EFFECT OF 3-TEAM TEACHING MODELS ON THE ACADEMIC ACHIEVEMENT OF PHYSICS STUDENTS IN COLLEGES OF EDUCATION IN NORTH EAST, NIGERIA

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Abstract

This study investigated the effect of 3-team teaching models on the academic achievement of physics students in Colleges of Education in North East Nigeria. The study is a quasi – experimental pretest – posttest control group design. The population of the study comprised of 411 NCE II physics students in all the 11 States and Federal Colleges of Education in the zone. The study employed a two-staged sampling approach. The first stage involved the Colleges that have lecturers I and above who served as research assistants and also taught as a team in teaching PHY 223. Eight out of the eleven Colleges satisfied the first staged sampling technique. The second stage was simple random sampling technique using pick from a hat method in which four Colleges were randomly selected and assigned the treatment groups E_1, E_2 and E_3 and the control group C respectively. Physics Achievement Test was the instrument used for the collection of data with a reliability coefficient of 0.82. Pretest and posttest were administered to the experimental and control groups before and after treatment. One research question was asked and a corresponding hypothesis was raised and tested at 0.05 level of significance using analysis of co-variance. The hypothesis was rejected at p – value (0.014).Due to this significant difference in the academic performance of students; a post hoc analysis was conducted using the Bonferroni Multiple Comparison Analysis. Teachers should pay attention to the training of their colleagues in the development of team models in the classrooms as an instructional strategy is one of the recommendations made in the study.

Key words: Academic achievement, Single teacher teaching model, Alternative team teaching model, blended team-teaching model True team-teaching model

Introduction

Team teaching plays a crucial role in both initial and ongoing teacher education, emphasizing the competence of teachers to guide all students in learning, particularly in essential skills like literacy and numeracy. Through team teaching, professional development takes place in real classrooms, in real time, through daily interactions between teachers and students. It also has the potential to enhance students' social and collaborative skills, as well as key 21st-century competencies such as teamwork, critical thinking, and creativity. In describing team teaching, Muza (2021) asserted that a team-teaching system involves two or more teachers collaboratively delivering meaningful instruction to a diverse group of students in a single classroom. In other words, team teaching is built on well-defined approaches and characteristics that set it apart from traditional teaching methods. Muza (2021) also outlined the distinct features of this model to

include: the involvement of two or more educators or certified staff, sharing commitment to instructional responsibility to a single group of students, primary classroom or workspace, clearly defined learning objectives, mutual ownership, shared resources, joint accountability, and varying levels of participation by each educator. Hayward (2018) defined team teaching as an educational approach where general and special educators collaboratively and systematically instruct diverse groups of students in inclusive learning environments, the roles of individual member in the team are determined based on performance and teaching skills in their areas of expertise.

Various scholars have identified different models of team teaching. Wang (2010) outlined six models: traditional team teaching, collaborative teaching, complementary/supportive team teaching, parallel instruction, differentiated split class, and monitoring teacher. Friend and Cook (2016) categorized team teaching into approaches such as one teach-one observes, parallel teaching, one teach-one assist, station teaching, alternative teaching, and tag-team teaching. Similarly, Cruz and Geist (2019) classified team teaching into four models: the co-teaching model, the alternative teaching model, the blended teaching model, and the true team-teaching model. According to Cruz and Geist (2019), the alternative teaching model involves multiple instructors teaching specific aspects of a course based on their areas of expertise, with each attending classes only when it is their turn. The blended teaching model requires all team members to attend each class session, collectively considering course content and logistics while making identifiable contributions. In contrast, the true team-teaching model integrates all team members into every class session, ensuring they actively contribute to discussions and merge their expertise into a fully unified learning experience.

Ahlefelfdt (2017) revealed that team teaching approaches have been recognized for enhancing student performance by incorporating diverse instructional experiences from a team of educators. The same author also highlighted that global collaboration in physics education can involve partnerships with scientists through email, e-group discussions, joint laboratory experiments, video conferences with international classes, and participation in global competitions such as the International Physics Olympiad. Jepketer, Kombo and Kyalo (2015), noted that worldwide countries have been striving to improve student performance and bridge achievement gaps by developing teaching standards and strategies, fostering teacher collaboration through learning teams, encouraging professional development, providing essential teaching resources, and investing in capacity building for educators.

Colleges of Education are teacher training tertiary institutions in Nigeria established to train teachers for primary and junior secondary schools. The academic programmes of these institutions include physics education for training prospective physics teachers. The role of the teacher is key teaching and learning. The teacher's participation ranges from complete control over what is learned and intermittently intervene in most aspect of the lesson. The teacher is the source of most of the knowledge and information that children acquire in class. Teachers can impact students learning in different ways; especially through the method used in delivering the subject matter. Therefore, the Cruz and Geist team teaching models i.e the alternative, blended,

and true team-teaching models were used in this study and find out their effects the academic performance of physics students in Colleges of Education in North East Nigeria.

Theoretical Framework

The theoretical basis for this research work is the social constructivist theory proposed by Vygotsky (1978), which asserted that the construction of knowledge is embedded in a social experience within a team environment and every effective teamwork can affect the successful delivery and implementation of many learning designs. Vygotskyian theory (2007) revealed that teaching in team can be grouped into two main groups, namely; socio-behavioral perspective and socio-cognitive perspective. In socio-behavioral perspective, the experience of being in a team drives the individual towards greater performance than would occur if the individual were teaching alone while scholars of socio-cognitive perspective argue that working in teams express team members to different ways of thinking about subject matter which, in turn, improves teaching and learning. The same theory also assert that teachers come to identify with teams in which they are members and this leads to the formation of social bonds with other members of their team. Therefore, the cohesion built around the team identity leads team teachers to combine their knowledge and skills for the team's benefit and greater achievement results from team identity and pooled effort.

Review of previous studies

For a long time now, teaching and learning has been dominated by emphasis on factual knowledge despite the effort by researchers to suggest better method of teaching. Therefore, empirical reviews were made with regards to team teaching models. Esomonu, Akudolu, and Ezenwosu (2015) examined the effects of team-teaching approach (TTA) on the achievement of students in English language comprehension and how the effects vary across gender. The study employed non randomized pretest-posttest, control group quasi experimental design. The population used consisted of 5,171 senior secondary two students made up of 2,407 males and 2,764 females in Onitsha education zone of Anambra State. A total of 189 students (97 males and 92 females) were randomly selected from four public secondary schools and constituted the sample. The findings showed students taught English language comprehension with team teaching approach achieved significantly higher than those of the control group who were taught with single teacher teaching approach. Muza (2021) examined the effects of team-teaching approach on academic performance of students in Faculty of Education in Kebbi State University of Science and Technology, Aliero, Nigeria.

The study used quasi-experimental research design and 162 undergraduate 200L students from Faculty of Education. The study used self-constructed open and closed ended questionnaires as data collection instrument. Two null hypotheses were raised and tested in the study, while the tools used for the analysis of data were independent sample t-test which is used in testing the two null hypotheses postulated in the study. The study revealed that students who were exposed to the use of team-teaching approach (experimental group) performed better than those who were taught with the single teacher approach (control group). Hooda and Sharma (2018) conducted a research on the effectiveness of team-teaching on academic achievement of

9th graders in Science. The data were collected from students of class IX in Rewari District of Haryana, India. Out of 50 students, 12 were selected in purposive manner in the experimental group and 12 were in the control group. Team teaching model was the experimental group, while the single teacher teaching model was designated as the control group. The study revealed that there was a significant difference between the two groups after treatment in favour of the experimental group considering academic performance. Ada (2016) in a study examined a comparative analysis of the effects of conventional and team-teaching strategy in secondary schools in Imo State Nigeria. Two research questions were posed to guide the study, with a mean value of 2.50 as cut off point for the pooled mean to be accepted if above it and not accepted if below. One null hypothesis was formulated and tested at 0.05 confidence level. The population for the study was 55,642 secondary school teachers out of which 240 were sampled for the study through a purposive sampling technique.

The data used was 18-item questionnaire developed by the researcher, and validated by her colleagues in the department while a reliability of 0.83 was determined using Cronbach alpha statistic. t-test was used for analyzing the scores. In the researcher's findings, students taught with conventional teaching strategy did not perform as well like students taught with team teaching strategy. Annele, Lawal, Asuke, Dambo and Yashim (2018) carried out a study on the effect of team teaching on performance of biology among SS II students of Giwa Education Zone of Zaria, Kaduna State Nigeria, a total of 120 students consisting of 60 females and 60 females formed the sample of the study. Purposive sampling technique was used for the study. The subjects were divided into two groups, the experimental group n = 60 and the control group, n = 60. The study adopted the pretest-posttest experimental and control group design. A pretest was administered before the treatment with a view to establishing the group equivalent. The team teaching strategy was used to teach the experimental group while lecture method was used to teach the control group the topic genetics, variation and evolution. The study showed significant difference in the mean academic performance in favour of the experimental group and concluded that SS II biology students learn biology concepts better when taught using team teaching strategy. Chukwuemeka, Oguoma, and Nsigbe (2022) investigated the effects of team teaching approach on pupils' achievement and attitude in mathematics. This study was carried out in Demonstration Primary School of Alvan Ikoku Federal college of Education in Owerri Municipal Council Area of Imo State. Based on the objectives of the study, three research questions and two hypotheses were posed for the study. It was a Quasi –experimental study adopting pretest-post-test, non –equivalent control group design. The population of study comprised of 1,247 primary six (6) pupils. A sample size of 253 students involving 123 males and 130 females was used for the study. The experimental group had 123 students while the control group had 130 students.

The instruments for data collection were menstruation achievement test and Mathematics attitude inventory questionnaire developed by the researchers. However, Yaga (2014) investigated the impact of team-teaching strategy on academic achievement and interest in basic science concepts among Junior Secondary School students in Potiskum, Yobe State, Nigeria.

Quasi experimental, control group design, involving pretest and posttest was used for the study. The subjects used in the pilot study comprised a total of 33 students in JSS 2. The population of the study was all government junior secondary two [JSS 2] students in Potiskum educational zone, involving 16 junior secondary schools running Basic Science Programme with the population of 3,597 boys, 2,330 girls, giving a total of 5,927 students in the study area. Two groups of the subjects were randomly assigned as sample for experimental and control groups by using simple random sampling technique with the total of 154. The result indicated no significant difference between the mean achievement scores of students taught Basic science using team-teaching strategy and those taught with single-teacher teaching strategy. However, a significant difference between the mean achievement scores of male and female students taught Basic science using team-teaching strategy in favour of the male group was recorded.

Concept 3-Team Teaching Models

Cruz and Geist (2019) suggested a new framework for team-teaching in higher education, one that integrated an implicit hierarchy pointing towards what is known and now called "true" team-teaching, which suggested that each of the instructors in the team is equally invested in the design, implementation, and assessment of a given course and name them as: Alternative team teaching, blended team teaching and true team-teaching models.

In the alternative team-teaching model, multiple instructors teach about a particular aspect of a topic. There is an overarching theme for the course and instructors contribute content based on their subject expertise. The teachers attend class only when it is their turn to present. The instructors coordinate aspects of the course such as evaluation, tests and examinations. In the blended team-teaching model, instructors collaborate and make decisions together concerning course content and logistics. All team members attend every class session, but there are clearly identifiable aspects that delineate one team members contribution from the other. In the true team teaching, there is a true collaborative partnership among the team members involved in the course. Often, the team members design and launch the course together. They meet to discuss course content, delivery methods, and assessments. All the team members are present and provide meaningful contributions to every class session. The constituent parts of the instructions are fully merged into one in order to complete integrated experience. Therefore, the present study adopted the Cruz and Geist (2019) team teaching models and investigated its effects on the academic achievement of physics students in Colleges of Education in North East Nigeria.

Statement of the Problem

Teaching of physics as one of the science subjects in the Colleges of education in Nigeria faces many serious challenges that hinder effective learning and knowledge acquisition among students. Achufusi, Orafu and Aghado (2019) revealed that due to inadequate subject knowledge and pedagogical skills, many physics teachers in Colleges of Education lack the deep understanding of the subject matter and fail to effectively communicate complex concepts to their students. Hence, this lack of knowledge and pedagogical skills undermines the quality of physics education in these institutions. Another significant concern is the mass departure of teachers from Nigeria's North East zone due to ongoing security challenges. This situation

highlights the urgent need to optimize the use of the remaining teaching workforce by adopting team teaching models to address the use of Cruz ans Geist (2019) team teaching models and their effects on the academic achievement of physics students in Colleges of Education in North East Nigeria.

Purpose of the Study

The purpose of the study is to find out the effect of three team teaching models on the academic achievement of Physics students in Colleges of Education in North Eastern Nigeria. Based on the purpose, the specific objective targeted is:

To determine the effect of alternative, blended and true team-teaching models and single-teacher teaching model on the academic achievement of Physics students in Colleges of Education in North-Eastern Nigeria.

Research Question

The research question below was raised to guide the study:

What are the mean academic achievement scores of physics students taught using alternative, blended and true team-teaching models and those taught using single-teacher teaching model in Colleges of Education students in North-Eastern Nigeria?

Hypothesis

For the purpose of the study the null hypothesis below is stated and tested at 0.05 level of significance.

There is no significant difference in the academic achievement of physics students in Colleges of Education taught physics using alternative, blended, true team-teaching models and those taught using conventional single teacher teaching model.

Scope of the Study

This study covered all the Colleges of Education in the North East Zone of Nigeria. It is delimited to PHY 223 (Thermal Physics II) with the following content: kinetic theory, thermal conductivity, viscosity,diffusion and osmosis, specific heat capacity, Second law of thermodynamics, carnote cycle, molecular speed, (root mean square speed), ideal gas equation, adiabatic and isothermal changes as contained in the Nigeria Certificate in Education (NCE, 2020) minimum standard 12th Edition.

Research Design

This study adopted the quasi-experimental type of the pretest-posttest, control group design. Rogers and Révész, (2020) revealed that quasi-experimental methods are more often used when comparing groups that are not possible to randomize. The nature of this study does not allow for randomization of the participants because of their unique features such as school type and course of study; therefore, an intact class was choosen for the study. The choice of the design is due to the fact that there was a causal relationship between independent and dependent variables. The independent variable is the variable of influence and the dependent variable is the variable that is being influenced (Rogers & Révész, 2020). The independent variable was

manipulated at four levels, namely: alternative, blended and true team-teaching models and control while the dependent variable is the students' academic achievement.

Population, Sample size and Sampling Technique

The population is comprised of all physics students in NCE II from all the 11 Federal and States Colleges of Education in North Eastern Nigeria studying PHY 223 (Thermal Physics II). It is a second semester course offered by all NCE II physics student. There are 411 physics students in NCE II of Colleges of Education in the 2023/2024 academic session in the North East Zone.

The study employed a two-staged purposive sampling approach. The major strata of interest are physics students in NCE II from the Colleges. The first stage was a purposive sampling technique that single out the Colleges that have lecturers I and above and who also served as research assistants during the treatment. Eight out of the eleven Colleges satisfied the first staged sampling technique. The second stage sampling technique was a simple random sampling technique in which four Colleges were randomly selected using pick from a hat method and assigned the treatment groups E_1, E_2 and E_3 and the control group C. Intact classes of 125 physics students in NCE II offering PHY 223 (Thermal Physics II) from the four sampled Colleges of Education were therefore used during the treatment and hence were the samples used in the study. See Table 1 below

Table 1

showing Sample size for the Study

S/N	Name of school	Location	No. NCE I1 selected		Total
			Male	Female	
1	C.O.E Waka Biu	Biu, Borno State	18	12	30
2	F.C.E Yola	Yola, Adamawa State	16	08	24
3	A S C.O.E	Azare, Bauchi State	24	13	37
4.	F.C.E (T) Gombe	Gombe, Gombe State	23	11	34
	Total		81	44	125

Source: Admission Office of the Colleges (2023)

Instrument

The instrument used for the collection of data collection was Physics Achievement Test (PAT). It was adapted since the test items were drawn from chapters containing topics in thermal physics in Advance Level Physics textbook by Nelkon and Parker (2015) and fundamental of physics by Haliday, Resnick and Walker 6th edition. 2001. The topics for the study are the ones obtained in PHY 223 (Thermal physics II). The instrument was validated on whether it conforms

to the objectives of the content and specifications it is meant to test and whether the items are clear, precise and free from ambiguity. The reliability coefficient of 0.95 was obtained using Kuder-Richardson formula 21 (K_r-21).

Treatments

The conventional single teacher teaching model made of one lecturer taught the control group while the services of six research assistants, (physics teachers who are Lecturers I and above formed a pair in the three Colleges and serve as a team of two Lecturers were engaged in their respective institutions taught the experimental groups using different team teaching models, namely; alternative team teaching model, blended team teaching model and true team teaching model respectively for eight weeks. Before the teaching sessions in the various experimental groups, orientation and training of the research assistants was conducted on the team teaching models. This orientations and training were spearheaded by the researcher for two weeks.

Procedure for data collection

Before treatment, the samples were classified as control group C, experimental groups E_1, E_2, and E_3 respectively. A pretest was conducted on all the groups using PAT with a view to finding the groups equivalences before treatment. After the pretest, the groups were subjected to eight weeks lesson of 2 hours/week for the treatment and a posttest was administered.

Procedure for data analysis

The data collected were analyzed using mean and standard deviation statistic for answering the research question; while the hypothesis was tested using Analysis of Covariance (ANCOVA) at 0.05 level of significance.

Research question

What are the mean academic achievement scores of physics students in Colleges of Education taught using alternative, blended and true team-teaching models and those taught using single-teacher teaching model?

Table 2

Results showing mean and standard deviation of students

Groups	N	Pretest		Post test		Mean difference
		Mean	S.D	Mean	S.D	
Alternative team teaching	30	24.77	8.02	43.33	11.76	18.56
Blended team teaching	37	29.32	7.97	48.27	11.96	18.95
True team teaching	24	28.63	10.19	51.50	11.96	22.87
Single teacher teaching model	34	28.21	7.70	38.74	10.38	10.53

Table 2 presents the mean and standard deviation of pretest and post test scores as well as the mean difference between these scores. For the alternative team-teaching model group, the

pretest mean score was 24.77 with a standard deviation of 8.02. After the intervention, the posttest mean score increased to 43.33 with a standard deviation of 11.76. This resulted in a mean difference of 18.56, indicating a substantial improvement in academic achievement.

The blended team-teaching model group started had pretest mean score of 29.32 and a standard deviation of 7.97. Their posttest mean score rose to 48.27 with a standard deviation of 11.96, resulting in a mean difference of 18.95. This shows a notable increase in academic achievement following the blended teaching approach. Students taught using the true team-teaching model with a pretest mean score of 28.63 with a standard deviation of 10.19. Their posttest mean score increased to 51.50, and a standard deviation of 11.96, yielding a mean difference of 22.87. This group demonstrated the highest improvement among the different team-teaching models. Lastly, the single-teacher teaching model had a pretest mean score of 28.21 with a standard deviation of 7.70. Their posttest mean score is 38.74 with a standard deviation of 10.38, resulting in a mean difference of 10.53. Although there was an improvement in academic performance, it was less pronounced compared to the team-teaching models. This suggests that team-teaching models, particularly the true team-teaching approach, are more effective in enhancing the academic achievement of physics students in these colleges.

Hypothesis

There is no significant difference in the mean academic achievement score of physics students in Colleges of Education taught physics using alternative, blended, true team-teaching models and those taught using single teacher teaching model.

Table 3

Summary of ANCOVA of Difference in the Mean Academic Achievement Scores

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	4253.297[a]	12	354.441	2.724	.003	.226
Intercept	14915.161	1	14915.161	114.629	.000	.506
Pretest	6.851	1	6.851	.053	.819	.000
Teaching strategy	1449.468	3	483.156	3.713	.014	.090
Error	14573.135	112	130.117			
Total	273213.000	125				
Corrected Total	18826.432	124				

a. R Squared = .226 (Adjusted R Squared = .143)

Table 3 presents the results of an ANCOVA analysis examined the differences in mean academic achievement scores of physics students in Colleges of Education taught using alternative, blended, true team-teaching models, and the single-teacher teaching model. The results of the analysis showed there isa significant difference in the mean academic achievement scores of physics students in Colleges of Education taught physics using alternative, blended, true team-teaching models and those taught using single teacher teaching model, $F(3, 124) = 3.713$, $p<0.05$ with a very small effect size as indicated by partial Eta squared value of 0.090.

This means that the null hypothesis is rejected since the p value (0.014) is less than 0.05. Due to this significant difference in the academic achievement of the students; there is the need for a post hoc analysis to locate where the difference lies; hence the Bonferroni multiple comparison analysis was conducted as indicated in Table 4.

Table 4

Bonferroni Multiple Comparison Analysis

(I) Teaching models	(J) Teaching models	Mean Difference (I-J)	Std. Error	Sig.[b]
Alternative team teaching	Blended team teaching	-7.562	4.716	.670
	True team teaching	-3.771	5.219	1.000
	Single -teacher teaching model	7.446	5.749	1.000
Blended team teaching	Alternative team teaching	7.562	4.716	.670
	True team teaching	3.791	3.924	1.000
	Single -teacher teaching model	15.008*	4.651	.010
True team teaching	Alternative team teaching	3.771	5.219	1.000
	Blended team teaching	-3.791	3.924	1.000
	Single -teacher teaching model	11.217	5.120	.183
Single -teacher teaching model	Alternative team teaching	-7.446	5.749	1.000
	Blended team teaching	-15.008*	4.651	.010
	True team teaching	-11.217	5.120	.183

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

b. Adjustment for multiple comparisons: Bonferroni.

Table 3 presents the Bonferroni multiple comparison analysis of the mean differences in academic achievement scores between different teaching models. First, comparing the alternative team-teaching model with the blended team-teaching model reveals a mean difference of -7.562 with a standard error of 4.716 and a significance level of 0.670, indicating no significant difference. Similarly, the comparison between alternative team teaching model and true team-teaching model showed a mean difference of -3.771, with a standard error of 5.219 and a significance level of 1.000, also indicating no significant difference. Additionally, the mean difference between alternative team teaching model and single-teacher teaching model is 7.446, with a standard error of 5.749 and a significance level of 1.000, again showing no significant difference.

For the blended team-teaching model, the comparison with the alternative team-teaching model shows a mean difference of 7.562, with a standard error of 4.716 and a significance level of 0.670, indicating no significant difference. When comparing the blended team-teaching model

with the true team-teaching model, there is a mean difference of 3.791, with a standard error of 3.924 and a significance level of 1.000, also indicating no significant difference. However, the mean difference between blended team teaching model and single teacher teaching model is 15.008, with a standard error of 4.651 and a significance level of 0.010. This result is significant at the 0.05 level, indicating that students taught using the blended team-teaching model had significantly higher academic achievement scores compared to those taught using the single-teacher teaching model.

Regarding the true team-teaching model, the comparison with the alternative team-teaching model shows a mean difference of 3.771, with a standard error of 5.219 and a significance level of 1.000, indicating no significant difference. Similarly, comparing the true team-teaching model with the blended team-teaching model there is a mean difference of -3.791, with a standard error of 3.924 and a significance level of 1.000, also indicating no significant difference. The mean difference between true team teaching model and single teacher teaching model is 11.217, with a standard error of 5.120 and a significance level of 0.183, indicating no significant difference.

For the single-teacher teaching model, the comparison with the alternative team-teaching model showed a mean difference of -7.446, with a standard error of 5.749 and a significance level of 1.000, indicating no significant difference. When comparing the single-teacher teaching model with the blended team-teaching model, there is a mean difference of -15.008, with a standard error of 4.651 and a significance level of 0.010, which is significant. This indicates that the single-teacher teaching model results in significantly lower academic achievement scores compared to the blended team-teaching model. Additionally, the mean difference between the single teacher teaching model and the true team-teaching model is -11.217, with a standard error of 5.120 and a significance level of 0.183, indicating no significant difference.

In summary, while the ANCOVA results show significant difference in academic achievement scores among the different teaching models, the Bonferroni multiple comparison analysis indicates that the significant difference is primarily between blended team teaching model and single teacher teaching model, with the former being more effective.

Discussion

The findings from the study revealed that team teaching model has positive impact on students' academic achievement when compared to single teacher teaching model as revealed in Esomonu, Akudolu & Ezenwosu (2015); Ada (2016); Besharat & Mazdayansa (2017); Hooda & Sharma (2018); Annele, Lawal, Asuke, Dambo & Yashim (2018); Muza (2021). Howerver, Scahlaadt (1966) and Yaga (2014) did not find any significant difference between team teaching models and the single teacher teaching model, however, both studies reavealed singnificant difference in gender. Further analysis revealed that the significant difference is primarily between blended team teaching model and single teacher teaching model, with the former being more effective. This difference can be due to some other related factors such as teacher related factor, environmental factors and students' emotions during the lecture periods.

Conclusion

This study revealed different team-teaching models as teaching strategies aimed at improving students' academic achievement towards physics. The study also exposes different teacher experiences working together to teach the same students using their individual styles and expertise. The results of the study revealed that team teaching strategy is effective and viable in teaching and learning. Team teaching has potentials to better students' academic achievement and also exposes teachers the requirements to acquire the necessary skills to deliver instructions and also help to appreciate the expertise of colleagues who are equipped with different styles of planning and organizing instructional content.

Recommendations

In view of the findings from the study, the following recommendations are given,

(i) Experts in teaching pedagogy in collaboration with the Ministry of Education should organize training teachers in the use team teaching instructional models such as alternative, blended and true team-teaching models as instructional strategies.

(ii) Teachers should make efforts and sacrifices to train their colleagues in developing themselves, complimenting and appreciating one another in subject content deliver.

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