*Research Article*

# An Evaluation of Teachers' Technological Knowledge and Pupils' Academic Performance in Religious and Moral Education (RME)

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**Abstract:** The purpose of this study was to evaluate teachers' technological pedagogical content knowledge and pupils' academic performance in Religious and Moral Education (RME) in basic schools in the Ga-South Municipality of Ghana. Correlational research design was used for the study. The population of the study comprised RME teachers and final year pupils in the basic schools in the Ga-South Municipality. Krejcie and Morgan table, cluster sampling technique multi-stage sampling technique, proportional allocation of sample size, and purposive sampling were used to select, 532 respondents (159 basic schools 357 pupils and 175 RME teachers) for the study. The main instruments for data collection were questionnaire, observation guide, standardised-achievement-test. The Pearson's Correlational Coefficient was used to describe the linear relationship between each of the variables in the data analysis. The study concluded that it was uncertain as to whether teachers possessed adequate knowledge about the use of technology or instructional resources when it comes to the teaching of RME. The study also indicated teachers did not make effective use of the technology or instructional resources as observed, probably because they do not recognize the important role the use of technology plays in the teaching and learning process, they did not know how to use some of these technologies. Besides, some of these technologies were not available for use in the schools. Although, there was a weak positive correlation between teachers' technological knowledge and pupils' academic performance, the important role that technology plays in the teaching and learning process cannot be ruled out. It is therefore recommended that, the Ministry of Education, Ghana Education Service and Curriculum Research and Development Division should organise in-service training for teachers, since it turned out during the observation sections that teachers did not make use of audio-visuals (TV and motion pictures) and audio materials (example radio and tape recorders) in the Ga-South Municipality.

**Keywords:** Teacher, Quality, Academic, Technological, Pedagogical, Content, Knowledge

## 1. Introduction

The need for quality and competent teachers is a very pertinent issue because Religious and Moral Education as a school subject is structured along the subject pattern of curriculum organization and well trained teachers are one of the requirements for the effective operation of the subject curriculum [1]. The role of the teacher in the effective implementation of the Religious and Moral Education curriculum cannot be overemphasized. Researchers posit, "whenever policies and programmes have originated from above, teachers must plan their activities around them for periods of time, ranging from a full-year course to a daily lesson of a few minutes" [2]. They further explain that teachers rely on the content and methods outlined in textbooks, syllabi, and teachers' guides for their planning, but what they actually teach depends on their own preferences.

They synthesize instinctively, in keeping with their own artistic flairs. Thus teachers, by their own ingenuity, break down the Religious and Moral Education curriculum into a form that could easily be assimilated by the learner in the classroom. The implication of this is that, a case of teacher ineffectiveness in the presentation of Religious and Moral Education lessons is likely to have a debilitating effect on pupils' performance as well as on the acquisition of the basic skills and knowledge required of them [2]. This calls for regular monitoring of Religious and Moral Education teachers, to ensure effective teaching of the subject at the Basic School level.

Teaching direct knowledge towards the learner [3]. Teaching is not a mechanical process but a rather intricate, exacting and challenging job. It is therefore not surprising that the technological, pedagogical and content knowledge (TPACK) of teachers has been introduced in this 21st century, as a framework for understanding teacher knowledge required for effective technology integration [4]. The model of technological, pedagogical and content knowledge (TPACK) argues that developing good content requires a thoughtful interweaving of all three key sources of knowledge: technology, pedagogy, and content. The core of the argument is that there is no single technological solution that applies for every teacher, every course, or every view of teaching. Quality teaching requires developing a nuanced understanding of the complex relationships between technology, content, and pedagogy, and using this understanding to develop appropriate, context-specific strategies and representations. Productive technology integration in teaching needs to consider all three issues not in isolation, but rather within the complex relationships in the system defined by the three key elements [4].

It is clear from the above discussion that efficient or quality teachers must have a sound knowledge of what their people must know and have the ability to relate the subject matter (content), method, sequence and pace of work to individual needs; to use the environment and appropriate media to support learning (technology), use a range of teaching strategies skillfully (pedagogy) and have enthusiasm for the subject [5]. In simple terms, quality teachers should have the ability to combine technology with pedagogy and content that inspires learners to enjoy learning and perform better. RME as a subject demands good quality teachers in the same direction as well. However, this is not so because; in most schools, RME is seen to be an easy subject therefore, anyone at all without appropriate qualifications like degree in religion could be made to handle the subject. To this end, at times Reverend Fathers are made to handle the teaching of Religious and Moral Education because of the assumption that any person at all with a sound Biblical knowledge could be made to handle the subject. This implies that, some of the teachers of RME in Ghana lack the required academic and professional competencies. There are number pedagogies at the disposal of the Religious and Moral Educators which include: the concept cracking approach, narrative approach, systems approach, gift to the child approach, existential approach, phenomenological approach, interpretive approach as well as the life themes approach to teaching Religion. This presented a significant challenge to the researcher to undertake this research to find out teacher quality (technological pedagogical content knowledge) as a determinant of pupil's performance in Religious and Moral Education. There is therefore the need to examine the relationship between the technological pedagogical content knowledge of teachers and pupils' performance academic performance in Religious and Moral Education (RME). The study was guided by the research question - What relationship exists between teachers' technological knowledge and pupils' academic performance in RME?

## 2. Materials and Methods

Correlational research design was used for the study. This design was chosen because it offered the researcher the opportunity to find out to what degree a relationship exists between teachers' technological knowledge and pupils' performance; teachers' pedagogical knowledge and pupils' performance as well as teachers' content knowledge

and pupils' performance in the Ga-South Municipality. The population of the study comprised RME teachers and final year pupils in the basic schools in the Ga-South Municipality. There were 275 basic schools in the Ga-South Municipality with a total RME teachers' population of 318 and final year pupils' population of 5,565 during the 2014/2015 academic year (Ga- South Municipal Assembly, 2015). Pupils were also selected to constitute the study because they are at the center of the teaching and learning process. Krejcie and Morgan table, cluster sampling technique multi-stage sampling technique, proportional allocation of sample size, and purposive sampling were used to select schools, pupils and teacher for the study.

Out of the 275 basic schools in the Ga-South Municipality, 159 basic schools were selected to participate in the study based on the Krejcie and Morgan table for determining sample size [6, 7]. The cluster sampling technique was used to select the various basic schools (both private and public) to participate in the study. The cluster sampling technique was used due to the large and widely dispersed nature of the population, which poses administrative problems gathering a simple random sample. Therefore, the various schools (159) were broken down into clusters of 8 based on the 8 circuits in the area. The proportional allocation of sample size was used to select schools from each circuit based on the number of schools in the circuit to give a fair representation of each circuit (i.e. number of schools in each circuit divided by the total number of schools in all the eight (8) circuits and the result was multiplied by the sample size 159 basic schools). When this was done, the sample of schools that constituted the study were as follows; Bortianor circuit (19), Weija circuit (17), Ngleshie Amanfro circuit (23), Kofikwei circuit (20), Oboom circuit (18), Ashalagya circuit (20), Adaisu circuit (19) Nsawam circuit (23). Cluster sampling is considerably more economical and practical than other types of probability sampling, particularly when the population is large and widely dispersed (Heiman, 1996), and that is why the researcher adopted it in this work. In all, 532 respondents (357 pupils and 175 RME teachers) were selected for the study according to Krejcie and Morgan (1970), for determining a sample size. These constituted the sample size of pupils and RME teachers used for the study. The multi-stage sampling technique was employed to select 357 pupils for the study. Firstly, a list of all the 159 schools in the Ga-South Municipality was obtained from the Ga-South Municipal Assembly. Secondly, a list of all the pupils in each school was obtained. The third phase involved proportional allocation of the sample size among each school such that schools with large population size obtained large sample size (i.e. the total population of each school was divided by the total population for all 159 basic schools and the result was multiplied by the total sample size for all the schools). This procedure was applied to all the 159 basic schools until the total sample for each school was obtained. Finally, the purposive sampling procedure was used to select the RME teachers for the study.

The main instruments for data collection were questionnaire, observation guide, standardised-achievement-test. The questionnaire items were on a five point Likert scale formulated to guide the study. Again, an observation guide was used to gather information on how teachers use instructional resources appropriately. Observation is one of the oldest methods of data collection" and "it literally means ... a method of data collection that employs vision as its main means of data collection [8]. The researcher employed a structured nonparticipant observation. The observation guide was structured by the use of a Likert scale. The application of observation was due to the fact that the researcher wanted to make up for the deficiencies that might occur with the use of only a questionnaire. Besides, the use of observation was relatively inexpensive, not time consuming and allowed for the collection of first-hand information. A standardised-achievement-test consisting of 20 multiple choice items was given to final year pupils in each of the basic schools that was included in the study to answer. The test was collected and marked by the researcher and scores recorded to cater for the performance variable in the study with which dependent variables such as teachers' technological knowledge,

teachers' pedagogical knowledge, as well as teachers' content knowledge were compared with. The test was compiled from the B.E.C.E RME past questions from 2008 to 2014.

The research instruments were subjected to a validity and reliability test. The instruments were given to an expert, colleagues in the same subject discipline for that matter to ascertain how they met face and content validity. The suggestions as given by my supervisor were used to effect the necessary changes to improve upon the instrument. Thereafter, a pilot test of the instruments was conducted whereby the observation guide and questionnaires were administered in thirty (30) selected schools in the Cape Coast Metropolis. This area was chosen for the pilot testing because the curriculum as implemented in this area has the same characteristics in terms of content and pedagogical practices as compared with what pertains in the Ga-South Municipal Assembly. The pupils also bear similar characteristics in terms of age as compared to the students in the Ga-South Municipality. Moreover, pupils from the Ga-South Municipality and those in Cape Coast write the same examination and are expected to relate Religious and Moral lessons to the existential experiences. The reliability of the instruments was determined using Statistical Product for Service Solutions (SPSS). All these actions were taken to ensure that the instrument would be capable of collecting quality and useful data for the study. The Pearson's Correlational Coefficient was used to describe the linear relationship between each of the variables in the data analysis. This was done with the use of computer software called Statistical Product for Service Solutions (SPSS).

## 3. Results and Discussion

**This section of the study presents results and discussion on the research question What relationship exists between teachers' technological knowledge and pupils' academic performance in RME?** The responses given by the RME teachers are shown in Table 1

**Table 1. The Views of RME Teachers concerning their Technological Knowledge**

| Statement | M | SD |
|---|---|---|
| I can learn technology easily. | 4.36 | .64 |
| I keep up with important new technologies. | 4.24 | .60 |
| I know about a lot of different technologies. | 3.82 | 1.00 |
| I use audio- visuals (example TV and motion pictures) in teaching. | 2.68 | 1.14 |
| I use visual resources (examples chalkboards, felt board, bulletin, boards and flash cards). | 4.76 | .42 |
| I use community resources (example resource persons and places of interest) in teaching. | 3.95 | .73 |
| I use audio materials (example radio and tape recorders) in teaching. | 2.39 | 1.09 |
| Instructional resources are not available. | 2.91 | 1.45 |
| Instructional resources are very expensive. | 2.86 | 1.29 |
| Use of instructional resources is time consuming. | 2.31 | 1.29 |
| I am incompetent in using instructional resources. | 1.87 | 1.14 |
| I use instructional resources for lessons. | 3.71 | 1.10 |
| Instructional resources help me to relate religious lessons to real life experiences of pupils | 4.47 | .61 |

*Scale: 1-Strongly Disagree, 2-Disagree, 3-Uncertain, 4-Agree, 5-Strongly Agree*

*Mean of means = 3.41*

*Mean of Standard Deviation = 0.96*

Teachers are the implementers of the curriculum. The responsibility of organising and planning pupils' learning is entrusted to the teacher. "Teaching is not merely instruction, but the systematic promotion of learning by whatever means. In that case they are strategically positioned to determine the technological knowledge they possess and use during the instructional period. A look at Table 2 shows that it was uncertain as to whether RME teachers had technological knowledge in the teaching of RME. A mean of means of 3.41 and a Mean of Standard Deviation of .96 clearly indicates that the RME teachers were uncertain about a lot of the statements which were meant to identify the technological knowledge that RME teachers possess. This is illustrated in the following instances in the rest of the items.

Regarding how teachers can learn technology easily, it was found out that a significant majority of the teachers agreed to the fact. A mean of 4.36 and a standard deviation of .64 were attained. Apart from the fact that the mean is higher than the mean of means of 3.41, the degree of agreement is considered appreciable because the measure of spread is very low. Also, the majority of the teachers agreed to the statement, "I keep up with important new technologies. A mean of 4.24 and a standard deviation of .60 were attained for this item and this falls within the option "agree" looking at the scale. A high standard deviation of 1.00 and a mean of 3.82 compared to mean of standard deviation of .96 and a mean of means of 3.41 clearly indicates that teachers know about a lot of different technologies. Even though the respondents agreed, their responses vary since the value of the standard deviation is high. In any case, it could be asserted that majority of the teachers support this statement. In connection with the statement; "I use audio- visuals (example TV and motion pictures) in teaching", the majority of the teachers were uncertain about it. The item recorded a mean of 2.68 and a standard deviation of 1.14 which fall under the scale of 3 meaning the respondents were uncertain about the statement.

In line with the statement; "I use visual resources (example chalkboards, felt board, bulletin, boards and flash cards)", a mean of 4.76 and a standard deviation of .42 was recorded meaning to a large extent, the teachers strongly agreed to the statement. Converting the mean to the nearest whole number it could be seen that the mean falls at 5 which depicts that they strongly agreed to the statement. The extent to which they agreed was also high due to the low standard deviation recorded. Therefore, a significant majority of the teachers support this assertion. According to There is a great variety of materials around that can be used to make our meanings more vivid and more interesting. The mere use of these materials however, does not guarantee effective communication or effective teaching [9]. So it is one thing acquiring the instructional resources and it is another thing using them effectively to achieve the stated objectives. This is the case that instructional resources are woefully unavailable in the selected schools. What do the teachers do in such a situation? They resort to what they have and leave the rest to chance. In fact, the only instructional resources that I saw the teachers use were RME Text books and chalkboard. With respect to whether RME teachers use community resources (example resource persons and places of interest) in teaching, a mean of 3.95 and a standard deviation of .73 were obtained clearly showing that the respondents agree to that. According to Aggarwal, "In addition to reading, vicarious experiences can be gained from still pictures, films, filmstrips, resource persons, simulation, mocking, television and the like. The more concrete and realistic the vicarious experiences, the more nearly it approaches the learning effectiveness of the first levels" [10].

Concerning whether RME teachers use audio materials (example radio and tape recorders) in teaching, a mean of 2.39 and a standard deviation of 1.09 was realised. Hence an approximation of the means to the nearest whole number would fall on scale 2 which is "disagree". A greater proportion of respondents disagreed that they used audio materials (example radio and tape recorders) in teaching. On the issue of whether instructional resources are not available, greater number of the respondents were

uncertain about it. This item had a mean of 2.91 and a standard deviation of 1.45. Though the teachers were uncertain about this statement, the responses varied as the standard deviation is higher than the mean of the standard deviation.

From Table 2, it is obvious that teachers were uncertain as to whether instructional resources are very expensive. With this, a mean of 2.86 and a standard deviation of 1.29 were realised indicating that to a large extent, the respondents were uncertain about it. The high cost of electricity operated audio–visual equipment and the difficulty in finding satisfactory suppliers and after sale service has limited the introduction of instructional resources in many countries [11]. This is the case in Basic Schools in Ga South Municipality. When the respondents were asked to respond to the statement: "the use of instructional resources is time consuming", a greater number of them disagreed to the statement. This item recorded a mean of 2.31 and a standard deviation of 1.29. The teachers disagreed to the statement since an approximation of the mean of the item falls on the scale 2 as stated under Table 1. This means that the teachers disagreed that the use of instructional resources is time consuming.

When RME teachers were asked the statement: "I am incompetent in using instructional resources", a mean of 1.87 and a standard deviation of 1.14 was realised. Hence a greater proportion of respondents disagree that they were incompetent in using instructional resources. On the issue of whether RME teachers use instructional resources for lessons, greater number of the respondents agreed to it. This item had a mean of 3.71 and a standard deviation of 1.10 Though the teachers agreed to this statement, the responses varied as the standard deviation is higher than the mean of the standard deviation. From Table 2, it is obvious that teachers agreed that, instructional resources help them to relate religious lessons to real life experiences of pupils. With this, a mean of 4.47 and a standard deviation of .61 were realised indicating that to a large extent, the respondents agreed to it.

A good teacher should have mastery of the knowledge and use of a repertoire of instructional resources or technological knowledge in order to help students to learn and attain academic excellence. These are paramount in facilitating instructional process and achieving success in teaching. In as much as the teacher is entrusted with the selection of methods of teaching in the classroom, it is incumbent on the teacher to play this role tactically and strategically. In fact, teachers play very important roles in the selection as well as use of instructional resources.

**Analysis of Data from Observation Sections Conducted in the Selected Schools**

As a backup data to research question one, teachers were also observed in order to have a vivid picture concerning teachers' technological knowledge and their appropriate use of instructional resources. Two lessons each were observed in the 175 accessible schools that were involved in the study. The data collected with the use of the observation guide was to serve as a back-up information to check whether the data gathered with the questionnaires were truly reflecting the situation on the ground pertaining teachers' technological knowledge. The following were the findings as shown in Table 2.

**Table 2. Teachers' Technological Knowledge for Teaching RME**

| Statements | Very much N (%) | Much N (%) | Somehow N (%) | Not at all N (%) |
|---|---|---|---|---|
| The teacher uses audio-visual materials | 0 (0) | 0 (0) | 0 (0) | 175 (100) |
| Use of visual resources | 0 (0) | 47 (24.3) | 128(75.7) | 0 (%) |
| Use of audio resources | 0 (0) | 0 (0) | 0 (0) | 175 (100) |
| Use of community resources | 0 (0) | 0 (0) | 0 (0) | 175 (100) |

*Source: Field data, 2015*

**Table 3. Teachers' Technological Knowledge for Teaching RME**

| Statements | Yes N (%) | No N (%) |
|---|---|---|
| With the aid of instructional resources, the teacher is able to relate the Biblical story to real life situation. | 0 (0) | 175(100) |
| The lesson is practical and concrete with the use of instructional resources | 0 (0) | 175(100) |
| The lesson is practical and concrete with the use of instructional resources | 0 (0) | 175(100) |

*Source: Field data*

From Tables 2 and 3, it is clear that none of the teachers used audio-visuals, audio, and community resources. Only visual resources were used and even that to a limited extent. The visual resources used were RME textbooks and the chalkboard. Few of the schools had marker boards. In one of the schools, out of the 35 students only 26 were having their own textbooks. On the whole, technological knowledge or the use of instructional resources to augment teacher quality in RME was nothing to write home about. This view contradicts the data gathered from the teachers. Though the teachers appeared to be technologically knowledgeable based on the responses they gave, this is just a façade because, they do not make use of it probably because, they have not recognized the important role that technology or instructional resources play in the teaching learning process. It is worthy to note that though the teachers were able to deliver their lessons well, they did it without the use of technology or instructional resources. With regard to relationship between teachers' technological knowledge and pupils' academic performance, the Pearson Product Moment Correlation Coefficient (r) was used through SPSS Version 15. The result as shown in Table 4 gave a correlation coefficient (r) of .093 between teachers' technological knowledge and pupils' academic performance. When this correlation coefficient (r=.093) was tested at 0.5 significant level the result revealed that it was not statistically significant. Since the Pearson's Product Moment Correlation Coefficient (PPMCC) indicated statistically no significant relationship (r = .093, p < .05) between teachers' technological knowledge and pupils' academic performance, the null hypothesis which stated that there is no significant relationship between teachers' technological knowledge and pupils' academic performance in RME was accepted.

**Table 4. Relationship between Teachers' Technological Knowledge and Pupils' Academic Performance in RME**

| Variable | | Pupils' Academic Performance |
|---|---|---|
| Technological Knowledge | Pearson Correlation | .093 |
| | Sig. (2-tailed) | .275 |
| | N | 175 |

Table 4 indicates a weak positive correlation (r = .093, sig. = .275) between teachers' technological knowledge and pupils' academic performance. This implies that as teachers' knowledge about the use of technology or instructional resources increases, pupils' academic performance in RME increases. In other words, as RME teachers acquaint themselves with the use of different technologies or instructional resources, there is an increase in the pupils' academic performance as well. When this correlation coefficient (r=.093) was tested at 0.5 significant level the result revealed that it was not statistically significant. If this is so, then it means that, perhaps other factors may better predict or

influence pupils' academic performance than teachers merely possessing technological knowledge about the use of instructional resources. This brings back to memory the interesting thing that came up during the data gathering when it was realized that, most of the private schools due to cheap labour employ the services of senior high school leavers (unqualified personnel) to teach their pupils whereas the public schools employed the services of well qualified degree holders with even teaching qualifications in the relevant area of study (RME) to teach. However, pupils from the private schools performed better in the researcher made test that was given them as well as even perform better in the BECE which is on record far more than those from the public schools. The view is shared by researchers who conducted a meta-analysis of research regarding the correlation between teacher qualification, teacher quality, and pupil achievement [12]. They pointed out that pupil test score gains are an imperfect measure of what we really want to know: the teacher's contribution to producing the gains [12]. Because other factors such as pupil, home, school, and community characteristics affect achievement as well, teachers deserve neither all of the credit for success nor all of the blame for the failures. Many factors affect pupils, yet numerous research studies point to the importance of the teacher in the classroom in relationship to pupil achievement gains. However, it needs to be mentioned here that, correlation does not necessarily mean causation and that pupils' poor academic performance cannot be entirely attributed to the mere fact that teachers possess adequate repertoire of technological knowledge about the use of instructional resources as other factors such as socio-economic background of learners, teacher commitment, certification, etc., have a role to play when it comes to this. This notwithstanding, correlation coefficient can predict with some degree of precision the direction and degree of magnitude the relationship between variables of interest. Therefore, this presupposes that, there may be other potent factors which influence pupils' academic performance better than technological knowledge that teachers possess and a critical investigation need to be conducted in these other areas in other researches.

It can therefore be concluded that, to a large extent, it was uncertain as to whether teachers possessed adequate knowledge about the use of technology or instructional resources when it comes to the teaching of RME and this was also confirmed by data gathered from the observation guide. However, there was a weak positive correlation (r = .093, sig. = .275) between teachers' technological knowledge and pupils' academic performance which implies that, as teachers' knowledge about the use of technology or instructional resources increases, pupils' academic performance in RME also increases. However, technological knowledge was seen as not a significant factor in influencing pupils' academic performance in RME since a sig. value of .275 was obtained which goes beyond .05 considered for use in the educational field. If this is so, then it means that, perhaps other factors (eg. Teacher commitment, teacher dedication, socioeconomic background of pupils etc.) may better predict or influence pupils' academic performance than teachers merely possessing technological knowledge about the use of instructional resources.

## 4. Conclusions

The study concluded that it was uncertain as to whether teachers possessed adequate knowledge about the use of technology or instructional resources when it comes to the teaching of RME. The study also indicated teachers did not make effective use of the technology or instructional resources as observed, probably because they do not recognize the important role the use of technology plays in the teaching and learning process, they did not know how to use some of these technologies. Besides, some of these technologies were not available for use in the schools. Although, there was a weak positive correlation between teachers' technological knowledge and pupils' academic performance, the important role that technology plays in the teaching and learning process cannot be ruled out.

### 5. Recommendations

Although it turned out that technology does not have any significant relationship with pupils' academic performance, technology still plays a vital role in education and instruction. It was uncertain as to whether teachers were competent when it comes to the use of technology or instructional resources. It is therefore recommended that, the Ministry of Education, Ghana Education Service and Curriculum Research and Development Division should organise in-service training for teachers, since it turned out during the observation sections that teachers did not make use of audio-visuals (TV and motion pictures) and audio materials (example radio and tape recorders) in the Ga South Municipality. This will help sharpen RME teachers' technological knowledge and skills in order to stand in a better position to use the technology. Again, the Ministry of Education, Ghana Education Service and Curriculum Research and Development Division should require teachers to go on contract in order to weed out those who merely went into teaching to secure a job from those who are committed to use the training they have been given for the good of the pupils.

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