

Assessing Basic School Teachers' Competence in the Application of Information and Communications Technology in Teaching: Implications for the New Ghanaian Curriculum

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Abstract

Information and Communications Technology (ICT) provides access to information through telecommunication technologies to interact in the digital world and continues to evolve to bring remarkable changes in the educational system. ICT integration in teaching is quite complicated and challenging because teachers need to be equipped with the right competencies for teaching practices. Therefore, the purpose of this study was to assess basic school teachers' competence in the application of Information and Communications Technology in teaching. The study used descriptive survey design by which simple random sample was used to select 285 teachers from Tano South municipality of Ahafo Region, Ghana. Data collection was done using closed-ended questionnaire. Data analysis was done with Statistical Package for Social Sciences (SPSS version 25). The study results revealed that teachers are instruments of change in educational establishments. They play significant roles in the implementation of ICT in education. Teachers' competence in integration of ICT in the classroom would bring new, stimulating and fulfilling learning experiences to policy makers, educators and learners. Based on these findings, it was recommended that teachers should be provided with administrative support to enable them integrate ICT into classroom activities in order to promote student learning. Teachers should be given regular-based ICT training workshops to possess the requisite knowledge and skills so that they can effectively support their students' ICT usage in classrooms. Also, provision of ICT infrastructure and resources in schools should be given maximum premium since access is a necessary condition to the integration of ICT in education.

Keywords: Competence; Information and Communications Technology; Basic School Teachers; Curriculum; Technological Pedagogical and Content Knowledge.

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1. Introduction

Information and Communications Technology (ICT) provides access to information through telecommunication technologies to interact in the digital world [1, 2, 3, 4]. ICT continues to evolve to bring remarkable changes in the country's educational system. Reference [5] emphasized that to successfully utilize technology in educational reforms teachers must have strong support and attitude towards the integration of ICT in education. Technology in the 21st century has a significant role in various fields that include education considering that it becomes an information super-highway worldwide. Innovation is essential in integrating technology in education for it can transform the way people think, work, and live [6]. The global economy has transformed into a knowledge-based economy because of ICT which is considered a powerful educational resource to improve quality education. ICT integration in an educational system inspires policy-makers and even invests great amount in developing countries [7]. Knowledge on information and communications technology is necessary however insufficient as foundation for Technological Pedagogical and Content Knowledge (TPACK). Thus, integration of ICT in the educational system provides a dynamic and proactive teaching-learning environment [8, 9] which can improve the quality and accessibility of the delivery of classroom instruction to students. This is vital to overcome the challenges of globalization [10]. Global development of ICT in education has a breakthrough in the structure of the digital environment and become the key force in the era of technology-driven education. Reference [11] supports that schools and communities must have access to ICT resources to link in the global economy. However, the process of adapting ICT demands continuous effort to support technology-driven information resources which is essential in the teaching-learning process [12]. References [13] pointed out that different disciplines can be effectively learned through technology-based tools and equipment. Few empirical studies investigate as to the impact of ICT to pre-service teachers with support received from training institution on ICT competencies, however, limited to single strategy only [14]. ICT integration in teaching is quite complicated and challenging because teachers need to be equipped with the competencies for teaching practices [15, 16]. Reference [17] supports that confidence, competence, and accessibility is the critical component of technology integrated in the educational system. Thus, teachers should be provided with technical support which includes software and hardware services. Some findings support that teachers have access and confidence in using ICT, however, limited to the use of common forms alone. As a result of the expanding possibilities of ICT integration in the educational system, the 21st-century teachers are facing new challenges in technological education. Accordingly, the potential of teachers is tailored to global competence which has a positive impact to reinforce effective technological practices in the educational system [18, 19, 20]. ICT is becoming increasingly important in our daily lives and in our educational system. For example, the usage of ICT has challenged conventional teaching methods, transformed instructional practices and contributed to emerging new instructional methods [21]. With its prospects, ICT usage has become an important component of educational reform and an integral part of the school curriculum [22]. The educational prospects of ICT usage include enriched learning environments, permitting learners to embrace several perspectives on complex phenomenon, encouraging flexible knowledge construction in complex learning domains and catering for individual differences Sang and colleagues [23] As part of Ghana government's efforts to transform the basic education curriculum, a national ICT policy known as Information and Communication Technology for Accelerated Development (ICT4AD) [24] was formulated and implemented in

2004. One key area the policy focused on was to promote ICTs in education by the deployment and exploitation of ICTs in education. To meet the challenges of education in the 21st Century, a new ICT in education policy was introduced in 2008 [25]. The purpose of this policy was to introduce ICT in JHSs through the teaching of ICT as a core subject, the integration of ICT as a teaching tool for all subject areas and the integration of ICT to support educational management and administrative functions. The ICT in Education Policy (2015) was the next to be developed by the government. This policy is hinged on three pillars, namely ICT as a learning and operating tool, integration of ICT into teaching and learning, as well as ICT as a career opportunity for students. The introduction of ICT at all levels of the Ghanaian education curriculum is seen as an important means of sustaining the integration of ICT and stimulating the interest of students [26].

As a way of implementing these policies, government has made several efforts, including making the study of ICT compulsory at all levels of education, distribution of laptops to teachers, distribution of computers and Uninterruptible Power Supplies to 926 basic, Senior High and a few tertiary institutions as well as the training of basic school teachers on the use of technology. There has also been an installation of wireless Internet facilities in about 700 Senior High Schools and selected Colleges of Education and Nursing Training Colleges across the country. Nonetheless, research works have shown that many teachers are unwilling to integrate ICT into their teaching [27, 21].

Studies have highlighted a number of factors to explain why teachers are reluctant to use ICT in their schools. These include, lack of ICT skills, inadequate computer access and inadequate time [28, 29, 30]. Regardless of the numerous efforts by researchers to study the factors that affect teachers' ICT integration, research studies have found that teachers' competence in terms of pedagogical use of ICT have fallen below acceptable standards and the factors that contribute to their integration have received insignificant attention by researchers in the Ghanaian basic education [28, 31]. Although, several researchers have conducted studies on teachers' competence in respect of pedagogical use of ICT, they employed insignificant number of factors and participants in their studies [32, 33], the present study has considered an appreciable number of factors and respondents to explore teachers' competence in the use of ICT (i.e. teachers' ICT usage in teaching). It is noticeable that investigating a new study which includes enormous number of teachers from different basic schools is essential to identify perceived value, expectancy of success, self-efficacy, competence, training and access to ICT tools as a means of applying technology. In spite of the enactment of ICT policies and the provision of ICT infrastructure, it has been revealed that teachers' competence regarding integration of ICT into their teaching activity is still low in Ghana [25].

Hence, this study is conducted to deal with this missing gap. Therefore, the purpose of this study was to identify the factors that influence teachers' ICT integration into their teaching practices. Teachers play key roles in the integration of ICT and are expected to use technology in their teaching.

In line with the above-mentioned literature, the following research questions guided the study:

1. What are the teachers' pedagogical applications of ICT in basic schools?
2. What are the viewpoints of teachers regarding factors affecting their ICT usage in basic schools?

2. Literature Review

2.1 Technological Pedagogical Content and Content Knowledge

TPCK is the understanding that emerges from the interactions and interplays between and among

technology, content and pedagogical knowledge that underpins meaningful teaching with technology [34]. The basis of effective teaching with technology, requiring an understanding of the representation of concepts using technologies; pedagogical techniques that use technologies in constructive ways to teach content; knowledge of what makes concepts

difficult or easy to learn and how technology can help redress some of the problems that students face; knowledge of students' prior knowledge and theories of epistemology; and knowledge of how technologies can be used to build on existing knowledge to develop new epistemologies or strengthen old ones [34]. Reference [35] insisted that the complex relationships between the constructs provide a basis for understanding teacher knowledge that supports successful technology integration into classroom learning environments. Technological pedagogical content knowledge refers to the knowledge required by teachers for integrating technology into their teaching in any content area. Teachers have an intuitive understanding of the complex interplay between the three basic components of knowledge (CK, PK, TK) by teaching content using appropriate pedagogical methods and technologies [36]

TPCK is different from knowledge of all three concepts individually. It is the basis of effective teaching with technology and requires an understanding of the representation of concepts using technologies; pedagogical techniques that use technologies in constructive ways to teach content; knowledge of what makes concepts difficult or easy to learn and how technology can help redress some of the problems that students face; knowledge of students' prior knowledge and theories of epistemology; and knowledge of how technologies can be used to build on existing knowledge and to develop new epistemologies or strengthen old ones.

2.2 ICT Competence

ICT competence is described as being able to handle a wide range of varying ICT applications for various purposes [37]. Several studies revealed that teachers' ICT competence together with their attitudes determine both their initial use of ICT and future behavior towards technology [38, 30]. Reference [31] investigated teachers' perceptions of ICT integration, the level of their ICT competence and the factors that might hinder their use of ICT in schools. The study concluded that teachers who are competent in the use of ICT often integrate the technology into their lessons. In a similar study, [39] investigated ICT teachers' professional growth viewed in terms of perceptions about teaching and competencies. The result found that teachers' perceptions and competencies are the important factors for their professional growth. Also, researchers [40] found that ICT confidence and ICT competence related to teachers' integration of ICT into their teaching. Finally, [41] found that successful implementation of ICT in schools depends mostly on teachers' competencies levels. However, [42] found that the impact of ICT competence on the innovative use of ICT is small. They indicated that innovative educators develop their competence based on the teaching goals they want to

accomplish with ICT. The use of ICT in schools remains a critical concern for both teachers and students to perform effectively. Therefore, teachers are required to be competent in the use of ICT [43, 44].

2.3 Perceived Value and Expectancy of Success

References [45, 46, 47] proposed an expectancy-value model of motivation. The theory is used for understanding and predicting people's behavior in the process of adopting innovations. Expectancy-value theory suggests that person's decision to do a particular task depends on the belief that there are advantages in executing the task and belief that they can succeed. In other words, the expectancy of success and perceived value must be high. Reference [48] adopted expectancy-value theory to study teachers' ICT implementation in school. They found that teachers' perceived value and expectancy of success were the most significant predictors of their ICT use. Teachers who believed that ICT can immensely improve teaching and learning seemed to be technologically innovative. Furthermore, researcher [49] found that perceived value, expectancy of success and perceived cost of using ICT than perceived cost significantly relate to teachers' integration of technology.

2.4 Computer Self-efficacy

Self-efficacy is defined as a belief in one's own abilities to perform an action or activity necessary to achieve a goal or task [50]. Self-efficacy can be considered as the confidence that an individual has in one's ability to do things that one strives to do. Prior studies [51, 52, 53, 54] found that teachers' self-efficacy or confidence relate to their use of ICT in teaching. Moreover, in a study conducted in Turkey, [21] found that teachers' self-confidence levels in the use of ICT were moderate. He posited that teachers' confidence levels with regard to ICT integration in education should be high in order for them to be motivated to use ICT, which in turn would result in successful implementation of ICT in classrooms. Finally, [55] conducted a study on teachers' acceptance and integration of ICT in classroom. A total of four teachers were interviewed. The results showed that teachers' confidence relates to their ICT usage. The researchers concluded that when a teacher is self-confident, he or she would possess positive attitudes toward ICT, and would be interested to integrate ICT into teaching. However, in another study, [56] reported that teachers were not confident in using ICT in their teaching despite taking courses in ICT.

2.5 Training

Teachers' training is a key factor to successful integration of computers into classroom teaching. Several studies have revealed that whether beginner or experienced, ICT-related training programs develop teachers' competencies in computer use [57, 58, 59] and influence teachers' attitudes towards computers [60]. In a similar study, [29] found that training is the strongest determinant of teachers' technology use in schools. Furthermore, teachers support the claim that if they involve themselves in quality technology professional training which will improve their ICT competence, it is likely they will apply ICT in their teaching activities [61]. A common criticism of professional development activities designed for teachers is that they are too short and offer limited follow-up to teachers once they begin to teach. Reference [62] claim that if training program is of high quality,

the period for training lasts longer, new technologies for teaching and learning are offered, educators are eagerly involved in important context activities, teamwork among colleagues is improved and has clear vision for students' attainment. Reference [56] reported that teachers who had had short-term ICT training, lack confidence and competence in using ICT and also do not know how to use ICT to improve and support students' learning. Training programs for teachers that embrace educational practices and strategies to address beliefs, skills and knowledge improve teachers' awareness and insights in advance, in relation to transformations in classroom activities [63]. Furthermore, [64] found that teachers' low level of ICT usage is due to lack of training. The result suggested an urgent need to train teachers in pedagogical and technical use of ICT in schools. The literature revealed that ICT training programs develop teachers' competencies in computer use. It is also evident from the literature that other technological skills acquire by teachers are necessary but ICT training skills are important conditions for ICT integration into teaching process. Computer training will be used as a variable in this study since a review of the literature found that training is an important factor to determine teachers' technology use.

2.6 Accessibility of ICT Tools

Access to ICT infrastructure and resources in schools is a necessary condition to the integration of ICT in education [30]. Effective adoption and integration of ICT into teaching in schools depends mainly on the availability and accessibility of ICT resources such as hardware, software, etc. Therefore, access to computers, updated software and hardware are key elements to successful adoption and integration of technology. Obviously, if teachers cannot access ICT resources, then they will not use them. Therefore, hardware, software and network infrastructure must be accessible to teachers in schools. A study conducted by [65] on the 'teacher effect' on the use of ICT in the classroom found that a smaller proportion of teachers work in conditions of high access to ICT in classroom. A similar study conducted by the [66] found that the greatest obstacle to teachers' use of ICT in teaching is access to ICT. Access to technology resources does not imply only availability but also the suitability of tools and program to support teaching and learning [67]. Teachers who have access to the necessary technological resources are likely to integrate ICT into their teaching activities [30]. However, many studies have found that the provision of ICT resources in schools does not guarantee its automatic use by teachers [68, 69].

2.7 Administrative Support

It is easy to recognize that factors such as access to computers, network and internet access, provision of training to educators, provision of ICT-based curriculum resources and technical support are important for implementation of ICT in education. Many national policies on ICT in education make plans for provisions in these areas. However, these factors alone would not be enough to bring about the sort of institutional change that would be necessary. Leadership engages the acquisition and coordination of these factors within the settings and limitations of the institution in defining and realizing the preferred results. Numerous studies [70, 30, 71] have found that leadership support is a stronger determinant of teachers' integration of ICT into teaching. Reference [72] believes that "without the leadership support, the educational potential of information and communication technology may not be realized". Yet he claims that research literature has paid no attention to

the significant role of principals in this aspect. Principals need to assume a major responsibility for initiating and implementing school change through the use of information and communications technology. Also, [73] confirmed that leadership support has been ignored irrespective of huge investment of technology in schools. They recommended that school administrators must show their total commitment to teachers' integration of ICT so that the value of the technology can be realized. Reference [74] conducted a study on the use of ICT in nine schools in Israel which successfully implemented ICT in teaching. He found that the leadership style can help ease the introduction of ICT into schools. Yet the task of providing effective leadership is a challenging one. For the use of ICT in teaching to be sustainable, leadership support and school community support are important. It is not the duty of a teacher [56].

3. Methodology

The study adopted quantitative approach underpinned by positivist paradigm. Descriptive survey design was employed since it was compatible with the selected approach. In essence, the said survey design provides quantitative or numeric description of trends, attitudes, or opinions of a population by studying a sample of that population [76]. The population for this study consisted of all basic school teachers in the Tano South municipality of Ahafo region, Ghana. The number sampled was 285 from a population of 1,086 teachers according to the Educational Management Information System's (EMIS) statistics available at the Municipal Education Office.

3.1 Population and Sampling

The study targeted teachers' population of all basic school teachers in the Tano South municipality. The total number of the said population amounted to 1,086 teachers. The choice of this population stemmed from the fact that population specification that addresses the inquiry affects the researchers' decisions on sampling and resources used [75]. Also the consideration of the said population had to do with having similar characteristics in terms of teachers' competence in applying ICT in teaching as compared to their compatriots in other basic schools in Ghana.

Therefore, the population of this study included all basic school teachers because they are the implementers of the ICT applications at the basic level. The study used a total sample size of 285 respondents for the study drawn from a population of 1,086 individuals. Generally, it is argued that the bigger the sample size used, the closer the distribution to an ordinary distribution, referred to as the central limit theorem, which can also occur if the sample is not ordinarily distributed [75]. The sampling technique used for the study was simple random. The choice of this sampling technique became useful since it was hoped to provide opportunity where everyone in the target population has equal chance of being selected for the study [76].

3.2 Instrument

This study applied the questionnaire method to collect data. A questionnaire is a research instrument for gathering data evaluated against a particular social, educational, and psychological perspective [75]. The questionnaire is distributed to specific people to obtain data on an investigated phenomenon. This research

instrument fit the study because it could reach many people with minimal cost and elicited a lot of information. The questionnaire was characterised with closed-ended questions to restrict the respondents from giving responses that were not relevant to the study. This also assisted the respondents to give views considered to be most important to augment the study findings.

3.3 Data Collection Procedure

The researcher sought approval from an Institutional Review Board of a recognized university in Ghana to conduct the study. Generally, the study was guided by informed consent since research participation is not a straightforward matter and needs permission [77]. In writing, the selected respondents were informed on their option to participate or not to participate. Further, the justification for sampling was clearly explained. The respondents were briefed properly before completing the questionnaire. To ensure a one-hundred percent retrieval of data, the researcher personally administered the questionnaire to the respondents. Data analysis was executed with SPSS version 25. The research purpose was to assess basic school teachers’ competence in the application of Information and Communications Technology in teaching.

4. Data Analysis and Results

Table 4.1: Teachers’ ICT Usage in Teaching.

Variable	Frequency	Percent	Cumulative Percent
Designing learning situations with ICT	17	5.9	5.9
Creating an environment in class by integrating ICT	24	8.5	14.4
Using ICT to search for relevant materials for lesson preparation	34	11.9	26.3
Using ICT for addressing all learning needs in class	26	9.1	35.4
Using ICT to motivate students to learn	30	10.5	45.9
ICT as a tool to sustain student interest in class	25	8.8	54.7
ICT as a tool to achieve effective learning outcome	36	12.6	67.3
Using ICT to design appropriate teaching aids	38	13.3	80.6
Using ICT to develop learners’ digital literacy skill	32	11.2	91.8
ICT as a student evaluation instrument	23	8.2	100.0
Total	285	100	

Source: Field Data March 2023

In respect of the findings from table 4.1 regarding basic school teachers’ pedagogical use of ICT, respondents

expressed their views as follows. The respondents’ ability to design learning situations using ICT was supported with a percentage of 5.9 and a cumulative percent of 5.9 respectively.

Creating learning environment by integrating ICT was lauded with 8.5 percent and a cumulative percent of 14.4. Also, the use of ICT for searching relevant materials to aid lesson preparation was welcomed with a percent of 11.9 and a cumulative percent of 26.3.

An encouraging number of respondents acknowledged that ICT is used to address all learners’ needs as indicated by a percent of 9.0 and a cumulative percent of 35.4. Similarly, an appreciable number of the respondents admitted that ICT is used to motivate learners to learn effectively as depicted with a percent of 10.5 and a cumulative percent of 45.9. Using ICT as a tool to sustain learners’ interest in class was greeted with a percent of 8.8 and a cumulative percent of 54.7. Moreover, using ICT as a tool to achieve effective learning outcome was appreciated with outstanding percent of 12.5 and a cumulative percent of 67.3.

An overwhelming number of the respondents accepted the fact that ICT is used to design appropriate teaching aids to augment interactive teaching as shown with a percent of 13.3 and a cumulative percent of 80.6. What is more, the use of ICT to develop learners’ digital literacy skill was applauded with a percent of 11.2 and cumulative percent of 91.8. Finally, the potential of ICT as a student evaluation instrument was welcomed with a percent of 8.2 and a cumulative percent of 100.

Table 4.2: Teachers’ Perceptions on Factors Affecting Their ICT Usage.

Variable	Frequency	Percent	Cumulative Percent
Competence	40	14.0	14.0
Perceived Value	50	17.5	31.5
Expectancy of Success	47	16.5	48.0
Computer Self-Efficacy	48	16.8	64.0
Training	25	8.8	73.6
Accessibility	45	15.8	89.4
Administrative Support	30	10.6	100.0
Total	285	100	

Source: Field Data March 2023

Judging from the views of the respondents in table 4.2 in respect of the factors affecting respondents’ ICT usage, the findings below highlight the outcome.

Competence as being able to handle a wide range of varying ICT applications for various teaching purposes was greeted with a percent of 14.0 and a cumulative percent of 14.0 correspondingly. Secondly, perceived value highlighting the understanding and prediction of respondent’s behavior in the process of adopting innovations chalked a percent of 17.5 and a cumulative percent of 31.5. In a similar vein, expectancy of success suggesting a respondent’s decision to do a particular task hinges on the belief that there are advantages in executing the task and believing that they can succeed bagged a percent of 16.5 and a cumulative percent of 48.0.

In addition, computer self-efficacy indicating a respondent’s self confidence and positive attitudes toward ICT

use was accepted with a percent of 16.8 and a cumulative percent 64.0. Regarding training being a key factor to successful integration of computers into classroom teaching by the respondents was applauded with a percent of 8.8 and a cumulative percent of 73.6. Similarly, accessibility of ICT tools denoting a necessary condition to the integration of ICT in education by the respondents was acknowledged with a percent of 15.8 and a cumulative percent of 89.4.

In line with administrative support indicating a stronger determinant of teachers' integration of ICT into teaching received a percent of 10.6 and cumulative of 100.0

5. Discussion

Ascertaining the respondents' pedagogical usage of ICT to facilitate effective teaching and learning to address research question one, the following observations were made. It was noted that the respondents' ability to design learning situations using ICT had a cumulative percent of 5.9. Even though the cumulative percent of this variable is marginal but it was indicating the efforts being made by the teachers to improve their competence in ICT for teaching. This finding is consistent with [5] who emphasized that to successfully utilize technology in educational reforms teachers must have strong support and attitude towards the integration of ICT in education. Also, it was discovered that respondents were able to create conducive learning environment by integrating ICT with a cumulative percent of 14.0. It is generally believed that effective learning takes place when the learning environment is conducive enough for the learners. In agreement [8, 9] posit that integration of ICT in the educational system provides a dynamic and proactive teaching-learning environment which can improve the quality and accessibility of the delivery of classroom instruction to students. Likewise, it came to light that ICT helps teachers to search for relevant information to facilitate lesson preparation and presentation with a cumulative percent of 26.3. In accordance with this finding, the usage of ICT has challenged conventional teaching methods, transformed instructional practices and contributed to emerging new instructional methods [21]. In addition, it was reported that ICT can be used to address the needs of learners with a cumulative percent of 35.4. As regards this finding [11] supports that schools and communities must have access to ICT resources to link in the global economy.

Further, it was acknowledged that ICT has the potential to motivate learners to learn effectively with a cumulative percent of 45.9. In buttressing this finding, [23] opine that educational prospects of ICT usage include enriched learning environments, permitting learners to embrace several perspectives on complex phenomenon, encouraging flexible knowledge construction in complex learning domains and catering for individual differences. As against ICT as a tool to sustain learners' interest in class, 54.7 percent of the respondents cumulatively affirmed that finding. This finding is compatible with [34] who postulate that the basis of effective teaching with technology, requiring an understanding of the representation of concepts using technologies; pedagogical techniques that use technologies in constructive ways to teach content; knowledge of what makes concepts difficult or easy to learn and how technology can help redress some of the problems that students face; knowledge of students' prior knowledge and theories of epistemology; and knowledge of how technologies can be used to build on existing knowledge to develop new epistemologies or strengthen old ones.

Moreover, it was observed that ICT can be used as an essential tool to achieve effective learning outcome with a resultant cumulative percent of 67.3. To ground this finding, [6] are of the view that innovation is essential in integrating technology in education for it can transform the way people think, work, and live. Beside this, it was reported that ICT is used to design appropriate teaching aids to augment interactive teaching backed by a cumulative percent of 80.6. Accordingly, the process of adapting ICT demands continuous effort to support technology-driven information resources which is essential in the teaching-learning process [12]. Last but not least, it was noticed that ICT can be used to develop learners' digital literacy skill and this was supported with a cumulative percent of 91.8. It is normally believed that global development of ICT in education has a breakthrough in the structure of the digital environment and become the key force in the era of technology-driven education. As a final point, it came to light that ICT can be used as a potential instrument to facilitate student evaluation process which was supported with a cumulative percent of 100.0. In consistency with this finding, ICT usage has become an important component of educational reform and an integral part of the school curriculum [22]. To discover the viewpoints of teachers on factors affecting their ICT usage in order to measure research question two, it came to light that competence being the first variable denoting teachers' ability to handle a wide range of varying ICT applications for various teaching purposes chalked a cumulative percent of 14.0. It is indeed an undisputable fact that teachers who are competent in the use of ICT often integrate the technology into their lessons. This supports findings of [38, 30] who contend that teachers' ICT competence together with their attitudes determine both their initial use of ICT and future behavior towards technology. In addition, perceived value highlighting the understanding and prediction of respondents' behavior in the process of adopting innovations was applauded with a cumulative percent 31.5. It is obvious that teachers who believe ICT can immensely improve teaching and learning seem to be technologically innovative. In consistency, [48] postulated that teachers' perceived value and expectancy of success were the most significant predictors of their ICT use. Similarly, expectancy of success suggesting a respondent's decision to do a particular task hinging on the belief that there are advantages in executing the task and believing that they can succeed was welcomed with a percent of 48.0 cumulatively. For teachers to be successful in their competence to integrate ICT in their delivery, their expectancy of success and perceived value must be high. In accordance with this finding, [49], concluded that perceived value, expectancy of success and perceived cost of using ICT than perceived cost significantly relate to teachers' integration of technology. To address computer self-efficacy being the fourth variable and also indicating a respondent's self confidence and positive attitudes toward ICT use received a cumulative percent of 64.0. Apparently, teachers' confidence levels with regard to ICT integration in education should be high in order for them to be motivated to use ICT, which in turn would result in successful implementation of ICT in classrooms. This finding is then buttressed by [55] who concluded that when a teacher is self-confident, he or she would possess positive attitudes toward ICT, and would be interested to integrate ICT into teaching. Moreover, training being a key factor to successful integration of computers into classroom teaching by the respondents witnessed a cumulative percent of 73.6. Undeniably, whether beginner or experienced, ICT-related training programs should develop teachers' competencies in computer use and influence teachers' attitudes towards computers. Compatibly, teachers support the claim that if they involve themselves in quality technology professional training which will improve their ICT competence, it is likely they will apply ICT in their teaching activities [60]. Added to this, accessibility of ICT tools denoting a necessary condition to the integration of ICT in education bagged a cumulative percent of 89.4. Effective

adoption and integration of ICT into teaching in schools depends mainly on the availability and accessibility of ICT resources such as hardware, software, etc. Therefore, access to computers, updated software and hardware are key elements to successful adoption and integration of technology. To support this finding, [30] opine that teachers who have access to the necessary technological resources are likely to integrate ICT into their teaching activities. Ultimately, administrative support being a stronger determinant of teachers' integration of ICT into teaching had a cumulative percent of 100. Clearly, leadership engages the acquisition and coordination of these factors within the settings and limitations of the institution in defining and realizing the preferred results. With regards to this finding, [56] claim that for the use of ICT in teaching to be sustainable, leadership support and school community support are important.

6. Conclusion and Recommendations

In this study, it is evident that teachers are instruments of change in educational establishments. They are very phenomenal who play significant roles in implementation of ICT in education. If teachers' competence in ICT integration is below belt, it affects its subsequent usage in the classroom.

The effect of ICT on students' learning totally depends on the teachers. They decide on how best to influence knowledge. Teachers' competence leading to integration of ICT in the classroom will bring new, stimulating and fulfilling learning experiences to policy makers, educators and learners. Therefore, training teachers to possess the requisite knowledge and skills to effectively support their students' ICT usage in classrooms is a necessity. In addition, training and competence are considered as significant determinants of successful ICT integration in schools and classrooms.

Teachers' positive perception of value and expectancies of success of ICT is a predictor of their readiness to integrate ICT into their teaching. Similarly, teachers who believe that technology is useful tend to successfully use it in teaching.

In the light of the findings in the conclusive part of this study, it is recommended that teachers be provided with administrative support thereby urging them to integrate ICT into classroom activities to promote student learning. Administrative support engages the acquisition and coordination of these factors within the settings and limitations of the institution in defining and realizing the preferred results [69, 30].

Thus, successful integration of ICT needs a school support that gives its teachers the requisite training in instructional use of technology to effectively integrate ICT into classroom activities. Also, provision of ICT infrastructure and resources in schools should be given maximum premium since access is a necessary condition to the integration of ICT in education [30]

7. Limitation and Suggestions Future Researchers

This study was limited to basic school teachers in only one municipality with a sample size of 285 therefore, its findings cannot be generalised across all basic schools in Ghana. Future research can be extended to teachers in Colleges of Education and other tertiary institutions.

The study used quantitative approach with its analysis being only numerical data pointing to positivist direction. Future research can employ mixed methods to see whether findings will converge or diverge. The study investigated basic school teachers' competence in the application of ICT in teaching. Teachers selected for this study were from all subject disciplines (English Mathematics, Science, etc.).

Future studies may consider subject specifics to address individual teacher's competence in their specialty. Finally, the study considered both sexes of the respondents' competence in the application of ICT in teaching. Future studies may consider gender specifics to determine their dominance in terms of their ICT competence.

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