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Article

Religious and Moral Education Teachers' Usage of the Flipped Classroom Model and its Influence on JHS Students' Academic Performance in the Nzema-East Municipality, Ghana

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Abstract: The purpose of this study was to examine Religious and Moral Eduction teachers' usage of the flipped classroom model Model and its Influence on JHS Students' Academic Performance in the Nzema-East Municipality of Ghana.The study adopted the quasi-experimental research design. The population for this study comprised all JHS Religious and Moral Education students and teachers within the Nzema-East Municipality of the Western Region. With the help of the Krejcie and Morgan's sample determination table, a sample of 110 comprising 10 teachers and 100 students were selected for the study through multi-stage sampling. The instruments used for data collection were tests and questionnaires. The study indicated that, the flipped classroom is a very potent method of teaching RME. This is so because the study provides enough evidence that the flipped classroom significantly improves the performance of learners more than the traditional approaches to teaching. This is even more appropriate in a technological era such as ours. The study also revealed that, teachers have a positive view of the use of the flipped classroom in teaching RME. Junior High School RME teachers are ready to adopt the flipped classroom model in their teaching provided challenges students face are eliminated. It is recommended that, School Improvement Support Officers and Headteachers should ensure that teachers use the flipped classroom to bring variations in lesson delivery so as to improve the academic achievements of learners. It is also recommended that government should provide technological devices to schools and teachers and ensure that teachers employ the various technological devices at their disposal to the benefit of their students.

Keywords: Religious and Education Eduction, Flipped Classroom Model, Academic Performance

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1. Introduction

The call for eminence education for all citizens of a nation as specified by goal four of the Sustainable Development Goals (SDG) of the United Nations , is a call for nations to offer subjects that inculcate in their citizens, facts, skills, attitudes, and values that are needed to solve societal and global problems. As a member of the United Nations, Ghana has put in place several subjects of study in their schools to ensure the attainment of goal four of the SDGs [1]. Religious and Moral Education is one of these subjects that is studied in schools. As specified by the National Council for Curriculum and Assessment, Religious and Moral Education stands to develop in learners the 4Rs, to become critical thinkers, problem-solvers, creators, innovators, good communicators, collaborators, culturally identified individuals, digitally literate and global citizens who have keen interest in their personal development. These core competencies if well-imbued in learners as specified by the Religious and Moral Education curriculum, would go a long way to develop students personally and the nation at large (National Council for Curriculum and Assessment [2].

The teaching of Religious and Moral Education (RME) should be learner-centred rather than teacher-centred [2]. There is a Chinese proverb that states "I hear, I forget; I see and I remember; and I do and I understand." This is interpreted to mean that when learners are fully involved in teaching and learning processes, they tend to develop great interest and subsequently contribute actively to lessons. In the same vein, it is expected that the teaching and learning of Religious and Moral Education should be participatory, and not to be turned into preaching sessions. Learners would become passive learners when Religious and Moral Education teachers attempt to impart every information solely by themselves, and this may not encourage effective teaching and learning (National Council for Curriculum and Assessment ([2]. This calls for teachers' use of learner-centred approaches to the teaching of RME of which the flipped classroom model is of no exemption. the use of implies that teachers can be not be at their optimum best in terms of planning and preparation, instructional skills, classroom management, communication skills and assessment skills [3]. This discipline is full of concepts which required requires a resourceful teacher to handle it [4].

Teaching resources play key roles in teaching and learning processes. Without them, learners are likely to find it difficult to understand various themes and concepts (topics) they study. Teaching resources such as charts, real objects and drawings help to make lessons interesting and practical. The RME teacher should therefore be resourceful and be able to find the relevant teaching materials that may be needed for lessons. It will be highly essential for teachers to use audio-visual resources such as films and videos in their lessons for learners to acquire the right knowledge, values, attitudes and skills needed. They will also acquire some language skills and other core competencies from the topics they study and this will facilitate their learning of Religious and Moral Education and other subjects on the school timetable. In addition, the teacher is expected to relate the various topics to the practical situations in their daily lives (National Council for Curriculum and Assessment [2]. This posit that teachers should assess their learners' learning outcomes to the main goal and objectives of the subject to develop a reflective, concerned, responsible and participatory citizen in the civic life of a country [5].

In the Ghanaian educational system, RME is not only a subject that imparts moral education to learners, its unique thrust and approach make it ideally appropriate to perform such a task [6]. Teaching resources play key roles in teaching and learning processes. Without them, learners are likely to find it difficult to understand various themes and concepts (topics) they study. Teaching resources such as charts, real objects and drawings help to make lessons interesting and practical. The RME teacher should therefore be resourceful and be able to find the relevant teaching materials that may be needed for RME lessons. It will be highly essential for teachers to use audio-visual resources such as films and videos in their lessons for learners to acquire the right knowledge, values, attitudes and skills needed (National Council for Curriculum and Assessment [2, 7].

Pedagogical training is a strong predictor for Critical thinking and resourceful teacher is needed to clarify and share learning intentions and criteria for success to foster effective classroom discussions and learning [7, 8-9]. As the philosophy of teaching of RME should be learner-centred rather than teacher-centred. There is a Chinese proverb that states "I hear, I forget; I see and I remember; and I do and I understand." This is interpreted to mean that when learners are fully involved in teaching and learning processes, they tend to develop great interest and subsequently contribute actively to lessons. In the same vein, it is expected that the teaching and learning of Religious and Moral Education would be participatory, and not be turned into preaching sessions. Learners would become passive learners when Religious and Moral Education teachers attempt to impart every information solely by themselves, and this may not encourage effective teaching and learning (National Council for Curriculum and Assessment [2]. This implies that effective use of instructional materials will help learner to assimilate

knowledge in teaching and learning. knowledge is constructed during the learning process and that a student discovers knowledge for him/herself, rather than receiving knowledge, and this inspires the notion of performance-based assessment [10].

Flipped classroom is a method where the teacher gives the content of a lesson in the form of videos to learners for them to watch at home and prepare before going to class [11]. Flipped classroom makes content of a lesson to be presented to learners online before the normal face-to-face lesson [12]. Studies revealed the identity of the one who presents the content in the video either on a disc or online. But they agree that flipping the classroom leads to high academic achievement as compared to the traditional teaching approaches [11, 12]. Flipped classroom makes learners understand key concepts of a lesson to the highest depth through engagement in practical lessons [13].

Existing studies have proven the significant positive influences and impact that flipping a classroom has towards learners' academic attainment. Researchers, for instance, found out that the flipped classroom results in high academic achievement in middle and high school learners. However, this study was conducted in the American context and also in different subject areas other than Religious and Moral Education [14]. Similarly, another study found out through quasi-experimental research that the flipped classroom produced a significant academic achievement relative to the traditional mode of teaching [15]. Again, this research was carried out in the American setting. Flip classroom makes students responsible for their learning, personalizes teaching and learning, and makes the teacher a guide in the classroom [11]. Flipping the classroom is regarded as a model that promotes 21st-century skills if used appropriately [16, 17]. A study found out that 96% of participants had scores above an average mark of five when the flipped classroom was used [18]. A similar study investigated the views of Ghanaian teachers on using flipped approach as an instructional strategy. The study made use of inferential and descriptive statistics, to reveal teachers' acknowledgement of the importance of the flipped classroom instructional strategy but teachers have little experience and expertise in using it [19].

Literature available to the researcher suggests that it appears no research examined the influence that the flipped classroom instructional strategy has on the academic achievements of Religious and Moral Education learners in the Junior High Schools in the Nzema-East Municipality. This reveals that there exists a gap in research involving the flipped classroom approach and its influences on Junior High School Religious and Moral Education learners' academic achievement in the Nzema-East Municipality. It is against this background that the researcher investigated the influence that flipping a Religious and Moral Education classroom has on the academic achievements of Junior High School (JHS) learners within the Nzema-East Municipality. The purpose of this study was to assess Religious andMoral Education teachers' usage of the flipped Classroom Model and its influence on the academic performance of Junior High School Students' in the Nzema-East Municipality of Ghana. The study sought to answer research questions and a hypothesis (1) what influence has flipped classroom got on JHS Religious and Moral Education learners' academic achievement in the Nzema-East Municipality? (2) what is the view of JHS Religious and Moral Education teachers in employing flipped classroom model to teach Religious and Moral Education within the Nzema-East Municipality? Hypothesis - $\mathbf{H_1}$: There is no statistically significant difference between the pre-test mean score of JHS Religious and Moral Education learners taught using flipped classroom and the pre-test mean score of JHS Religious and Moral Education learners taught using traditional methods of teaching. $\mathbf{H_2}$: There is no significant difference between the post-test mean score of JHS Religious and Moral Education learners taught using flipped classroom and the post-test mean score of JHS RME learners taught using traditional methods of teaching.

1.1. Influence of Flipped Classroom on Academic Achievements

Researches involving the flipped classroom and academic achievements seem to be minimal. Few pieces of research looking into the influences the flipped classroom model has on the learners' academic achievements have produced positive outcomes regarding academic achievements although a few others have produced contradictory findings. For instance, a study that was conducted to examine the effect of the flipped classroom on the academic achievement of students in a high school Mathematics course yielded a negative result against the flipped classroom [20]. The study was purposed to determine whether there was a statistical difference in student academic achievement in two high school mathematics classrooms once the flipped classroom concept was implemented. Obtaining independent t-test results of p = .239, the researcher concluded that there was no significant difference between the mean scores of students exposed to the flipped classroom and the mean scores of students taught using the traditional methods of teaching and learning [20].

Meanwhile, Smallhorn (2017) had also identified that there is no statistically significant difference between the academic performance of students taught using flipped classroom models and the academic performance of students taught using active learning strategies in the traditional methods of teaching with the statistics for two different year groups reported as M = 58.52, SD = 19.96; M = 58.25, SD = 21.45; p = .864; t(46) =.172; d = .013. However, Smallhorn asserts that the flipped classroom rather engages students through spending time on campus and establishing a positive relationship with peers and educators. Similarly, in a quasi-experimental study where pretest and posttest items were used, found out that there was no statistically significant difference in the academic performances of learners who were taught using the flipped classroom and those taught using the traditional methods of teaching ($F(1,57) = 0.926$, $p < 0.05$, $\eta 2 = 0.016$). Despite this finding, her research revealed that students were satisfied going to class prepared and no need to do assignments at home were a few of the benefits of the flipped classroom model [21].

Several other studies, on the other hand, have reported contradictory findings by stating more positive effects of the flipped classroom over the negative effects. In a study aimed at analysing the trends and contents of flipped classroom research using 20 research article reports published on the flipped learning classroom from 2013–2015 found out that the flipped classroom has a significant impact on students' learning. Through their content analysis, they found out that the flipped classroom benefited students academically and motivated students, thus, making them study at their own pace while becoming confident during their encounter with the teacher in the classroom [22]. The numerous advantages they identified from their review made them suggest that the flipped classroom model be seen as a modern-day model that should be incorporated in the teaching-learning of different subjects. Along the same paradigm, a study involving science students (sophomore) at the University of Extremadura also found out that there was a 10% increase in students who took the course for the first time and passed by being taught through the flipped classroom model while higher final year grades were also reported [23].

A study on the effects of the flipped classroom model on Calculus students' academic achievements at Tabuk University, also found out that using the flipped classroom in teaching was effective. In the study, he found out a statistically significant difference between the treatment group and the control group after conducting an achievement test in Calculus [24]. Using ANCOVA, he inferred that the mean score of the treatment group (19.87) was higher than the mean score of the control group (14.96). The researcher thus, recommended the use of the flipped classroom model to enhance students' learning especially, the at-risk students. In a pretest-posttest experimental study using undergraduates students of the University of Anadolu found out that there was a massive improvement in the academic achievement of students who were taught using the flipped classroom model [25]. Without using a control group, Karadeniz conducted a pretest for

the undergraduate students using 20 items and obtained their mean score. After taking learners through 11 weeks of the flipped classroom model, a posttest also consisting of 20 items was also given to the students and the mean score was obtained. A t-test was then conducted to ascertain the level of differences that existed in the performances. It was revealed that there was a statistically significant difference in favour of the flipped classroom (pre-test mean = 3.88 and post-test mean = 11.69). Having used only one group, it can be deduced that his study may be influenced by several extraneous variables such as learners readiness to do the out of class activity, teachers sometimes shifting to the traditional system when not getting the results and many others [25]. However, the study called for more usage of the flipped classroom by teachers and incoming teachers [26].

A related experimental study, found a significant difference in the posttest scores of the experimental group and the control group. This was determined after an independent sample t-test was run to ascertain the differences in means of both the treatment group (those subjected to the flipped classroom) and the control group (those subjected to the classical blended learning method) producing a result of [$t_{(64)}$= 3.47, $p < 0.05$] [27]. They attributed the differences in performance to the materials used during different lessons and the learning environment in which the flipped classroom is used. This is an indication that the type of materials and the learning environment have a great role to play if the flipped classroom model intends to contribute greatly to the academic achievements of learners [27]. Therefore, for one to use the flipped classroom to improve the academic achievement of learners, the teacher should consider the environment and the resources to be used. Action research carried out on the use of the flipped classroom approach to enhance the understanding of JHS 1 students on the topic of density in Integrated Science, showed that the flipped classroom was effective in improving the academic performance of students [28]. However, the population was not clearly defined and the use of only frequency tables and bar graphs to analyse the results did not indicate the extent to which differences existed in the performance of students in both the pretest and post-test of the students [28].

Additionally, a research on the flipped classroom's impact on the academic performance of students pursuing a degree in Social Work at the University of Zaragoza, found out that students who were taught using the flipped classroom-based learning achieved higher academic performance, producing a mean of 6.56 with a standard deviation of 1.58 ($n = 60$) in comparison to those engaged in the traditional lecture-based methodology who obtained a mean score of 5.43 with a standard deviation of 1.97 ($n = 50$). Qualitatively, they indicated that 6.9% of students taught using the flipped classroom learning model obtained outstanding performance as against 2.3% of those taught using the lecture-based methodology. This provides a clear indication that the flipped classroom produces higher academic achievements in comparison to the traditional teaching methodology [29]. In another study involving undergraduate medical students offering a pharmacology course, agreed on earlier findings that the flipped classroom methodology produces better academic achievements as compared to the traditional teaching methods. In the study, the mean scores of both the experimental and control group in pre-test and post-tests were compared using an independent sample t-test. The tests results revealed that there was a statistically significant difference between the mean scores of the treatment group and the experimental group ($p < 0.0001$). Proceeding to obtain qualitative data from students, it was found out that 94% of the students felt that the flipped classroom model enabled them to achieve stated learning objectives while 96% of the students indicated that the interactive, applied in-class activities during the flipped class enhanced their learning greatly [30]. This made the students call for the frequent use of the flipped classroom in future lessons. In the same way, researchers in their systematic review and meta-analysis of studies involving the use of the flipped classroom to improve students' learning and satisfaction, also indicated that the flipped classroom has a slight advantage in terms of students' academic achievement as compared to the traditional

lecture method. What the researchers were not able to find out is the specific mechanisms adopted by users of the flipped classroom that contributed to the academic performance of learners [31].

According to Talan and Gulsecen the flipped classroom is more effective at increasing the academic achievements of students as compared with blended learning and face-to-face teaching methodology [32]. This was found out after running a paired sample t-test for three groups offering a Computer-I course. The pretest and posttest mean scores were compared where the t-test revealed statistically significant differences in the scores [$t_{experiment\text{-}I}(39) = -17.851$, $t_{experiment\text{-}II}(38) = -14.846$, $t_{control}(39) = -11.364$; $p < .05$]. Despite the significant difference identified in favour of the group that was taught using the flipped classroom, Talan and Gulsecen suggest that different instructional methods such as mobile learning, cooperative learning, problem-based learning as well as project-based learning could be blended with the flipped classroom to promote effective learning [32]. Another study also conducted on the effects of the flipped classroom practices on the academic achievement of students in a Social Studies course. Using an embedded experimental research design, the study revealed that students exposed to the flipped classroom (experimental group) obtained a higher mean than students that were taught using the traditional teaching methods (control group). The post-test mean score for the experimental group was found out to be 25.39 while the post-test mean score for the control group was 20.82. Moving further to identify the effect size using Cohen's d value, they were able to identify that the flipped classroom alone contributed 45% of the students' academic achievement as against other factors [33]. This made them suggest that the flipped classroom be used in teaching of Religious and Moral Education to help learners to achieve higher in terms of academic performance. They also suggested that a flipped classroom guide be prepared for teachers who would like to adopt the approach while in-service training is organised to help teachers to improve upon their technological competencies to use the flipped classroom effectively. The review has revealed that the flipped classroom leads to greater academic achievements if used appropriately and in the right context. It has been established that one needs to consider the environment in which he or she finds himself and apply the model accordingly. Studies reviewed have called for a lot of in-service training on the use of technological tools that could be used to make the flipped classroom effective to use to promote students' academic achievement.

1.2. Using the Flipped Classroom for Effective Teaching and Learning

Literature suggests that there is no one way to carry out the flipped classroom instruction. However, all authors of the flipped classroom literature agree that the most important element of bringing the hitherto homework in school should not be missed out [34]. The following five components were suggested in an earlier study:

- Setting clear learning targets.
- Determining the specific objectives that best meet the goals and how to apply direct and clear instructions to better capture them.
- Ensuring that learners have access to the materials, being it videos or reading assignments.
- Integrating in-class learning activities.
- Creating several types of assessment for the student to demonstrate his/her mastery of each learning objective in each particular unit of study [35].

Just like in every activity, teaching does not go unplanned. Every teacher has goals to achieve at the end of a specified duration. These goals are achieved through setting specific objectives. The specific objectives are thus, achieved through the stimulus the teacher presents to learners. Learners, therefore, engage in series of activities to ensure that they acquire or achieve the teacher's intended targets. The teacher finds out whether learners have achieved those targets through several assessment tasks. These tasks help

the teacher to evaluate the attainment of the learners. To support the above guidelines, three main stages or activities have been identified by other researchers in their review of the flipped classroom activities. They identified these three main stages as pre-class activities, in-class activities and after-class activities [36]. According to their review, the pre-class activities that teachers should ensure their learners engage in includes reading text materials and taking notes from them, doing online exercises and discussions and watching instructional videos. In the classroom, teachers should engage the learners in individual practices and quizzes, perform a brief overview and small group activities, have a short lecture and make students present solutions to problems posed to them. In the after-class activities, the learner should be made to do self-evaluation and reflect on what they have learnt [36].

1.3. The Views of Teachers in Using the Flipped Classroom in Teaching

The extent to which a particular item or idea will be embraced depends largely on the user's view or perceptions of that particular item. In that regard, it was prudent for the researcher to find out the views teachers hold on the use of the flipped classroom. This section discusses some of the findings from researches that examined teachers' views on the flipped classroom and its influences on academic performance. In an article that reported on the views of lecturers on the use of the flipped classroom in teaching students at rural universities in Australia, all five participants (100%) in the interview indicated a positive view on the use of the flipped classroom. Among the many advantages, they viewed the flipped classroom as an approach that makes the learning situation more flexible for learners, focuses on problem-solving than merely providing theoretical knowledge, increases the level of understanding, provides adequate time for classroom activities and offers better opportunities for students to be actively engaged in lessons [37].

Another study that looked into the opinions of Social Studies teachers on the use of the flipped classroom through semi-structured interviews revealed that the opportunity the flipped classroom model provides for absentee learners to catch up with their peers is one of the numerous benefits that the flipped classroom adds to the teaching and learning situation [38]. The study also revealed that the heterogeneous nature of Social Studies classrooms makes it difficult for the teacher to be able to meet the needs of all individuals when the traditional method of teaching is used. However, the flipped classroom provides every learner with the chance to individualise the learning situation and increase their understanding of concepts. As the flipped classroom research gains grounds, a lot of researchers focus on the preservice teachers' view [39, 40]. This is apparently because these students will be teachers sooner than later and need to be introduced to the concepts while they are at school. To find out whether new teachers under training will embrace the flipped classroom teaching model in a discipline, researchers solicited the views of the to be teachers in their research to ascertain the effectiveness of the flipped classroom approach on preservice Social Studies teachers. Their findings showed that 75% expressed the view that they will use the flipped classroom in their classroom due to its benefits. Seventy percent of the to be teachers indicated that they will use the flipped classroom because it personalises learning [39]. In the same way, a study conducted to look into teachers' perception of the flipped classroom in Mathematics instruction revealed that teachers see the flipped classroom as an instructional approach that trains learners critical thinking and also make students learn actively [41]. The study, which utilised both online and face-to-face interviews, revealed that all teachers (100%) view the flipped classroom as promoting critical thinking skills because learners had information before the class discussions.

1.4. Bloom's Taxonomy

As a teacher, it is common to hear learners state that teachers provide them with less complex examples during face-to-face lessons and assign difficult tasks to them to do at home. This is probably because teachers expect learners to acquire the fundamentals and apply the knowledge and skills gained to solve complex issues in society. Students do complain because when they face a challenge in working on those complex tasks mostly at home, they do not get someone to share their challenges with. In 1956, Benjamin Bloom, alongside friends, came out with a framework for classifying educational objectives. This framework became known as Bloom's Taxonomy. They classified educational objectives based on those requiring lower-order thinking and those requiring higher-order thinking.

A study categories of educational objectives put forward by Bloom and his team are; knowledge, comprehension, application, analysis, synthesis, and evaluation [42]. These classifications were later revised by other researchers as remembering, understanding, applying, analyzing, evaluating, and creating. Although revised, it is worthy to note that knowledge and understanding in the original classification are seen as lower-order thinking abilities while application, analysis, synthesis, and evaluation are seen as higher-order thinking processes [43]. Armstrong went further to explain that aside knowledge, all others in the classifications are skills and abilities. This suggests that irrespective of the skills one may possess, we still need knowledge before we can embark on anything. In school, learners may have some skills but often struggle to put these skills into use due to a lack of basic knowledge. Teachers may think learners are not ready to apply their skills and tend to move on by lecturing them. However, the flipped classroom emphasizes the importance of knowledge in Bloom's taxonomy by ensuring that learners obtain knowledge at home and apply the knowledge to solve real-life problems at school. This implies that the flipped classroom helps to eliminate the complaints students make in terms of where and when they solve complex problems. In the flipped classroom, learners get to solve complex tasks in class so that they can contact their friends or teachers when they face challenges [42]. A research confirmed that students in the flipped classroom asked challenging and independent scientific questions, an indication that the flipped classroom approach helps learners to solve challenging issues in society thereby responding to the needs of the Bloom's taxonomy [44].

2. Materials and Methods

The study adopted quasi-experimental research design. A quasi-experimental design has greater generalisability of results and addresses several research questions that a researcher may not be able to use the true experiment to address due to its costive nature [45]. The population for this study comprised all JHS Religious and Moral Education students and teachers within the Nzema-East Municipality of the Western Region. The sample for the study was 110 made up of 100 students and 10 teachers. Krejcie and Morgan's sample determination table was used as a guide to select a sample of 110 comprising 10 teachers and 100 learners for the study [46]. Sampling is the process of obtaining a representative of a population (sample) for a study. Many techniques can be used to obtain a sample for a study. However, researchers warn about the choice of the technique or procedure used to determine the sample to prevent sampling bias. To avoid sampling bias, the researcher used the multi-stage sampling technique to select the participants for the study (where simple random sampling was used at various stages to select learners whereas convenient sampling was used to select RME teachers). The multi-stage random sampling technique was used because, despite its subjective tendencies, it is more convenient, flexible and cost-effective [47].

The researcher prepared the sampling frame for all schools in the accessible population (Bokro circuit) and obtained ten Junior High Schools. These schools were paired by the researcher according to proximity. Schools that were at a maximum distance of 200 metres apart were paired. Two schools that were outside the Bokro township but in its outskirt were, however, paired conveniently. Aside from the two schools that were

located in the outskirts of the Bokro township, the pairings were done by writing the names of the schools on pieces of paper, folded and placed into a bowl. A colleague teacher who had no idea of what the research was about was called to select only one paper from the bowl without looking into it. The pair of schools that was selected was Bokro M/A JHS and and the Eziom Methodist JHS. These schools were within 120 metres apart and had a combined student population of 360.

Given that learners in these schools were in three different classes (JHS 1–3), and that the research work should not distract the academic activities of learners, the names "participating class" and "non-participating class" were written on three pieces of paper, folded and placed into a bowl. The paper containing 'participating class' was one while two pieces of paper contained the 'non-participating class'. Class representatives from each school were called and asked to form groups of two according to the class they represented from their school. Each group was asked to pick a piece of paper from the bowl. From the activity, the group representing JHS 2 selected the participating class. This class had a combined student population of 120 (58 for Bokro M/A JHS and 62 for and the Eziom Methodist).

Again, the participating class group was dissolved and were asked to pick from two pieces of paper with the inscription 'treatment' and 'control' which was thrown on the ground. The student that picked the control group came from Bokro M/A JHS while the one that picked the treatment paper was from Eziom Methodist. The total number of students in the class that picked the control group was 62 while the number of students in the class that picked the treatment group was 58.

Using software called G*Power 3.1.9.2, a sample size of 100 for independent samples (two groups) was obtained at a statistical power of 0.95 and an alpha of 0.05 with cohen's d of 0.73 on the part of learners. The software produced a control group sample of 50 and the treatment or experimental group sample of 50. To prevent sampling bias once again, the researcher took 62 pieces of papers and wrote 'active' and 'non-active on them and placed them in the bowl. The 'active' papers were 50 while the 'non-active papers were 12. Students from the class whose representative picked the 'control' paper were asked to pick only one piece of paper from the bowl in turns. Those who picked the 'active' papers were chosen as the sample for the control group which was 50. A similar thing was done to the students whose representative selected the 'treatment' paper. Again, the 'active' papers were 50 while the 'non-active papers were eight (8). Those who selected the papers with 'active' written on them were chosen as the sample for the experimental group. At the time the research was initiated, there were 10 known JHSs in the Bokro Circuit. This means that there were 10 Religious and Moral Education teachers in the circuit guided that each school had one Religious and Moral Education teacher. All the 10 JHS Religious and Moral Education teachers were conveniently included in the study. This was because the researcher felt they will be in a position to provide the information needed for the study. This yielded a total of 110 participants for the study.

The instruments used for data collection were tests and questionnaires. The tests (pretest and posttest) were developed personally by the researcher using topics specified in the JHS Religious and Moral Education curriculum. The pretest was given to both the control group and the experimental group. The pretest consisted of 20 multiple choice items selected from the topics; 'Mapping our Environment', 'Conflict Management and Prevention' and 'Education and Productivity'. The post-test was made up of the same number of test items on the same topics and was given to both groups a week after the flipped classroom treatment was administered. The questionnaire was made up of four-point Likert closed-ended statements that required learners to tick, where appropriate, their responses. Participants were expected to indicate whether they strongly Agree (SA), Agree (A), Disagree (D) or Strongly Disagree (SD) to a particular statement or item. The data were analysed using the descriptive statistics tool in SPSS version 26.

3. Results and Discussions

This section presents results on the Research Question 1: *What influence has the flipped classroom model got on the academic achievements of JHS RME learners in the Aowin Municipality?* Studies from varied sources have indicated the significant influences that the flipped classroom has on the academic achievements of learners. Consequently, this research question sought to establish the influence of the flipped classroom model on the academic achievements of JHS RME students in the Nzema - East Municipality. To find answers to this question, two hypotheses were formulated and tested. They included;

H_1: There is no statistically significant difference between the pre-test mean score of JHS RME learners taught using flipped classroom and the pre-test mean score of JHS RME learners taught using traditional methods of teaching.

H_2: There is no statistically significant difference between the post-test mean score of JHS RME learners taught using flipped classroom and the post-test mean score of JHS RME learners taught using traditional methods of teaching.

Results from the tests (pre-test and post-test) that were administered to the students were used to find the influence of the flipped classroom model on RME learners' academic performance in the Aowin Municipality. The results of the tests were analysed using descriptive statistics (mean and standard deviation) and inferential statistics [t-tests (independent sample)]. The first to be analysed was the descriptive statistics of all tests given to respondents in both the control and experimental group. This was done using the descriptive statistics tool in SPSS version 26. The results of the analysis have been presented in Table 1.

Table 1. Descriptive Statistics of Pretest and Posttest Results of Groups

Test	N	Min.	Max.	Mean out of 20	Std. Deviation
Pre-test scores of experimental group	50	2	15	6.78	2.743
Post-test scores of experimental group	50	10	20	15.54	2.305
Pre-test scores of control group	50	2	13	6.50	2.460
Post-test scores of control group	50	7	16	10.92	2.514

Source: Field survey (2021); N = Sample, Min = minimum score, Max = maximum score

From Table 1, it is seen that learners who answered the tests in each group were 50 in all cases. It is seen that the mean score of the experimental group in the pretest was 6.78 with a standard deviation of 2.743. The post-test mean score of the experimental group was 15.54 with a standard deviation of 2.305. This shows that the mean score of the experimental group in the posttest was higher than the mean score of the experimental group in the pretest. The standard deviation of 2.305 in the posttest of the experimental group was lower than the standard deviation of 2.743 during the pre-test. This means that the performance of the class after the use of the flipped classroom was more homogeneous than it was before the treatment. This suggests that the use of the flipped classroom model can bridge the gap between the high achievers and the low achievers in the classroom.

Table 1 also shows that the mean score of the control group in the posttest was 10.92 with a standard deviation of 2.514. Meanwhile, the mean score of the same group in the pretest was 6.50 with a standard deviation of 2.460. The standard deviation of 2.460 obtained during the pretest and 2.514 during the posttest of the control group shows that they are identical indicating that the extent to which they are clustered around the mean score was very identical. This revealed that there was not much difference in terms of the varied individual learner characteristics in the control group even after the posttest.

H_1: There is no significant difference between the pre-test mean score of JHS RME learners taught using flipped classroom and the pre-test mean score of JHS RME learners taught using traditional methods of teaching.

This hypothesis sought to compare the performance level of the experimental and the control groups before the treatment was given to the experimental group. This was to find out if both groups had similar performance levels before the treatment. The pretest scores for both groups were compared using the independent t-test. The results are presented in Table 2.

Table 2. Independent Sample t-test for Pretest for Experimental and Control Group

	Levene's test for equality of variance		Test for equality of means		
	F	Sig	T	df	Sig(2-tailed)
Equal variances assumed	0.261	0.611	0.537	98	0.592
Equal variances not assumed			0.537	96.862	0.592

Source:Field survey (2021)

One of the assumptions for an independent t-test is the test for equality of the variances. Results from Table 2 indicates a sig value of 0.611. Since the sig value of 0.611 is greater than the alpha level of 0.05, the differences in the variances were not statistically significant. Consequently, equal variances were assumed for the pretest scores. Again, Table 2 shows that the difference in means between the control and experimental groups was not statistically significant at $t(98) = 0.537$, $p > .05$. This means that the two groups were performing almost at the same level before the use of the flipped classroom model.

H_2: There is no statistically significant difference between the posttest mean score of JHS RME learners taught using flipped classroom and the post-test mean score of JHS RME learners taught using traditional methods of teaching.

The study further sought to compare the influence of the flipped classroom model and the traditional method on the performance of the students. The independent sample t-test was used to compare the posttest score of the control group and the experimental group. Table 3 presents the results of the independent t-test.

Table 3. Independent t-test for Post-Test of both Experimental and Control Groups

	Lavene's test for equality of variance		Test for equality of means		
	F	Sig	T	df	Sig(2-tailed)
Equal variances assumed	0.226	0.636	9.577	98	0.000
Equal variances not assumed			9.577	97.274	0.000

Source: Field survey (2021)

From Table 3, Levene's test for equality of variances yielded a sig value of 0.636. Since the sig value of 0.636 was greater than the alpha level of 0.05, it can be concluded that there was no statistically significant difference between variances. Hence, equality of variances was assumed for the study. From Table 3, the test for equality of means resulted in a t-statistic of 9.577 and a sig value of $p < .001$. Since the sig value of $p<.001$ is less than the alpha level of 0.05, the difference between the posttest scores for both groups was statistically significant. The descriptive statistics in Table 1 shows that the mean score for the experimental group during the posttest was higher than the mean score for the control group during the posttest.

Research Question 2: *What is the view of JHS RME teachers on the use of flipped classroom model in teaching RME in the Aowin Municipality?* The study also sought to find out if RME teachers had positive or negative views on the use of the flipped classrooms in teaching RME. As a result, a 15-item questionnaire of the four-point Likert scale type was administered to them. A mean of greater than or equal to 3.50 shows that many of the teachers strongly agreed with the statement and that was an indication that RME teachers have positive views on the use of the flipped classroom in teaching RME within the Nzema East. A mean greater than or equal to 2.50 but less than 3.50 showed that most teachers agreed with the statement while a mean of less than 2.50 was an indication that teachers either disagreed or strongly disagreed with the statement. The results from the teachers' questionnaire were used to find answers to this research question and are presented in Table 4.

Table 4. RME Teachers' Views on the Use of the Flipped Classroom

Statement	SD (%)	D (%)	A (%)	SA (%)	Mean	Std. Dev.
Flipped classroom makes students learn better and score higher when used appropriately.	0(0)	0(0)	4(40)	6(60)	3.6	.516
Flipped classroom provides a better opportunity to interact with students during class.	0(0)	1(10)	3(30)	6(60)	3.5	.707
Flipped classroom makes students go to class more prepared.	0(0)	0(0)	3(30)	7(70)	3.7	.483
Preparing videos and other materials for learners in a flipped classroom model helps teachers to learn more about the content.	0(0)	0(0)	2(20)	8(80)	3.8	.422
Flipped classroom makes learners interact with technological tools, thus, connecting them globally.	0(0)	0(0)	2(20)	8(80)	3.8	.422
Flipped classroom model motivates learners to learn.	0(0)	0(0)	3(30)	7(70)	3.7	.483
Flipped classroom provides an opportunity for absent students to catch up with knowledge lost during their absence.	1(10)	1(10)	1(10)	7(70)	3.4	1.075
Flipped classroom enables positive student-student and student-teacher relationships.	0(0)	0(0)	4(40)	6(60)	3.6	.516
Flipped classroom makes the teacher cover a wide range of content areas.	0(0)	1(10)	4(40)	5(50)	3.4	.699
Flipped classroom promotes critical thinking in students.	0(0)	1(10)	2(20)	7(70)	3.4	.699
Flipped classroom make students learn at their pace.	0(0)	1(10)	3(30)	6(60)	3.5	.707
Preparing videos or materials for learners in a flipped class is time-consuming.	0(0)	5(50)	2(20)	3(30)	2.8	.919
Flipped classroom adds an extra burden to the teacher.	0(0)	4(40)	4(40)	2(20)	2.8	.789
There is no guarantee that learners will watch or read materials assigned to them.	0(0)	7(70)	2(20)	1(10)	2.4	.699
The flipped classroom is good for teaching students in the cities.	1(10)	4(40)	3(30)	2(20)	2.6	.966

Source: Field survey (2021); Mean of means = 3.33

Information from Table 4 showed that a greater number of teachers strongly agreed with the statement that the flipped classroom makes students learn better and score higher when used appropriately (M = 3.6, SD = .516). It also showed that most of the teachers strongly agree with the flipped classroom providing a better opportunity for them to interact with students during class and also make students learn at their pace (M 3.5, SD = .707). Again, most of the teachers strongly agreed with the flipped classroom making students go to class more prepared (M = 3.7, SD = .483). It was also realised from the questionnaire that most of the respondents indicated that they strongly agreed with the statement that preparing videos and other materials for learners in a flipped classroom

model helps teachers to learn more about the content (M = 3.80, SD = .422). The same result was produced for the statement that the flipped classroom makes learners interact with technological tools, thus, connecting them globally. A lot of the respondents also strongly agreed with the statement that the flipped classroom model motivates learners to learn (M = 3.7, SD = .483). Also, most of the respondents strongly agreed that the flipped classroom enables positive student-student and student-teacher relationships (M = 3.6, SD = .516).

The views of teachers were solicited to find out if the flipped classroom provides an opportunity for absent students to catch up with knowledge lost during their absence and Table 4 shows that the majority of the teachers agreed to the statement, producing a mean of 3.4 and a standard deviation of 1.075. Again, the researcher solicited the teachers' views on the flipped classroom making the teacher cover a wide range of content areas and also promotes critical thinking in students and the results as reported in Table 4 shows that most of the teachers agreed with the statement (M = 3.4, SD = .699).

One of the challenges that teachers face in using the flipped classroom to teach is the time that teachers need to prepare their materials for the learners. The researcher, therefore, wanted to know the views of teachers in that regard. Results from Table 4 shows that a lot of the respondents agreed that preparing videos or materials for learners in a flipped class is time-consuming (M = 3.4, SD = .699). In terms of adding extra burden to the teacher, it was also revealed by Table 133 that a lot of the teachers agreed that the flipped classroom adds an extra burden to the teacher (M = 2.8, SD = .789). Most teachers also agreed that the flipped classroom is good for teaching students in the cities (M = 2.6, SD = .966). On the issue of no guarantee that learners will watch or read materials assigned to them, a mean of 2.4 and a standard deviation of 0.699 is an indication that most of the teachers disagreed with the statement.

4. Discussion

4.1. Flipped Classroom Influence on Learners' Academic Achievement

This research question wanted to find out if the flipped classroom model has any significant influence on the academic achievement of JHS students in the JHS in the Aowin Municipality. To obtain answers to this research question, pretest and posttests were conducted to determine the performance of learners before and after the treatment. To further find out if the results produced from the test emerged from the treatment given, two hypotheses were formulated and tested. The t-test tool in SPSS version 26 helped the researcher to obtain the differences in the performance of learners. The independent sample t-test result obtained from testing Hypothesis 1 [t(98) = 0.537, p >.05] showed that there was no statistically significant difference in the academic achievement of students in the experimental group and control group in terms of the pretest. This indicates that the learners were at the same level even though the means of the two groups varied (m = 6.78, SD = 2.743 for experimental, m = 6.50, SD = 2.305 for the control group). Thus, the difference in performance can therefore be attributed to sampling errors. This suggests that any statistical difference noticed after the treatment can be attributed to the different conditions given to the two groups.

The paired sample t-test was used to compare the pre-test scores and post-test scores of the students for both groups. Beginning with the experimental group, the paired sample t-test produced a significant difference in the academic achievements between the pretest and posttest scores t(49) = 23.546, $p < 0.001$. This presupposes that the use of the flipped classroom is an effective pedagogical tool that can improve the performance of the students. This finding is in concordance with the previous findings that the flipped classroom significantly improves the academic achievements of learners [12]. Another findings commensurate with an earlier study that the flipped classroom significantly improved the performance of students in Social Work [29]. The findings, however,

contradict the findings of Saunders who examined the effect of the flipped classroom on the academic achievements of students in a high school Mathematics and concluded that the use of the flipped classroom did not significantly improve the performance of the students [20]. This suggests that though the flipped classroom has led to an improvement in the academic achievements of JHS RME students in the Aowin Municipality, it might not be effective for all disciplines in the school curriculum.

The paired sample t-test results for the control group also showed a significant difference in the academic achievements of learners in the control group during the pretest-posttest comparison, t(49) = 18.887, $p < 0.001$. This means that the use of the traditional approach in teaching Social Studies also increases the academic achievements of learners. Sequel to these findings, it can be concluded that the flipped and traditional methods of teaching Social Studies are effective. This suggests that, amid a pandemic such as Covid-19 and the advancement of technology, the flipped classroom is a good alternative for teachers to teach RME.

The study went further to explore the differences in effectiveness between the two conditions. Thus, the independent sample t-test was used to compare the performances of the students in both groups during the posttest. The results revealed that there was a statistically significant difference in the performances of students between the control group and the experimental group. This means that the use of the flipped classroom model is more effective in improving the academic achievement of students than the traditional method of teaching Religious and Moral Education. This contradicts previous findings that there was no statistically significant difference between the academic performance of students taught using flipped classroom models and the academic performance of students taught using active learning strategies in the traditional methods of teaching with the statistics for two different year groups reported as M = 58.52, SD = 19.96; M = 58.25, SD = 21.45; p = .864; t(46) =.172; d = .013 [48]. The study, however, agrees with a findings that there was a massive improvement in the academic achievement of students who were taught using the flipped classroom model than those taught using the traditional approach [25]. It again confirms the assertion on action research reported on the positive influences of the flipped classroom in teaching density in Integrated Science to JHS 1 students. In effect, the use of the flipped classroom aside from bridging the gap between the low achievers and high achievers in the classroom significantly improves the achievement level of students [28]. Similar findings were also reported in the work of an a researchers whose study investigated the effectiveness of the flipped classroom in teaching Math2 courses to preparatory year students of the University of Tabuk and found out a significant increase in the academic performance of the students [24].

4.2. Teachers Employing Flipped Classroom Model to Teach RME

The study also sought to find out if RME teachers had positive or negative views on the use of the flipped classrooms in teaching Religious and Moral Education. The questionnaire administered to teachers revealed that teachers have positive views on the use of the flipped classroom in teaching RME in the Nzema East Municipality. The mean of means of 3.33 indicates that the majority of the teachers agreed to the items that were presented by the questionnaire. This is by no surprise as research findings on the views of teachers on the use of the flipped classroom in teaching has produced similar results [39, 41}. That notwithstanding, other researchers also reported that teachers do not see the flipped classroom as improving students academic achievement of the traditional method [49]. This indicates that not all teachers fully embrace the concept of the flipped classroom. In conclusion, the positive view that teachers have about the flipped classroom presupposes that they will willingly use the flipped classroom if the challenges associated with its use are overcome.

5. Conclusions and Recommendations

The study indicated that, the flipped classroom is a very potent method of teaching RME. This is so because the study provides enough evidence that the flipped classroom significantly improves the performance of learners more than the traditional approaches to teaching. This is even more appropriate in a technological era such as ours. The study also revealed that, teachers have a positive view of the use of the flipped classroom in teaching RME. Junior High School RME teachers are ready to adopt the flipped classroom model in their teaching provided challenges students face are eliminated. It is recommended that, School Improvement Support Officers and Headteachers should ensure that teachers use the flipped classroom to bring variations in lesson delivery so as to improve the academic achievements of learners. This calls for the Ghana Education Service to organise in-service training for RME teachers on the use of the flipped classroom model in teaching RME. Given that teachers have a positive view about using flipped classroom in teaching but lack devices needed to carry out the approach, it is also recommended that government should provide technological devices to schools and teachers and ensure that teachers employ the various technological devices at their disposal to the benefit of their students.

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