

PEER INTERACTIONS AND POSITIVE STUDENT-LECTURER RELATIONSHIP AS A TOOL FOR IMPROVING THE TEACHING AND LEARNING OF COLLEGE ALGEBRA. A CASE STUDY AT USIU

Mrs. Nadezhda Pavlovna Okello

Lecturer of Mathematics, United States International University-Africa (USIU)

Abstract

This paper sets out to interrogate the role played by peer interactions in the teaching and learning of College Algebra in a classroom setting. It also explores the impact of positive student-lecturer relationship on teaching and learning of College Algebra at the university level and the general improvement of student performance. The instrument of data collection herein comes from observations made from the classroom teaching, interviews with students and from questionnaires administered to students who willfully and voluntarily filled them in. The finding indicates that indeed students' classroom participation during College Algebra lessons is influenced by the kind of feedback they get from their colleagues. This peer interaction is very crucial in their learning as they are more active when they get positive feedback and are withdrawn when their colleagues' response is negative. It was also established that the lecturer-student relationship during College Algebra classroom lessons can create either a positive or negative impact on the students learning process and hence his/her overall performance in College Algebra examinations. Further research in this direction can play a major role in resolving some of the challenges facing the teaching and learning of mathematics in general and College Algebra in particular.

Keywords: Mathematics, College Algebra, Peer interaction, Lecturer-Student relationship, challenges, teaching, learning and performance.

Introduction

The importance of mathematics is recognized worldwide as an essential discipline that needs to be enhanced in education to equip students

with skills necessary for higher education, career aspiration and personal fulfillment [4.1]. There exists a link between mathematics and other sciences such as chemistry and **Salau (2000)** concludes that a student who performs well in mathematics is more likely to have high scores in other examinations [4.7]. Apart from understanding mathematics per se, mathematics is necessary in our daily life as it is a social skill. We apply it in our economy and medicine to mention but a few [4.3].

Since College Algebra is a branch of mathematics, it follows that it is important for students to understand it and pass it [4.1]. College Algebra is called the gatekeeper subject in 21st century. It is applied by professionals of all shades be they electricians, criminologists, architects, journalists, computer scientists, biologists or doctors to mention some of them once said **Robert Moses the founder of the Algebra Project** which advocates for mathematics literacy in US public schools. Anything involving computers and networking uses College Algebra. Poor background in Algebra leads to poor performance in College Algebra which ends up making a degree course to take longer and more costly as remedial classes must be undertaken. College Algebra is a prerequisite for all College-bound students and for most jobs. It has almost become a rite of passage. It is a tool of modern life. College Algebra makes students develop abstract reasoning skills necessary in life. It is more than a set of rules and procedures for solving mathematical problems. It is a way of thinking as it facilitates a deeper understanding of the world around us. It describes how virtually all everything in our environment works.

On passing the Placement Test a student joins **MTH1109** College Algebra class. Those who fail join **MTH 1105** Algebra in Practical Context class which is more of remedial class. In **USIU** College Algebra is part of general education that is studied by all students and is normally undertaken for one semester. Despite the importance of mathematics in our lives, many studies have established that students are faced with numerous challenges in learning it. These challenges may be grouped as follows: student-related, classroom-related and school- related [4.2].

Objectives and importance of the research

The purpose of this study is to explore the impact of positive student-lecturer relationship on the teaching and learning of College Algebra at the university level and to interrogate the role played by peer interactions in the teaching and learning of College Algebra in a classroom setting. The intent of the study was to ascertain if the best teacher characteristics fostered good classroom positive peer interactions and favourable student-lecturer relationships.

This research is significant as it provides useful information for mathematics teachers on how to promote conducive classroom learning environment that fosters positive teacher-student relationship and facilitates peer interactions that improve students' performance in mathematics.

As stated earlier in the **Introduction Part**, College Algebra is an essential tool in many fields including natural science, engineering, medicine and social sciences. College Algebra as any other branch of mathematics plays a major role in the socio-economic as well as scientific development at both personal and societal levels. It is the only subject that is applied in every sphere of our lives. **Peter Braunfeld of the University of Illinois** often tells his students, "Our civilization would collapse without mathematics", and he is right.

Studies on the performance of students in mathematics have continuously shown that mathematics is problematic at both the learning and teaching stages. In **Mrinal, Majidul [4.4; 2013]** study the following scenarios were established:

Table1: Responses to Mathematics as difficult subject

How do students find Mathematics	Response in percentage
Difficult to learn	52%
Average to learn	27%
Not difficult to learn	21%

Table2: Table of student's abilities in Mathematics

Ability	Percentage of Students
Poor	50%
Average	30%
Brilliant	20%

Okello [4.5; 2010] in her paper about the challenges in the learning and teaching of College Algebra at USIU assessed the students' performance and found the following:

Table3: Students' performance in College Algebra at USIU

No of Students	Percentage of Students who passed at Fall 2007	Percentage of Students on borderline to failure at Fall 2007	Percentage of Students who failed at Fall 2007
56	23%	66%	11%

From the above findings in **Tables No.1 to No. 3** it is evident that there are fundamental challenges in the learning and teaching of College algebra and in broad sense mathematics at university level. Studies have identified the following amongst others to be the main challenges:

- Poor mathematical foundation of students [**Okello 4.5; 2010**]
- Wrong attitude towards mathematics by students [**Okello 4.5; 2010; Mrinal, Majidul 4.4; 2013 and Victoria 4.8; 2010**]. There is a sense of fear and failure regarding mathematics amongst most students.
- Lack of appropriate technological tools in the learning and teaching of mathematics. Traditional methods are no longer adequate and relevant in the modern environment [**Okello 4.5;2010, Mrinal and Majidul ,4.4 ; 2013**]
- Lack of Teaching Preparation and Support to students and lack of adequate student practices in learning mathematics.[**Mrinal , Majidul 4.4; 2013 and Lazarus , Role ,Jackson , Paul 4.3; 2012 and Okello 4.5 ;2010**]
- Poor student-teacher relationships. [**Julia E.B. 4.2; 2013 and Wilkins J. 4.9;2006**]. Positive student-teacher relations make learning mathematics easier.
- Lack of peer interactions in classroom lessons[**Olive 4.6; 2004 and Ampadu 4.1;2011**].
Human interactions are key factors in facilitating the learning process in general and mathematics in particular.

A more detailed discussion on these challenges can be found under **Part IV** of this paper.

Literature review

4.1 Ampadu, E (2011); “Does Peer Influence Affect Students’ Participation in Mathematics?” In this study, Ampadu confirmed that students are generally enthusiastic and willing to participate in the teaching-learning of mathematics and that improves their performance.

4.2 Julia, E.B (April 12, 2013); “Teacher-student relationships and student achievements in grade six and seven mathematics”: A dissertation presented in partial fulfillment of the requirements for the degree of Doctor of Education-Liberty University April 12, 2013. Her research found out that positive student-teacher relationship enhanced the classroom environment and made learning of mathematics easier.

4.3 Lazarus N.M; Role E, Jackson K.T, Paul K. (2012 March); “Evaluation of teacher factors associated with mathematics performance in primary schools in Kenya”: Published in International Journal of Scientific Research in Education (IJSRE) March 2012, Vol(1), 47-62, ISSN 117-3259. In this study, the authors conclude that the effectiveness of mathematics teachers should be enhanced in the area relating to teaching strategies, such as creation of an effective climate of learning and inclusion of inquiry

learning style. Explicit understanding of mathematics is necessary for teaching it.

4.4 Mrinal S., Majidul A; “A study on the difficulty of teaching and learning mathematics in undergraduate level with special reference to Guwahati City.”

This paper is a research study on the difficult areas that are encountered during the learning and the teaching of mathematics. The broad objective of the study is to investigate the problems of teaching and learning mathematics at the under-graduate level in colleges of Guwahati, Assam.

4.5 Okello N.P (2010); “Learning and teaching College Algebra: Challenges and opportunities-A case study at USIU”: The Journal of Language, Technology and Entrepreneurship in Africa, Vol.2.No.1.2010, ISSN 1998-1279.

Her study yielded various factors that affect the performance of students in College Algebra and highlighted that the pedagogy of teaching College Algebra was one of these factors.

4.6 Olive, C (2004); “Facilitating Peer interactions in learning mathematics: Teachers’ practical knowledge”. University of Calgary. Proceedings of the 28th conference of the International Group for the psychology of mathematics education, 2004 Vol.2 pp. 191-198.

Olive promotes the position that learning takes place in a social setting and emphasizes human interactions as a key factor to facilitate learning.

4.7 Salau, M (2000, September); “Options in sustaining mathematics as the language of science and technology in the 21st century.” Paper presented at the annual conference of Mathematics Association of Nigeria (MAN).

Salau points out that there exists a link between mathematics and other science subjects. This implies that a student who performs well in mathematics is most likely to perform well in overall subjects.

4.8 Victoria, N (2010 January 18th); “The challenges of learning and teaching mathematics. The guardian.com, Monday 18 January 2010 18.18 GMT.

Victoria states that students’ lack of confidence in mathematics is one of their undoing which can only be sorted out by a confident mathematics teacher who has been adequately trained and empowered. The study adds on that understanding mathematics builds confidence and confidence builds understanding.

4.9 Wilkins, J (2006, August 21);An examination of student teacher behaviours that contribute to good student-teacher relationships in large US urban high schools.

“Good student-teacher relationships”. Buffalo, New York: New York State University.

Wilkins asserts that teachers’ helpful behaviour is supportive in that the teacher interacts positively with the student.

5.0 Despite the importance of mathematics in our lives, many studies have established that students are faced with numerous challenges in learning mathematics. These challenges may be grouped as follows:

Student-related, classroom-related and school-related’ [4.2]

5.1 Student-related challenges include:-

- Student’s ability
- Motivation
- Effort
- Attitude

Self-confidence-students who lack confidence in mathematics perform poorly in examination as confidence builds understanding [4.8].

5.2 Classroom-related challenges include:-

- Instructional practices
- Assessment procedures
- Teachers’ actions and interactions [4.5].

5.3 School-related challenges include:-

- Teaching and learning materials
- Staff
- Other resources necessary for effective teaching and learning mathematics [4.8].

In this paper, we shall dwell more on both the student-teacher and peer interactions factors which when applied reduce the challenges students encounter when learning mathematics.

To understand the student-teacher factor, it is important to appreciate the existence of the following characteristics: the helpful teacher, the understanding teacher, the admonishing teacher, the dissatisfied teacher and finally the freedom teacher [4.2].

The characteristics of those various kinds of teachers as expounded by Julia 2013 [4.2] are as follows:

5.4 Helpful teacher characteristics

- Assists
- Shows interest
- Joins students
- Behaves friendly or in a considerate manner
- Inspires confidence and trust in students

5.5 Leadership teacher characteristics

The teacher who:-

- Notices what is happening
- Leads
- Organizes
- Gives orders
- Sets tasks
- Determines procedures
- Structures classroom situation
- Explains and hold intention

5.6 Uncertain teacher characteristics

- Keeps low profile
- Apologizes often
- Waits to see how things go
- Admits one is in the wrong
- Sets tasks

5.7 Understanding teacher characteristics

- Listens with interest
- Emphasizes
- Shows confidence and understanding
- Accepts apologies
- Looks for ways to settle differences
- Is patient
- Is open to students

5.8 Admonishing teacher characteristics

- Gets angry
- Takes students to tasks
- Expresses irritation
- Forbids students to act
- Corrects students
- Punishes students

5.9 Dissatisfied teacher characteristics

- Waits for silence
- Considers pros and cons
- Keeps quiet
- Shows dissatisfaction
- Looks gloomy
- Questions
- Criticizes

5.10 Freedom teacher characteristics

- Gives opportunity to independence of working
- Waits for class to blow off steam
- Gives freedom to students
- Gives responsibility to students

6.0 Studies undertaken in several large urban schools in USA and other studies established that there are specific teacher behaviours that contribute to good student-teacher relationships [4.2; 4.5; 4.9]. These behaviours are as outlined below:-

6.1 Demonstrating care and concern: Examples of such behaviours are such as making an effort to know the students, talking to students out of classroom, being available to listen to students' problems.

6.2 Offering help: Examples of this behaviour are such as offering extra help in class, being available before and after class, helping students with problems.

6.3 Providing academic help: This involves providing academic support by explaining concepts not understood by students, helping students study for examinations, giving students positive feedback on their tests and exercises.

6.4 Being Supportive: Such behaviour includes the teacher interacting in a positive manner with students, exhibiting patience with students, listening to them, being humorous, being friendly, and supporting students with their problems.

6.5 Being respectful and fair: This behaviour is demonstrated by a teacher allowing students to make classroom decisions, respecting students' opinions, eliciting students' opinions, speaking respectfully to students.

6.6 Demonstrating a positive interaction: This shows that the teacher has a positive relationship with the students. The student feels that the relationship with the teacher is beneficial. Teachers should be able to include some of their personal experiences into the lessons.

6.7 Considering students' feelings: It makes students respond positively to the teacher and this makes learning conducive. The teacher should value the differences of the students.

As discussed earlier, these teacher behaviours are addressed by certain teachers who display some specific characteristics. This implies that teachers must strive to have these required characteristics. If they lack them then they need training.

Now that we have exposed what is required of the teacher, we need to discuss the role that is displayed by the students' peer interactions in learning mathematics. This paper focuses on understanding both the peer interactions in learning College Algebra and the role played by positive teacher-student relations in minimizing the challenges encountered by the student during this

learning process [4.4; 4.5; 4.6 4.9]. Peer interactions are considered to be classroom based during which students talk to each other to learn mathematics. The mathematics teacher should adapt to such learning environment and strive to consistently provide opportunities for students to engage in these interactions.

Four themes characterize the teacher's role in providing such opportunities:-

- **Conditions to support the social perspective of mathematics education:**

The teacher has to appreciate that learning comes through talk and discussion. Mathematics learning occurs when the students (learners) understand and explain the concept which has been presented in their own words and they can teach it to someone else.

- **Students' behaviours from peer interactions**

The teacher is supposed to understand that through peer interactions, students acquire from each other the following behaviours:

- Compare experiences thus getting information from each other.
- Share ideas which allow them to collaborate and expand their thinking through sharing each other's view point to refine their own.
- Articulate mathematics through mathematics language.
- Pose questions to each other which generate debates that are healthy to clear understanding of mathematical concepts.
- Get motivated and build confidence as they lend support to each other.
- Gain autonomy which makes them less dependent on the teacher.
- Test their own understanding as they test each other's thoughts, ideas thus helping them formulate their own mathematical perceptions.

- **Learning activities that support peer interactions**

Through the following activities/experiences the teacher can accord students with opportunities to engage in peer interactions:

Inquiry of the problem solving- process which is achieved by teacher allowing students to work in groups when solving a given problem.

Inquiry of a new concept during which the students are allowed to explore a situation in small groups before the teacher provides any explanation.

Whole class presentation in which the teacher allows students to interact during their presentations.

- **Teacher's behaviours that support peer interaction**

Listens and observes: Search a behavior provides the teacher with a feedback from students. He/She can know how and when to intervene in the students' learning process.

Questions and answers: The teacher uses questions to assess the students' understanding of new concepts. When students are unable to proceed, the teacher gives answers.

Supporting students' thinking: The teacher gives the students the freedom to think and reason out answers with his/her help.

Promoting good peer interactions: The teacher facilitates a cooperative learning process by encouraging students to form groups according to their choice and to solve mathematical problems in groups with each member of the group allowed to participate. Weak students get assistance from the mathematically stronger students in any given group. When all students are stuck with any given problem, the teacher assists them.

Methodology and instrumentation

A non-experimental questionnaire **QT1** was designed to carry out a survey amongst unsampled and unbiased one hundred and thirty College Algebra students at USIU to seek their responses to the following key areas of this study:

- Students' mathematical background and their attitude towards mathematics
- Teacher – student interaction during College Algebra classroom lessons.

Under **Part VII** there are sample questions in the questionnaire QT1 that indicate the following:

1. The College Algebra students' opinions about their lecturer to establish in which category he/she falls amongst the following characteristics: helpful, leadership, uncertain, understanding, admonishing, dissatisfied and freedom [**Question 2**]

Hypothesis: Positive answers to this question shall indicate that the lecturer predominantly displays the following characteristics: helpful, leadership, understanding and freedom which are normally preferred by students.

2. Lecturer – Student relationship paradigm [**question 9**].

Hypothesis: positive answer to this question shall indicate good interpersonal relationship between the lecturer and the student.

3. Students attitude towards mathematics in general [**Questions 1, 6, 14**].

Hypothesis: Negative answers to these questions shall confirm the common student related challenges in the learning of mathematics namely: students' ability and attitude among others.

4. Peer interaction [**Questions 9,11,15**]

Hypothesis: Positive answers to these questions shall show that the lecturer facilitates peer interaction [Question 9] and that students gain from these interactions [**Questions 11, 15**].

5. Students' mathematical background [**Question 3**]

Hypothesis: Students with a good mathematical background finds it easier to learn mathematics at university level and tend to perform better in their mathematics examinations.

Participants

The questionnaire **QT1** was administered to one hundred and thirty **(130)** College Algebra two classes **MTH1109** College Algebra and **MTH 1105** Algebra in Practical Context the latter being treated like remedial class for students who did not pass Placement Test in Mathematics normally taken by all students irrespective of their specialties before they join **USIU**. In **USIU** College Algebra is part of general education that is studied by all students and is normally undertaken for one semester. These students are of varied mathematical backgrounds, races and are international in their mix as they come from all over the world.

The questionnaire contained pre-designed questions formulated by the College Algebra Lecturer undertaking this study to seek findings on the following key issues of concern: **the role played by peer interactions and the impact of positive lecturer-student relationship on the teaching of College Algebra at the university level.**

Questionnaire (Qt1)

Usiu

Questionnaires (Qt1) - March 2014

Do not write your name for the responses are confidential and anonymous. This is NOT a test.

Your Lecturer shall not use your answer to affect your grade.

Your answers to the questionnaire are to assist the lecturer improve his/her teaching methodology.

Choose either A or B or C

1. Do you like mathematics?
A Yes
B No
C Not Sure
2. Do you like your mathematics Lecturer?
A Yes
B No
C Not Sure

- 3 Did you pass your school level mathematics?
A Yes
B No
C Cannot Remember
4. Did you like your mathematics teacher at school?
A Yes
B No
C Not Sure
5. How did you perform in your Mathematics Placement Examination?
A. Excellent
B Good
C Average
6. How did you perform in your Mathematics Placement Examination?
A. Excellent
B Good
C Average
7. Do you always do your mathematics homework?
A Yes
B No
C Sometimes
- 8 Do you find Mathematics to be hard?
A Yes
B No
C Not Sure
- 9 Do you find Mathematics to be hard?
A Yes
B No
C Not Sure
- 10 When you registered for mathematics class, how did you decide on which lecturer to choose?
A. To pass and to learn
B. To pass but not necessarily to learn
C. By convenience of the lesson time
- 11 Do you think peer (or group) learning is helpful?
A Yes
B No
C Not Sure
12. Should all students do the same mathematics whether they are in 1105 or 1109 classes?
A Yes
B No
C Undecided

- 13 Do you like learning at USIU?
 A Yes
 B No
 C Not Sure
- 14 Is it necessary to learn mathematics?
 A Yes
 B No
 C Sometimes
- 15 Does peer teaching help you to understand mathematics?
 A Yes
 B No
 C Not Sure

Data analysis table

The data collected through answers to the questions contained in the Questionnaire (QT1) administered to **130** students of College Algebra at USIU has been analyzed as below:

Table no. 4: data analysis table with questions from QT1

Questions	Yes responses (Excellent)	No Responses (Good)	Not sure responses (Average)	Yes responses as percentage of the Total	No responses as percentage to the Total	Not sure responses as percentage to the Total
Question 1 Do you like Mathematics ?	76	38	16	58.5%	29.2%	12.3%
Question 2 Do you like your Mathematics Lecturer?	96	14	20	73.8%	10.8%	15.4%
Question 3 Did you pass your school level Mathematics	88	35	7	67.7%	26.9%	5.4%
Question 4 Did you like your Mathematics Teacher at School?	88	31	11	67.7%	23.8%	8.5%
Question 5	12	29	89	9.2%	22.3%	68.5%

How did you perform in your Mathematics placement Exams?						
Question 6 Do you believe Mathematics is hard?	39	72	19	30%	55.4%	14.6%
Question 7 Do you usually do your Mathematics Homework?	62	17	51	47.7%	13.1%	39.2%
Question 8 Do you find Mathematics to be hard?	67	46	17	51.5%	35.4%	13.1%
Question 9 Do you ask questions during Mathematics lesson whenever you do not understand what is being taught?	43	25	62	33.1%	19.2%	47.7%
Question 10 When you registered for Mathematics class, how did you decide on which lecturer to choose	71	10	49	54.6%	7.7%	37.7%
Question 11 Do you think peer (group) learning is helpful?	106	13	11	81.5%	10	8.5%

Question 12 Should all students do the same Mathematics whether they are in MTH 1105 or MTH 1109?	38	69	23	29.2%	53.1%	17.7%
Question 13 Do you like learning at USIU?	115	3	12	88.5%	2.3%	9.2%
Question 14 Is it necessary to learn Mathematics?	89	20	21	Appr.68.5%	15.4%	Appr.16.2%
Question 15 Does peer teaching help you to understand Mathematics?	96	14	20	73.8%	11%	15.4%

Analysis of the findings of questionnaire (qt1)

1. Questions **No 1,6,14** were aimed at establishing the students' attitude towards mathematics in general. **Question no 1** was more specific as it sort to know whether the students like mathematics. **58.5%** of the students gave an affirmative answer to this question implying that they liked mathematics. But when asked in **question no 6** whether they believed mathematics is hard, **55.4%** answered to the negative meaning that they have a negative attitude towards mathematics.

Question no 14 enquired whether the students felt that it is necessary to learn mathematics to which **68.5%** answered in the affirmative confirming that they appreciate the importance of mathematics in their lives.

We can therefore conclude that these students have a positive attitude towards College Algebra despite the fact that learning mathematics is challenging [4.4, 4.5].

2. **73.8%** of the students gave a positive answer to **question no 2** which sort to know whether they like mathematics lecturer. This result confirmed that their lecturer had those attributes that were appealing to them. Various studies have confirmed that such attributes(characteristics) are mainly being helpful , showing good

leadership, demonstrating an understanding of the students' freedom to freely express themselves [4.2, 4.3, 4.6, 4.9].

3. Positive response of **67.7%** to **question no 3** confirmed that the mathematical background of students play a role in their learning of College Algebra at the university level [4.5].
4. Positive response of **67.7%** to question no 4 indicated that positive teacher student relationship is important in the learning of mathematics.
5. Uncertainty in the response (**68.5%**) to **question no 5** was an indication that the majority of students performed poorly in Mathematics Placement Examination which contradicts their responses to **question no.3** to which **67.7%** of the students confirmed that they passed their mathematics at the school level. These results point a finger to the standard or relevance of the school curriculum to the standard required at the entrance to the university.
6. **30%** of the students in answering **question no 6** believed that mathematics is hard. This is a demonstration of negative attitude towards mathematics. It was observed in the studies [4.5, 4.4, and 4.8] that students tend to have a sense of fear of mathematics which eventually leads them to finding the learning of mathematics challenging.
7. **47.7%** of students gave affirmative answer to **question no 7**. This percentage is low and indicated that students did not do adequate practice in mathematics which may be the reason for their observation confirming the findings in the following studies [4.4, 4.3, and 4.5].
8. **51.1%** of the students in response to **question no8** confirmed that they find mathematics hard which leads to the conclusion that learning mathematics is challenging to students [tables no 1 and 2 in 4.4 and table 3 in 4.5].
9. **Questions no 9, 11, 15** aimed at establishing the role played by peer interaction in the learning of mathematics. This is one of the core research issues in the present study. **Question 9** in another sense was tailored to establish whether or not the lecturer facilitated peer interaction during the mathematics lesson. **47.7%** of the students who were not sure could be interpreted to have made a statement of strictness from the part of the lecturer which hindered their full disclosure or participation.
10. Students' positive response of **54.6%** to **question no 10** indicated that students had the liberty to choose their lecturer and most preferred the lecturer that they perceived to be more friendly. This is

another confirmation that student- teacher relationship plays a role both in the teaching and learning of mathematics [4.2, 4.9].

11. **Question no 11** was more specific in asking whether or not the students thought peer (group) learning is helpful in learning process of mathematics. **81.5%** answered in affirmative which unequivocally confirmed that peer interaction plays a positive role in the learning of mathematics (**College Algebra**).
12. Negative response of **53.2%** to **question no 12** showed that students appreciate the fact that they do not have equal abilities in learning mathematics. This observation is also confirmed in **Table 2 [4.4]**.
13. The overwhelming positive response of **88.5%** to **question 13** and **73.8%** to **question no 2** indicated that College or school-related factors have a role in the teaching and learning of mathematics [4.2, 4.3, 4.6].
14. **Question no 15** still sorts to confirm whether or not peer teaching helps students to understand mathematics. **73.8%** gave a positive answer to this question. This result further confirmed that teachers who encourage peer interaction make the learning of mathematics easier. The answers to **questions 9, 11, 15** confirm that a mathematics lecturer should facilitate peer interactions as these interactions are helpful in the learning of College Algebra.

Discussion of the findings: Making sense of the results

The study set out to interrogate the role played by peer interactions in learning College Algebra in a classroom setting and to explore the impact of positive student- lecturer relationship on the learning and teaching of College Algebra and whether or not that improves the student's performance.

Just as **Ampadu [4.1; 2011]** in his research titled "Does Peer Influence Affect Students Participation in Mathematics?" confirmed that students are convinced that peer interactions are helpful and play a positive role in their learning of College Algebra. This study also arrived at the same conclusion.

Julia E. Britt [4.2; 2013] found out that positive student – learning relationships enhanced the classroom environment and made learning pleasurable which positively impacted on students overall success / achievements in College Algebra. This study also confirmed that good interpersonal relationship between the lecturer and the students facilitates peer interactions that are gainful to the students.

Recommendations

The pedagogy focus in the teaching of College Algebra should incorporate among others the reinforcement of the teacher's practical

knowledge through continuous professional development (training) as it plays a role in the facilitation of peer interaction [**Olive, 4.5; 2004 1**] and [**Lazarus, Role, Jackson, Paul, 4.3; 2001**].

Further research

Strategies for promoting teacher – students’ relationships during the mathematics lesson in a classroom environment.

How to improve the mathematics teacher’s practical knowledge so as he / she can better facilitate peer interaction in the classroom lesson.

To establish the characteristics of the teacher – student relationships in a classroom setting that foster improved student’s performance in mathematics.