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Attitude towards Mathematics: The Case of Pre-Service Mathematics Teachers in Selected Colleges of Education in Ghana

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***Abstract*: -** *The attitude of students towards mathematics is a global problem that directly affects the achievement of students in the subject. Research has shown that teachers are a contributory factor to this canker. It is in connection with this that the study aimed at investigating pre-service mathematics teachers' attitude towards mathematics in selected colleges of education in Ghana. A quantitative survey design was adopted by the researchers for this study. A total of 186 pre-service mathematics teachers, comprising 109 males and 76 females, selected from three Colleges of Education in the Central region of Ghana, participated in the study. Based on the results of this study, it was concluded that pre-service teachers in the Colleges of Education in the Central region of Ghana have high attitudes towards mathematics. Again, there was no statistically significant difference in attitudes towards mathematics between male and female pre-service teachers. This indicates that tutors in mathematics education must ensure a fair standard of care for both male and female pre-service teachers. It is recommended that tutors at the colleges should be encouraged to put in more so as not to lower the standards of teaching.*

***Keywords*: -** *Attitude towards mathematics, pre-service mathematics teachers, colleges of education, gender*

Introduction

Lipnevich, MacCann, Krumm, Burrus, and Roberts (2011) opined that mathematical skills are essential to economic development in societies. Similarly, these skills have also been reported to be advantageous for countries in their scientific and technological growth (Enu, Agyman, & Nkum, 2015). This is because mathematics is required to comprehend other fields such as engineering, technology, social sciences, and even the arts, includes (Patena & Dinglasan, 2013; Phonapichat, Wongwanich, & Sujiva, 2014). Consequently, Abe and Gbenro (2014) point out that mathematics plays a multidimensional role in science and technology, widening its scope to all areas of science, technology, and business enterprises. Due to the value of mathematics, the subject became significant in the school curriculum. According to Ngussa and Mbuti, the mathematics curriculum is intended to provide students with knowledge and Skills that are relevant in a changing technological environment (2017).

Not only does learning mathematics require thinking and reasoning, but it also relies on the attitudes of learners towards learning mathematics (Kele & Sharma, 2014). Han and Carpenter (2014) state that attitudes consist of cognitive, affective, and behavioural responses those individuals demonstrate to an object or the environment based on their feelings or interests.

Accordingly, Mensah, Okyere, and Kuranchie (2013) are of the view that what people think or feel about mathematics is the cognitive component of behaviour. Thus, the affective element of the attitude is the thoughts or feelings of the person associated with learning mathematics (Ingram, 2015). Therefore, the affective aspect is the source of driving student interest in mathematics. Besides, the affective factor is also influenced by the belief

created by the cognitive component of attitude, which generates a mindset that over time becomes permanent and affects the feelings of students about studying mathematics (Ingram, 2015). As such, the cognitive and affective elements of action are closely linked and closely linked to each other (Di Martino & Zan, 2011).

The behavioural aspect of attitude is the ability to respond to mathematics learning in any way (Akinsola & Olowojaiye, 2008; Maio & Haddock, 2009; Mensah et al., 2013). Behavioural attitude is also influenced by affective behaviour. Students who feel secure in mathematics are connected to being successful in mathematics, which is considered a positive behaviour. If students in mathematics are not positive, they will not succeed and negative emotions are considered to be failed acts (Zan & Di Martino, 2007). Therefore, the behavioural aspect of attitude also affects the cognitive component of attitude. They feel committed, positive, and connected to their learning when learners see the significance of mathematics in real life (Attard, 2012). Therefore, the three components of attitude, confidence, the value of mathematics, and participation are interrelated (Mensah et al., 2013).

How to achieve an increased degree of confidence, awareness of the importance of mathematics, and participation to achieve the attitudes of students is an important problem that is becoming more beneficial in studying mathematics? Teaching mathematics in a meaningful way might be the solution. Setting mathematical questions in a certain sense will encourage students to see applied mathematics (Anthony & Walshaw, 2007; Reys, & Reys, 2013). In mathematics education, there are many meanings for the word context (Gilbert, 2006; Harvey & Averill, 2012). Thus, a context is an event that occurs in a fixed environment, according to Gilbert (2006). The learning environment in the context of the situation and the features of the task make up the task context. Like Harvey and Averill (2012), in this article, we use the word context to refer to real-life situations.

Scientists (Attard, 2012; Mata, Monteiro, & Peixoto, 2012) have identified important variables contributing to students' attitude towards learning mathematics. They include the students themselves, the classroom, the teachers' beliefs and attitudes (Beswick, 2006), and their teaching methods.

The teaching method of teachers has a big impact on the attitudes of students towards mathematics (Akinsola & Olowojaiye, 2008; Mensah et al., 2013). Teachers may do a variety of things to facilitate classroom learning to decrease students' level of engagement and interest in mathematics learning (Attard, 2012; Kele & Sharma, 2014). Similarly, according to Sullivan and McDonough, teachers should find ways to encourage student interest and faith in learning mathematics (2007). Major operations implemented in real-life environments will do this (Kacerja, 2012).

Empirical Review

In literature, various meanings are given to the attitude of students towards mathematics. Kibrislioglu (2016), for example, describes the attitude towards mathematics as the love or hate of a subject; a desire to engage in mathematical activities or avoid them; a belief that mathematics is good or bad; and a belief that mathematics is useful or useless. Tahar, Ismail, Zamani, and Adnani provide a simpler definition (2010). An attitude towards mathematics is, according to Tahar et al, a positive or negative emotional disposition. All aspects of beliefs and feelings should be discussed based on this when explaining attitudes to mathematics. We adopt the definition of Tahar, et al. (2010) because it looks better for students, both from a cognitive and social perspective.

Several studies have shown that mathematical attitudes are directly and substantially linked to student success. For example, Mensah and Kurancie (2013) conducted a study in Ghana and found a strong positive association between the attitude of students and their performance. Likewise, Nicolaidou and Philippou (2003) found that there is a clear connection in mathematics between attitude and achievement. The 2007 results of the Trends in

International Mathematics and Science Survey (TIMSS) published in Gonzales, et al. (2008) also indicate that, compared to those with less positive attitudes, students with a more optimistic attitude in 4th and 8th grades had higher average mathematics achievement. In another earlier study conducted by Schofield (1982) that demonstrated stronger relationships in boys than in girls, a significant relationship between attitude and achievement was also established. In a more recent study, Ngussa and Mbuti (2017) conducted a study in Arusha, Tanzania, involving secondary school students. They built a mild relationship between the student's attitude and performance when teachers use humor as a teaching technique. They concluded that the progress of mathematics students would be improved by enhancing the positive attitude of learners. However, Joseph (2013) found that the majority of students (55 percent) had a generally negative attitude towards mathematics in his study of community high school students in Kagera, Tanzania, with a positive and important association between attitude and performance ($r = 0.33$).

The literature indicates that the attitude of students is influenced by several variables. These include factors such as childcare, peer learners, the home setting, and culture (Yang, 2013). Researchers, Yılmaz, Altun, and Olkun (2010) identify factors that include the relationship between mathematics and real life, the use of teaching resources, teacher personality, and knowledge of subject areas of teachers, bad teaching practices, lack of commitment to student management, and the classroom of teachers. Other considerations include teacher emotional support (Blazar & Kraft, 2017), teacher affective support (Sakiz, Pape, & Hoy, 2012), class activities, subject material and amount of work, shortage of teachers, and inadequate resources (Joseph, 2013; Enu et al., 2015), peer and parental effect (He, 2007). Besides, the variables also involve the emergence of insecurities in the skill of mathematics students and the inability of teachers to provide explanations for the mathematical concepts being taught, in line with Simmers (2011).

According to Yilmaz et al (2010), the reasons that are responsible for learners who like mathematics are successful teaching and enjoyment of the course. Although factors such as boring teachers, students' inability to solve math problems, failure to understand the topic well, friends talking during a lesson, having a bad grade for an exam are related to students' dislike of mathematics. The studies analysed to suggest many factors influencing the liking or disliking of mathematics by students.

Theoretical framework

The ABC Model of Attitude

The theoretical basis for this research is the Tripartite Model, also called the ABC Attitude Model. It acts as a beneficial theoretical basis for the development of attitude measurements in mathematics. The ABC Attitude Model is based on a hierarchical model from Ajzen (1993) that conceptualizes an attitude as an amalgam of three distinct measurable components: effect (A), action (B), and cognition (C). Affect is the subjective aspect of emotions and thinking linked to an object of attitude (in our study mathematics). Conduct is the component of actions consisting of predispositions to act towards the object of attitude in a particular way. Cognition is a mental element consisting of the beliefs and perceptions of the object of the attitude held by individuals. Those three components must be present before we conclude that an attitude exists. A good feeling, feeling relaxed in a mathematics classroom (affect), wanting to learn more mathematics (behaviour), and thinking that it is easy to learn mathematics can be a particular attitude (cognition). Students may develop a favourable or unfavourable attitude towards mathematics.

Students develop attitudes over time through direct experience of learning mathematics or through gaining knowledge of the mathematics subject. As a guide to their overt mathematics learning actions, students use the learned attitudes, resulting in consistently favourable or unfavourable reaction patterns to the subject. In mathematics, attitudes are considered to be precursors to learning actions.

Ajzen and Fishbein (1977) postulate that when predicting actions based on a given attitude, there should be a correspondence between measures of attitude and those of behaviour. Students' attitude to mathematics reflects their evaluation of studying mathematics as a subject. Attitudes may be verbal or nonverbal behaviour (Ajzen, 1993). Several researchers have attempted to examine behaviours using different approaches. There are three therapeutic approaches proposed by Ajzen (ibid). They include observable actions performed by the investigator's registered subjects, individual commitment to behavioural success, and self-reported behaviour. However, the last two steps should be taken only if it becomes difficult to make specific conclusions about such behaviours. It is possible to achieve high correspondence between attitude and behaviour measures through conventional scaling scales such as the Likert scale (Ajzen & Fishbein, 1977), which we have adopted in this study.

Attitude

Attitude refers to the learned tendency of a person to respond positively or negatively to an object, situation, concept, or person. It is often perceived by individuals as a belief that communicates their values and feelings and can often be expressed in actions (Joseph, 2013). Attitudes, behaviour, and emotions are related in such a way that people's attitudes determine their behaviour towards things, situations, and people. They also affect the relationships between these variables (Joseph, 2013).

Attitude is a hypothetical term that cannot be specifically checked yet, as is the case in our study, Learning Math, which can be inferred from measurable responses to the object of attitude (Ajzen, 1993). In line with Syyedaa, attitudes are multidimensional (2016). There are three elements: affect, cognition, and actions that are taken into account. Affect is composed of the emotions, beliefs, and vision of the subject. The feelings of pleasure or enjoyment in learning or seeing the subject as boring, frustrating, and dull are emotions. Beliefs are related to students' trust in their ability to learn the subject. Vision represents students' curiosity about mathematics. Cognition shows the students' perceived usefulness of the subject. Conversely, behaviour is connected to students' desire to learn, which is reflected in students' attitudes, commitment, and progress in class.

By using these components to consider the attitude of students towards mathematics, we analyse the following aspects: self-confidence, anxiety, enjoyment (affect), intrinsic motivation (behaviour), and perceived usefulness (cognition).

Attitude Aspects

Affect

Self-assurance: As a mathematics learner, mathematics self-confidence refers to student self-expectations, which involve beliefs regarding one's own ability to learn and perform well in mathematics (Adelson & McCoach, 2011). The results of research by Hannula, Maijala, and Pehkonen (2004) show that self-confidence is a significant factor that affects students' learning, which in turn affects their performance in mathematics. Van der Bergh (2013) indicates that highly optimistic students believe in their ability to succeed in mathematics learning, thus overcoming the fear of failure. These students are prepared to take on mathematical problems that increase their academic achievement in turn; otherwise, students with low self-confidence do not believe in themselves and therefore prefer to avoid mathematical difficulties (Adelson & McCoach, 2011). This then leads to minimising the possibility of expanding their mathematical skills and growth. It is therefore desirable to observe the students' attitude towards their confidence and how it relates to progress.

Anxiety over mathematics: Mathematical anxiety is characterized as a state of emotional reaction to mathematics in which students encounter and assess negative reactions to mathematical concepts (Chaman & Callingham, 2013). Anxiety in mathematics, therefore, is a feeling of tension, helplessness, and discomfort that impedes the ability to concentrate and thus affects learning

mathematics (Zakaria & Nordin, 2008). Anxiety in mathematics is thought to have an impact on the attitude and motivation to learn mathematics, resulting in the achievement of students (Getahun, Adamu, Andargie, & Mebrat, 2016). (Getahun, Adamu, Andargie, & Mebrat, 2016). In the Hoorfar and Taleb (2015) study, it was found that anxiety is negatively correlated with metacognitive knowledge in mathematics, which is the ability to reflect, understand, and monitor one's learning. This indicates that the less metacognitive knowledge they have, the more anxious students are, which hampers their long-term performance.

Mathematics Pleasure: The extent to which students enjoy doing and learning mathematics is mathematical enjoyment (Kupari & Nissinen, 2013). Student satisfaction during learning may influence their behaviour or the cognitive portion of their attitude (Syyeda, 2016). According to the PISA 2012 results reported by the OECD, students should study mathematics because they find it fun and interesting (2013). They further posit that interest and enjoyment are affected by the degree and continuity of engagement in learning and the depth of understanding. This indicates that the more mathematics students enjoy doing, the more likely they are to engage in problem-solving, thus enhancing their learning and effectiveness. Since student enjoyment, learning and performance are related, to keep track of students' learning and performance, it is worth evaluating the status of students' mathematical enjoyment.

Behaviour

Intrinsic motivation: In this study, both curiosity and the desire to learn mathematics are related to intrinsic motivation (Guy, Cornick, & Beckford, 2015). Students are automatically motivated to study mathematics if they choose to do so after finding studying mathematics interesting (OECD, 2013). Motivation is regarded as the guiding force behind learning (Yunus & Ali, 2009). According to PISA 2012 findings in the OECD (2013), intrinsic motivation influences both the degree of student participation, career choice, and success. The study of motivational variables concerning attitude and achievement is therefore important.

Cognition

Perceived utility: Perceived usefulness refers to students' awareness of the significance of mathematics in today's everyday life and the future (Adelson & McCoach, 2011). The perceived usefulness of mathematics is presumed to influence the attitude of students towards the subject. When learners understand the importance of mathematics in their lives, they are motivated to study, practice, and teach the subject (Syyeda, 2016). This study also indicates that, although the majority of students had negative feelings towards mathematics, they demonstrated positive cognition towards mathematics. This reflects students' understanding of the value of mathematics in their lives and future careers.

Research problem

Attitudes are part of our everyday lives and you have a specific like or dislike, love, fear, or appreciation for a certain thing (Hannula, 2002). Attitudes are part of human identity; it has been claimed (Mohamed & Waheed, 2011). Mathematics as an entity could also be liked, feared, hated, or despised, just like any other object. The learning of a particular subject may then be linked to the attitudes one has on that subject, as a "strong interaction between cognitive and emotional aspects" is suggested (Zan & Di Martino, 2007, p. 3). It, therefore, follows that the emotional aspect (part of attitude) would come into play in studying mathematics (cognitive). Therefore, low mathematics performance can be partly attributed to the attitude of learners towards mathematics (Bayanga & Wadesango, 2014; Farooq & Shah, 2008; Hannula, 2002; Mahanta, 2014; Mohamed & Waheed, 2011). We have found that most students we teach have a negative attitude towards mathematics in our teaching experience, as they often say negative things about the learning of the subject (Narh-Kert & Ampadu, 2020). In mathematics tests, we have also found that they appear to perform poorly. This study aims to assess

students' attitudes towards mathematics and whether these attitudes have an effect on the achievement of these students. The main objective of this research is to identify factors affecting the attitudes of learners towards mathematics. Researchers have concluded that student attitudes play a crucial role in learning mathematics (Ingram, 2015; Kele & Sharma, 2014). However, most of these studies have explored the attitude of students in high schools towards mathematics (Bora & Ahmed, 2018; Kunwar, 2020; Tuncer & Yilmaz, 2020; Mensah, Okyere, & Kuranchie, 2013; Yasar, 2016). Kunwar (2020), for example, discovered that the attitude of secondary level students towards mathematics was positive. In an inquiry, however, Yaşar (2016) found that the attitudes of high school students towards mathematics were medium-level. Surprisingly, Bora and Ahmed (2018) found that the mean score of the students' attitude towards mathematics at the secondary level was below the average. Nevertheless, only a few studies have been carried out at the colleges of education level (Enu et al., 2015). It is against this context that the researchers examined the "attitude towards mathematics among pre-service mathematics teachers in selected colleges of education in Ghana."

Purpose of the Study

Based on the problems highlighted, the study aimed at investigating the attitudes of pre-service teachers towards mathematics.

Research Questions

1. What are the attitudes of pre-service teachers towards mathematics?

Hypotheses

1. There is no statistically significant difference between pre-service teachers' attitude towards mathematics by gender.
2. There is no statistically significant difference between pre-service teachers' attitude towards mathematics across colleges.

Research Methods

Research design

This study aimed to investigate the attitude of Pre-Service mathematics teachers towards mathematics in selected Colleges of Education in Ghana and based on this, the cross-sectional survey design was adopted in this study. This survey method was deemed appropriate for this current study because it allows for data to be collected on a large sample within a relatively short time or in a snapshot (Cohen, Manion, & Morrison, 2007; Creswell, 2012).

Sampling procedure

A sample of 186 pre-service mathematics teachers, comprising 109 males and 76 females, selected from the three Colleges of Education in the Central region of Ghana, participated in the study. To get this sample size, pre-service mathematics teachers in the three colleges were censured for data collection. This implies that all pre-service mathematics teachers at the time of data collection participated in the study.

Research instrument

A one data collection instrument called The Fennema-Sherman Mathematics Attitude Scale was used. "Fennema and Sherman (1976) developed the instrument and consist of a group of nine instruments as (1) Attitude Toward Success in Mathematics Scale, (2) Mathematics as a Male Domain Scale, (3) and (4) Mother/Father Scale, (5) Teacher Scale, (6) Confidence in Learning Mathematics Scale, (7) Mathematics Anxiety Scale, (8) Effectance Motivation Scale in Mathematics, and (9) Mathematics Usefulness Scale. Two of the nine instruments in the Fennema-Sherman Mathematics attitude scale were used in the study due to convenience: personal confidence of students to do mathematics and usefulness of mathematics as perceived by students. These two instruments comprised of 12 items with a five-point Likert-scale ranging from strongly disagree to strongly agree" (Tapia & Marsh, 2004). Since no validity and reliability of the items was established by the developers (Cooper, 2013), it was pilot tested on pre-service mathematics teachers, with similar characteristics as those used in the current study, in

one College of Education in the Greater Accra region. The content validity of the items was established by two experts in mathematics education at the University Of Cape Coast and the reliability coefficient using Cronbach's alpha was .89.

Data collection procedure

A research permit was obtained from the colleges' authorities before the data collection. The set of questionnaires was administered to the pre-service mathematics teachers. The intention for giving outset of questionnaires is to obtain the views and opinions as to the objective of the study. The return rate was 100% since it was collected within 40 minutes after administration in each college. Data collection lasted for two weeks.

Data processing and analysis

The data was processed and handled after the data had been obtained by coding the data, editing the data where appropriate, and entering the data to produce results, and eventually cleaning the data to eliminate any types of confusion that could have gone unnoticed. To answer research question one, descriptive statistics (i.e., specifically means and standard deviations) were used. Hypothesis one was tested using independent samples t-test since there is one independent variable (gender) at two levels (male and female) and one dependent variable (attitude). Hypothesis two was tested using One-way analysis of variance (ANOVA) since there is one independent variable (college) at three levels (Schools A, B, and C) and one dependent variable (attitude).

Results and Discussion

Results of this study are presented and discussed based on research questions and hypotheses raised.

Attitudes of Pre-Service Teachers towards Mathematics

One of the objectives of this study was to investigate the attitudes of pre-service teachers towards mathematics. To do this, means and standard deviations were used to determine the level of attitude pre-service teachers have towards mathematics. The results are presented in Table 1.

Table 1. Descriptive statistics of pre-service teachers' attitudes towards mathematics.

	Item	Mean	Standard Deviation
1	By analysing it from mathematics textbooks, it is better to find out why anything is valid than to be told.	4.05	1.107
2	In mathematics, the issues addressed are not interesting.	3.42	1.334
3	More mathematics lessons should be given every week.	4.31	.918
4	One of the most interesting science subjects is mathematics.	4.18	.979
5	I am always prepared for mathematics lessons.	4.12	.936
6	Lessons in mathematics are uninteresting.	3.58	1.343
7	Studying mathematics at school is very important.	4.49	.943
8	At the highest level of my education, I would like to study mathematics related course.	4.08	1.055
9	I must do well in mathematics.	4.46	.765
10	I love mathematics lessons very much.	4.22	.906
11	If there were no mathematics, I would like my specialty more.	3.02	1.379
12	One of the most problematic of all the subjects I have done Mathematics.	3.50	1.423

Grand Mean = 3.95 Grand Standard Deviation = 1.091

To interpret these results, a mean value between 0 – 2.4 was interpreted as low attitude, a range of 2.5 – 3.4 and neutral or undecided attitude, and a range of 3.5 – 5.0 as high attitude towards mathematics. This was because a five-point Likert scale was used and so there were three distinct categorisations. All negatively stated items were also recoded to allow

for consistency in analysis. The descriptive statistics of pre-service teachers' attitudes towards mathematics is shown in Table 1. As shown in Table 1, pre-service teachers' attitude towards mathematics (M = 3.95, SD = 1.091) is high. A careful look at the spread of the means for the items ranged from 3.02-4.49. This indicates that on two of the items (i.e., items 2 and 11), pre-service teachers were undecided on their attitude towards mathematics. The standard deviation which is the spread of the responses from the mean showed that it was moderate since it ranged from .906 – 1.423. This result or finding is extremely encouraging since they are confident about the attitude they possess towards mathematics.

Difference between Pre-Service Teachers' Attitude towards Mathematics by Gender

Hypothesis one sought to test whether there is a statistically significant difference in attitude between male and female pre-service teachers towards mathematics. The independent samples t-test was, therefore, used. The results are presented in Table 2.

Table 2: Result of independent samples t-test for posttest scores

Group	N	M	SD	t	df p
Male	76	3.774	.331		
				7.908	87 .781
Female	109	3.789	.375		

Not Significant, since p > .05

As shown in Table 2, there was no statistically significant difference in mean scores between the male [M = 3.774, SD = .331] and female [M = 3.789, SD = .375, t (183) = .278, p > .05]. It therefore means that both male and female pre-service teachers possess similar attitudes towards mathematics.

Difference between Pre-Service Teachers' Attitude towards Mathematics across Colleges

Hypothesis two sought to test whether there is a statistically significant difference in pre-service teachers' attitudes towards mathematics across the three colleges the study was undertaken. One-way between-groups analysis of variance (ANOVA) was conducted to gain more statistical evidence. Before testing this hypothesis, assumption testing of independence of observation, random sampling, equality of variance, and adequacy of sample size was done and no violations were detected. Table 3 presents the summary of ANOVA.

Table 3: Summary of One-way Analysis of Variance (ANOVA) Results

	Sum of Squares	df	Mean Square	F	p
Between Groups	.407	2	.204	1.621	.201
Within Groups	22.999	183	.126		
Total	23.407	185			

Table 3 shows whether the overall *F* ratio for the one-way between-groups analysis of variance (ANOVA) is significant or not. From the analysis, it was noted that the F-ratio (1.621) is not statistically significant at the .05 (*p* =.201) alpha level. It implies that pre-service teachers in all three Colleges of Education have similar attitudes towards mathematics. This result is encouraging and provides the view that they will attach seriousness to the teaching of mathematics when the need arises.

Discussion

The findings have shown that the attitude of pre-service teachers towards mathematics is strong, meaning they have a positive attitude towards the subject. For instance, Mensah and Kurancie (2013), from literature, conducted a study in Ghana and found a strong positive association between student attitude and performance. Likewise, Nicolaidou and Philippou (2003) found that there is a clear connection in mathematics between attitude and achievement. It is inconsistent with Joseph (2013)

who discovered a generally negative attitude towards mathematics by the majority of students (55 percent). In this study, pre-service teachers, both male and female, have similar attitudes towards mathematics. Research conducted by Mata, Monteiro, and Peixoto, (2012), however, found that no gender influence was recognized in their study, although the more they advanced in education, girls displayed a continuous decline in attitudes. In a study conducted by Mensah, there were mixed findings on unique variables (2017). Given the influence of the mathematics teacher, according to Mensah, it seems that boys have a better attitude towards mathematics rather than girls. On the effect of peers, however, it appeared that girls had a better attitude towards studying mathematics than boys on peer influence. Finally, pre-service teachers have similar attitudes toward mathematics in all three Colleges of Education regarding the colleges the research was carried out. This is inconsistent with the study by Lee and Anderson (2015) that revealed differences in math attitude with girls in single-sex school with the most positive attitudes and girls with the least positive attitudes in the coeducation environment. It is clear from the above that our results agree with some studies and disagree with others, suggesting that there is a need to participate in further research in this field.

Conclusions and Recommendations

Regarding the findings of this research, it can be inferred that pre-service instructors have high attitudes towards mathematics in the Colleges of Education in the Central Region of Ghana. It is recommended that tutors at these institutions be motivated to put in more in order not to lower teaching standards. Again, there was no statistically significant difference in attitudes towards mathematics between male and female pre-service teachers. This suggests that tutors must maintain an equal level of treatment for both male and female pre-service teachers in teaching mathematics. Finally, there was no statistically significant difference in attitudes of pre-service teachers towards mathematics across colleges. It is recommended that colleges should collaborate and maintain similar practices in the delivery of mathematics.

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