of ICT tools.

Table 5. Regression Coefficients of ICT Adoption and Utilization<sup>a</sup>

Model		Unstandardized		Standardized	t	Sig.	95% Confidence	
		Coefficients		Coefficients			Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	3.022	2.482		1.218	.228	-1.939	7.984
	Factor 1 (A)	5.233	.706	.148	7.407	.000	3.821	6.645
	Factor 2 (PU)	9.253	1.007	.216	9.191	.000	7.240	11.266
	Factor 3 (PEU)	-.518	.997	-.023	-.519	.605	-2.510	1.475
	Factor 4 (AA)	6.370	.376	.233	16.925	.000	5.617	7.122
	Factor 5 (TTS)	6.155	.768	.129	8.018	.000	4.621	7.689
	Factor 6 (MI)	13.938	.873	.496	15.959	.000	12.192	15.684

a. Dependent Variable: ICT Adoption and Utilization

**Source: Field Data (2021).**

*Training and Technical Support* was also found to be statistically significant ( $t = 8.018$ ,  $Beta = .129$ ;  $p = .000$ ). Therefore, the null hypothesis that training and technical support does not significantly relate to ICT adoption and utilization was rejected. Also, it was found that *Motivation and Incentives for using ICT tools* was a statistically significant factor that relates to ICT adoption and utilization ( $t = 15.959$ ,  $B = .496$ ;  $p = .000$ ). Therefore, the null hypothesis that motivation and incentives does not significantly relate to ICT adoption and utilization was rejected. Again, it emerged from the analysis that *Motivation and Incentives for using ICT tools* made the strongest unique contribution ( $Beta = .496$ ) to predicting ICT adoption and utilization, when the variance explained by all other factors is controlled for. Therefore, from the results above, the regression model for this study can be deduced as:  $Predicted\ ICT\ Adoption\ and\ Utilization = 3.022 + 5.233(A) + 9.253(PU) + 6.370(AA) + 6.155(TTS) + 13.938(MI)$

## Discussion

The study focused on the contextual factors that relate to ICT adoption and utilization by school administrators. We hypothesized that each of the factors was not significantly related to ICT adoption and utilization by school administrators of basic schools. In respect of Attitude towards ICT, it was revealed that this factor was statistically

significant ( $t = 7.407$ ,  $Beta = .148$ ;  $p = .000$ ). The null hypothesis that attitude towards ICT does not significantly relate to ICT adoption and utilization was rejected. This implies that the attitudes of school administrators towards ICT tools were significantly related to ICT adoption and utilization. This result suggests that attitude towards ICT is a significant factor in predicting ICT adoption and utilization, and agrees with the findings of Cazares (2010), Kim and Davis (2008) and Owolabi (2005), who reported that attitude towards ICT is significantly related to users' performance in the use of ICT tools for work-related activities. Also, it confirms the finding of Abedalaziz, et al. (2013) who stated that positive attitude towards ICT influences adoption behaviours. Again, the results corroborate the finding of Huang and Liaw (2005), which noted that users' attitudes towards ICT influence their acceptance of its usefulness and integration in other activities. The result therefore suggests that the school administrators of basic schools have positive attitudes towards ICT, and consider attitude as a very important factor that influences their ICT adoption and utilization. As a result, they are likely to adopt ICT for professional practices when all other factors are held constant.

*Perceived Usefulness of ICT tools* was found out to be statistically significant ( $t = 9.191$ ,  $Beta = .216$ ;  $p = .000$ ), hence we rejected the null hypothesis that perceived usefulness of ICT tools does not significantly relate to ICT adoption and utilization. In other words, school administrators' perception of the usefulness of ICT tools were significantly related to ICT adoption and utilization. This means that perceived usefulness of ICT tools is a critical factor in predicting ICT adoption and utilization by school administrators of basic schools. The result confirms the views expressed by Hu, Clark and Ma (2003), who reported that users' perception of the usefulness of ICT tools have a significant positive impact on their decision to adopt ICT for educational purposes. It also agrees with the view that perceived usefulness of ICT has a positive correlation to actual ICT adoption (Kumar, et al, 2008), such that perceived usefulness of ICT is considered a very important factor in deciding to adopt ICT for school administration. This outcome implies that users' appreciation of the value or worth of ICT for their professional practices is very paramount for ICT adoption and utilization.

Again, in reference to *Perceived Ease of Use of ICT tools*, it was noted that the factor was not statistically significant ( $t = -.519$ ,  $Beta = -.023$ ;  $p = .605$ ). We therefore retain the null hypothesis that perceived ease of use of ICT tools does not significantly relate to ICT adoption and utilization. This implies that the ICT adoption and utilization by school administrators was not significantly related to perceived ease of use of ICT tools. It also emerged that perceived ease of use of ICT tools related negatively to ICT adoption and utilization. The implication of this result is that the perceived ease of use of ICT tools does not significantly play a role in ICT adoption and utilization by school administrators of basic schools. This outcome contradicts the findings of several researchers, including Omotayo and Chigbundu (2017) which reported that perceived ease of use is a major factor for predicting ICT adoption, Smarkola (2007) which indicated that perceived ease of use is a predictor of user acceptance of computer technology, as well as Chong, et al. (2005) which indicated that the perception of the ease of use of ICT tools directly lead to the adoption of ICT. Furthermore, this result is in contrast with the findings of Askar, et al. (2006) which stated that perceived ease of use of ICT is a high determining factor in users' decision to adopt and use ICT. Perhaps, the glaring deviation of this result from several others in literature (Askar, et al, 2006; Jebelie & Reeve, 2003; Teo, 2008; Tella, et al, 2007) is probably due to the fact that all the participants in this study owned ICT tools, and have been exposed to ICT tools prior to their current professional occupation and

practice. This level of accessibility to ICT tools, and prior experience in using ICT provides some level of comfort in ICT utilization (Teye, 2014), and may explain why perceived ease of use was not considered as a major factor for predicting ICT adoption and utilization by the participants.

Again, *Access and Availability of ICT tools* was found to be statistically significant ( $t = 16.925$ ,  $B = .233$ ;  $p = .000$ ), hence we rejected the null hypothesis that access and availability of ICT tools does not significantly relate to ICT adoption and utilization. This result shows that ICT adoption and utilization by school administrators was significantly related to access and availability of ICT tools. The finding is consistent with the position of Miller, Naidoo, van Belle and Chigona (2006), who noted that ICT adoption is affected by availability and accessibility of ICT resources. The result also agrees with the view of Muriithi, Horner and Pemberton (2016), which stated that several factors affect ICT adoption and use practices, including availability and access to ICT resources. The implication of this finding is that when school administrators of basic schools are provided with the requisite ICT tools and resources, they will most likely adopt ICT tools for their professional practices. Therefore, it is imperative that efforts are put in place to provide ICT resources to school administrators who may not have these ICT resources at their disposal, if the levels of ICT adoption and utilization are expected to increase significantly. These resources may include Internet connectivity, computers and peripheral devices, as well as appropriate and relevant software applications that are suitable for school management and administrative functions.

Similarly, *Training and Technical Support* was found to be statistically significant ( $t = 8.018$ ,  $Beta = .129$ ;  $p = .000$ ). Therefore, the null hypothesis was rejected. This shows that training and technical support were found to relate significantly to ICT adoption and utilization by school administrators. This result is consistent with the findings of other researchers who indicate that training one of the significant factors that influence ICT utilization (Ozden, 2007; Ghavifekr & Wan Athirah, 2015). It is important however, that the training services provided to school administrators meet their specific needs for their job performance in order to be considered as effective and helpful for their professional practice, leading to ICT adoption decisions (Gomes, 2005). Similarly, the result supports the assertions by Haslaman, Mumcu, and Usluel, 2008, as well as Moses, Khambari, and Luan (2008), who indicates that technical support is one of the factors that has significant impact on ICT adoption and utilization and therefore should be provided as part of efforts to promote ICT adoption and utilization. It is important that school administrators of basic schools are provided with some technical support to overcome the several challenges they encounter or are likely to encounter (Resta, 2002), especially in developing countries like Ghana.

In the same way, *Motivation and Incentives for using ICT tools* was found to be a significant factor that relates to ICT adoption and utilization ( $t = 15.959$ ,  $B = .496$ ;  $p = .000$ ). We therefore reject the null hypothesis that motivation and incentives does not significantly relate to ICT adoption and utilization was rejected. This result shows that motivation and incentives is very critical to ICT adoption and utilization by school administrators. The result also agrees with the findings of Fung and Yuen (2012), which stated that extrinsic factors such as motivation and reward systems increases users' interest and encourages technology use. The result also gives credence to the opinion that there is no job excellence without offering some motivation and incentives (Fisher, 2003). Also, the result is consistent with the finding of Gautreau (2011), which notes that recognition and financial incentives are the most important factors that would motivate users to adopt and use ICT systems. From this result, it can be

observed that motivation and the provision of incentives relates positively to ICT adoption for professional practices. This gives a clear indication that when school administrators are properly motivated for their ICT adoption and utilization, there would be more ICT adoption decisions by other school administrators for their job performance.

The study also revealed that *Motivation and Incentives for using ICT tools* was the strongest factor in predicting ICT adoption and utilization (Beta = .496), when the variance explained by all other factors is controlled for. This result corroborates the findings of Sik and Lee (2010) which reported that motivation is a significant factor in influencing the intention to adopt and continue using ICT. This result may be due to the fact that motivation influences peoples' intentions on their behaviours and actual performance of an activity (Zain, Hanafi, Don, Yaakob & Sailin, 2019).

Overall, the study found that in linear combination, the variation in the adoption and utilization of ICT by school administrators can be explained by five factors namely: 1) Attitude towards ICT; 2) Perceived Usefulness of ICT tools; 3) Access and Availability of ICT tools; 4) Training and Technical Support; and 5) Motivation and Incentives for using ICT tools.

## Conclusions

The study showed that the five contextual factors significantly relate to ICT adoption and utilization by school administrators of basic schools in Ghana. These are attitude towards ICT tools, perceived usefulness of ICT tools, access and availability of ICT tools, availability of training and technical support, and the provision of motivation and incentives for using ICT tools. However, the provision of motivation and incentives for using ICT tools was found to be the most influential factor for ICT adoption and utilization.

It is therefore recommended that the Ghana Education Service should organize regular ICT training workshops, and also offer technical support to school administrators to ensure that they continue to form positive attitudes towards ICT tools. Most importantly, motivation and incentive packages should be offered to school administrators who use ICT tools for their professional practices. This will help in concretizing the adoption and utilization of ICT tools for school administration functions.

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