

Influence of Gender Streamed (Boys' and Girls' Only) Classes on Coeducational Secondary Schools' Mathematics Teachers Perceptions in Nakuru, Uasingishu, Kericho and Baringo Counties of Kenya

Barmao Anne C., Changeiywo Johnson M. Githua Bernard N.
Department of Curriculum, Instruction and Educational
Management, Egerton University. P.O. Box 536-20115, Egerton, Kenya

Abstract

The skills acquired in mathematics provide a country with a human resource that is highly educated and able to tackle most of the country's social economic problems. However, the performance of students at the KCSE mathematics examinations in Kenya has been dismal for many years. In addition, majority of the girls in particular have been performing poorly in the subject compared to the boys. As a possible remedy to this, single sex classes within coeducational secondary schools were created. There is however limited research, which has been carried out to compare mathematics teachers' perceptions between single and mixed sex classes in coeducational secondary schools in Kenya. Therefore, this study was designed to find out the effects this intervention. The study adopted an ex post facto causal comparative research design. A sample of 203 mathematics teachers from county and sub county co-educational secondary schools (those with mixed sex and single sex classes) in Nakuru, Uasingishu, Kericho and Baringo counties of Kenya participated in the study. Data was obtained using self-report questionnaires for mathematics teachers. The instrument was pilot tested and validated to improve it before actual data collection. A Chronbach alpha reliability coefficient was calculated and an index of 0.87 obtained. The collected data was analyzed using descriptive statistics and ANOVA at a significant level of alpha (α) equal to 0.05. The findings show that mathematics teachers' perceptions of their classes are positive irrespective of the class gender composition. The findings further show that there were no statistically significant differences in their perceptions between single sex and mixed sex classrooms in both the sub county and county schools. The results from the study have yielded valuable information that may inform the intervention in Kenya's coeducational secondary schools and advice policy makers, teachers and administrators of the schools on appropriate measures to undertake to enhance its effectiveness in the teaching and learning of mathematics.

Keywords: Gender streamed classes, mathematics teachers, Perceptions, Coeducational secondary schools

1. Introduction

The concern for the education of girls' and their under-achievement in mathematics in Kenya can be traced back to the 1970s (Mondoh, 2002). Eshiwani (1975) began in earnest to investigate some of the causes of this scenario by conducting a study on gender differences and mathematical abilities among Kenyan High School children. The results of the study indicated that the teaching methods used by teachers in mathematics classes could be responsible for girls' underachievement in mathematics. The findings indicated that girls prefer to be taught the subject using the programmed instruction (PI) and Integrated Programmed Instruction (IPI) methods as opposed to the conventional classroom Approach (CCA) method preferred by boys and mostly used by teachers during mathematics lessons. This finding is supported by those of Githua and Mbugua (2004) who confirmed that there are gender differences in the preference of instructional methods used during mathematics lessons.

Mondoh (2002) found out that there exist certain factors within co-educational schools that aggravate the problem of girls' poor performance in mathematics. These include; method of instruction, gender-role stereotyping, past academic experiences, learners' anxiety in examinations, the teaching staff, syllabuses and text books. Mathematics teachers in these schools have also been accused of disrespecting the cognitive styles of learners through their use of teaching methods that do not agree with their learning styles and their inability to encourage girls to pursue mathematics (Saitoti, 2005; Suchia, 2001).

Githua (2002), Mukwa and Too (2005) and Smyth (2010) have criticized mixed sex classes by asserting that such classes inhibit classroom participation by both sexes due to the existence of some form of fear. According to them both sexes fear giving incorrect responses hence do not respond to questions in class. This situation is further aggravated by societal stereotypes which seem to allude to the fact that boys should be superior in mathematics and sciences than girls. From the foregoing, all these scholars seem to agree that the mixed sex classroom learning environment tends to foster unequal treatment of boys and girls which may have led to gender disparities in their Kenya Certificate of Secondary Education (KCSE) mathematics examinations performance. Table 1 illustrates the gender differences in performance in KCSE mathematics examinations from the year 2002 to 2012.

Table 1
Students Percentage Mean Scores by Gender in K.C.S.E Mathematics Examinations, 2002-2012

Year	PERCENTAGE MEANS		Mean Differences
	Boys	Girls	
2002	22.53	16.44	6.09
2003	22.10	16.05	6.05
2004	21.34	15.39	5.95
2005	18.49	12.97	5.52
2006	21.87	15.78	6.09
2007	23.10	15.78	7.36
2008	24.31	17.71	6.06
2009	23.63	18.11	5.52
2010			
Math A	25.75	19.71	6.04
Math B	20.20	17.94	2.26
2011			
Math A	27.80	21.00	6.8
Math B	14.00	12.51	1.49
2012			
Math A	31.38	25.30	6.08
Math B	9.95	8.96	0.99

Source: KNEC 2003-2013 K.C.S.E Examinations Candidates Performance Reports.

Note: Math A and Math B refer to mathematics alternatives A and B respectively

The data in Table 1 shows that from the year 2002 to 2009 students sat for one mathematics examination, however from 2010 students choose to study mathematics alternative A or B. From the data in Table 1, performance of both boys and girls in mathematics continues to decline. Further, the results show that there is gender disparity in performance in favor of boys. By observing the mean differences column, one realizes that initially the differences were higher, then reduced and later started widening by the year 2006. The Rift Valley Provincial Director of Education noted that streaming by gender in Kenya was introduced in some co-educational schools in the country during the year 2000 (Provincial Director of Education PDE, 2010). The Table shows that gender differences in mathematics decreased up to the year 2005 and increased towards the year 2007. This could further mean that gender streaming may have initially generated some positive results which are no longer there. It could also indicate that learners were separated in class and yet the teachers continued with their conventional way of teaching in mathematics classes. Therefore it is critical that mathematics teachers' perspectives of the intervention be determined with the hope of making adjustments and hopefully leads to an improvement of girls' mathematics performance in examinations.

Perception refers to the way in which something is regarded, understood and interpreted (Hornby, 2006). It may also refer to way of thinking about or understanding of someone or something (Hornby, 2006). In this study, teachers' perceptions of mixed and gender streamed classes referred to their understanding and interpretation of such classes especially pertaining to their mathematics learning benefits and shortcomings.

Teachers are very important elements of a school system. Teo (2008) stated that teachers are key agents of change in any school. Their support is very vital in the success of school policies and initiatives. Kreiter and Kinicki (2007) have argued that in addition to teacher support, effective communication is also key in creating and maintaining an effective school policy. Therefore, it was important to establish mathematics teachers' perceptions of gender streamed classes within coeducational secondary schools. This is because their positive perceptions towards the policy will ultimately ensure its success.

There are very few studies which have been conducted to establish teachers' perceptions of teaching learners in mixed and single sex mathematics classes within coeducational secondary schools. However; there is a preponderance of studies which have been conducted on the effects of this policy on students' achievement in mathematics and sciences among other factors. Rennie and Parker (1997) conducted a study on students' and teachers' perceptions of single- sex and mixed-sex mathematics classes in Australia. The study was conducted following a recommendation that coeducational schools create single sex classes for males and females as a strategy for improving their performance in mathematics. The study found that, teachers perceived that single sex classes provided a more supportive environment for girls but rather a less supportive environment for boys. It also found that teachers used different teaching strategies with the two kinds of classes. Finally, the study found that the single sex class environment afforded opportunities for teachers to mitigate apparent shortcomings that arose from boys' and girls' previous educational experiences. This brought about improved students' attitudes and performance. From the study, it is clear that teachers 'perceive that single sex classes provides an opportunity for them to adjust their teaching strategies and address some of the unique gender related challenges

in the teaching of mathematics.

Willis, Kilpatrick and Hutton (2006) interviewed teachers in single sex settings in coeducational schools and found that they perceived that girls became more assertive within the second year of implementation of the policy as demonstrated by their willingness to try new activities. Teachers reported that the single gender classes gave them an opportunity to identify and adjust their teaching styles to suit the different learning styles of boys and girls. The teachers also observed that both boys' and girls' behavior were generally better at school both inside and outside the classroom. From the findings of this study it is clear that teachers' perceptions of gender streamed classes in coeducational schools are positive. They perceive single sex classes in coeducational schools as avenues upon which they could tailor instruction in ways that will overcome inter-gender difficulties.

Younger and Warrington (2013) carried out another study on teaching of students in single-sex classes in a coeducational comprehensive school in England entitled "An Evaluation of Single Sex Teaching based upon Students Performance and classroom Interactions." The researchers interviewed teachers and students of one coeducational school where single sex teaching had been the practice from the time the school was started. The findings of the study indicated that both male and female students benefited from having their own learning space. The teachers indicated that they explicitly adjusted their teaching styles when teaching boys' or girls' classes. The study's findings further indicated that girls consistently achieved better results than boys in most subjects and that the improvement levels of both girls and boys were similar and significantly higher than the national average. This study's findings may imply that single sex teaching has potential of raising students' achievement levels especially for girls provided that different teaching approaches are planned and implemented for males and females.

Studies conducted to determine the effect of this policy on factors related to students reveal conflicting results. Booth and Nolen (2012) conducted a study using a sample of English fifteen year old students from coeducational and single sex schools to examine the role of nurture in explaining why women may shy away from competition. They found that girls in single sex schools are significantly more likely to be competitive. The behavior of boys and girls attending single sex and coeducational schools was also compared. The researchers found that girls attending single sex schools behave more competitively than their counterparts in coeducational schools. For boys they found that neither attendance in single sex nor coeducational school influences whether they choose to compete. This finding suggests that class type has no effect on the competitive nature of boys while girls become competitive in single sex classes.

Eisenkopf, Hessami, Fischbacher and Ursprung (2012) analyzed the impact of female only mathematics classes on mathematical achievement of girls. The researchers randomly assigned girls into single sex and coeducational classes in a Swiss secondary school. Their finding indicated that girls' performance in mathematics improved in single sex classes and that this improvement was greater when taught by a male teacher. This could be an indication that apart from the single sex setting girls' also thrives if taught the subject by male teachers.

However, a report published by the American Association of University Women in 1998 contrasts Younger and Warrington (2013) and Rennie and Parker (1997). The report noted that though girls' achievement improved in single sex schools the same did not happen for girls in single sex classes within coeducational schools. It further noted that in single sex classes for boys, the teachers often failed to notice their reading and writing problems, handled inappropriately their emotional and social needs and tended to interpret their behavior as discipline problems. The report concludes that teachers generally failed to adjust their teaching methods to take into account boys' unique learning styles.

In contrast Sadker and Sadker (1995) conducted a three year study where trained observers visited more than 100 classrooms in Connecticut, Maryland, Massachusetts, Virginia and the District of Columbia. The findings of the study indicated that teachers indeed handled boys and girls in class differently. Teachers were found to value boys' comments more than girls' comments, responded to girls with a simple nod or okay but praising, correcting, helping and criticizing the boys. In addition, the teachers encouraged boys to solve problems on their own while helping girls who were stuck on problems. It is important to note that these teacher behaviors toward boys encourage them to persevere, be patient and not to give up easily. Mondoh (2002) argues that learners who possess such attributes are likely to be good mathematics students. Therefore, this could imply that the teachers could be responsible for cultivating good attributes in boys for mathematics learning while not doing the same for girls.

Studies conducted in Kenya on gender streamed classes have mainly focused on the effects of the policy on the learners. Mwendwa (2014) conducted a study on the influence of gender based streaming on the teaching and learning of mathematics in Kasue secondary school in Kitui County. The findings indicated that gender streaming improved the performance of boys in mathematics and other subjects. Barmao and Mondoh (2006) investigated the effects of streaming by gender on students' mathematics performance in one coeducational secondary in Nakuru district. From the findings, there were still gender disparities in the performance in favor of boys. The two studies confirm that gender based streaming has achieved little benefits

for girls' mathematics performance. In addition, most studies on gender streaming have tended to focus on the effects on students hence, there was need to find out the mathematics teachers perspectives of the policy.

Gender inequality in mathematics performance has always been an issue in national examinations from the KNEC reports (KNEC 2002-2014). Further, the mixed sex classroom environment has been accused of aggravating this problem. Hence, single sex classes were created within coeducational schools as a possible remedy to it. There is limited research which has been conducted in the country to investigate mathematics teachers' perceptions of this relatively new phenomenon. It was on the basis of this that the study was conducted.

Purpose of the Study

The purpose of the study was to investigate the influence of gender streamed (boys' and girls' only) classes within coeducational classes on mathematics teachers' perceptions on the learning/teaching of mathematics in those classes.

Objective of the Study

The proposed study was guided by the following specific objective.

To compare mathematics teachers' perceptions between mixed and single sex classes (boys' and girls' only) within co-educational secondary schools by school category.

Hypothesis of the Study

Ho1: There is no statistically significant difference in mathematics teachers' perceptions between mixed and gender streamed (girls' and boys' only) classes within co-educational secondary schools by school category.

2. Methodology

Research Design

The study employed an *ex-post facto* (causal-comparative) research design. According to Cohen, Manion and Morrison (2011) the design is used when the type of the study cannot allow the investigator to manipulate the independent variable in order to observe its effects on the dependent variables. The independent variable already exists; hence the investigator sets out to discover possible effects of a phenomenon by comparing the subjects in which the variable is present with similar subjects who do not possess the variable. The design was appropriate for the current study since the independent variable (gender streamed mathematics classes) is a phenomenon that was already in existence in some co-educational secondary schools in Rift Valley. The researcher compared gender streamed classes (boys' and girls' only) with mixed sex classes in these schools on the mathematics teachers' perceptions.

Sampling Procedures and Sample Size

The target population comprised of mathematics teachers and their form four students drawn from all county and sub-county co-educational secondary schools in Nakuru, Uasingishu, Kericho and Baringo Counties of Kenya. The sample was selected using purposive, stratified and simple random sampling techniques. The researchers selected two types and categories of co-educational secondary schools from the counties. The two types were those with mixed sex and those with gender streamed (boys' and girls' only) classes, while the two categories were the county and sub-county public coeducational secondary schools.

Gall, Gall and Borg (2007) recommend that for a causal comparative study, there should be at least 15 participants in each subgroup to be compared. However to take care of situations where some data may be lost or insufficient, the current study selected 20 schools in each school type and category. This gave a total of 80 schools. From each type of mathematics class namely mixed and gender streamed (boys' and girls' only) in each school the researcher randomly selected two mathematics teachers based on gender stratification where possible. This provided a total of 240 mathematics teachers. Table 2 shows how the schools' and mathematics teachers' sample size was arrived at.

Table 2

Schools' and Mathematics Teachers' Sample Size

	School Type		Gender streamed (boys' and girls' only) classes	
	Mixed sex classes			
School	No of	No of	No of	No of teachers i.e
Category	schools	teachers	Schools	2 from each class type (boys' and girls' only classes)
District	20	2 x 20 = 40	20	4 x 20 = 80
County	20	2 x 20 = 40	20	4 x 20 = 80
Total	40	80	40	160

From Table 2, 80 teachers were selected from coeducational schools with mixed sex classes while 160 teachers were selected from coeducational schools with gender streamed (boys' and girls' only) classes. This

gave a total of 240 (80 plus 160) mathematics teachers.

Stratified sampling technique was employed to select the coeducational secondary schools. Schools were stratified based on school category (either county or sub-county) and school type (those with gender streamed classes or those with mixed sex classes). To select the schools, the researcher obtained a list of sub-county and county public coeducational secondary schools together with the mobile telephone numbers of the schools' principals from the County Directors of Education of the selected counties. The researcher then contacted each of the principals to obtain information on the type of streaming in their schools. A list of all the schools based on the streaming (those with gender streamed or mixed sex classes) and school category (county or district) was then generated from each county. Proportionate sampling technique was then used to select 20 schools from each school category and type in each of the counties. Once the required number of schools from each county had been determined, simple random sampling was used to select the participating schools. After selecting schools, stratified random sampling based on gender where possible was also used to select the mathematics teachers that participated in the study.

In addition one form four stream for each class type was randomly selected from each coeducational school out of which 10% of the students were selected to participate in the study. Once the required number of students was obtained from the class, stratified random sampling based on gender where possible was used to select the students that participated in the study. However, some questionnaires were found to be incomplete while some teachers did not submit some. Therefore' the actual number of questionnaires collected from the teachers and students was 203 and 516 respectively.

Instrumentation

A questionnaire named Mathematics Teachers Perceptions Questionnaire (MTPQ) was used to collect data on mathematics teachers' perceptions. Part A of the questionnaire sought teachers' background information in terms of age, sex, teaching load, qualifications, teaching experience and type of mathematics class taught by the teacher while part B sought information on teachers' perceptions of gender streamed and mixed sex mathematics classes. Items in the MTPQ were likert type with a scale of 1 to 5. A score of 5 indicated that the teacher strongly agreed with the perception item while a score of 1 indicated that the teacher strongly disagreed with it. The questionnaire was validated and piloted before use to improve it. A cronbach reliability coefficient of 0.87 was obtained. This was within the accepted threshold of above 0.7 in social science research.

Data Collection and Analysis

The responses on each item were coded in order to obtain the magnitude of what was measured. Coded data was then analyzed using the statistical package for social sciences (SPSS). Quantitative methods of data analysis were used in which descriptive which included means, standard deviation and inferential which included ANOVA were applied. The statistical significant level for inferential statistics was at coefficient alpha (α) equal to 0.05 levels.

3. Results

A Comparison of Mathematics Teachers' Perceptions of Mixed and Gender Streamed (Girls' and Boys' Only) Classes within Co-educational Secondary Schools by School Category

To achieve this objective, the mean perception scores obtained by mathematics teachers in mixed and gender streamed (girls' and boys' only) classes were used to ascertain whether or not there were significant differences in their perceptions in the sub-county and county categories of secondary schools. The purpose was to test the hypothesis that there was no statistically significant difference in mathematics teachers' perceptions of mixed and gender streamed (girls' and boys' 'only) classes within co-educational secondary schools by school category. Table 1 shows the overall mean scores and SD of sub-county schools' mathematics teachers' perceptions of gender streamed (girls' and boys' only) and mixed sex classes.

Table 1

Mean scores and SD of Sub-County schools' mathematics teachers' perceptions of gender streamed (girls' and boys' only) and mixed sex classes.

Class Type	N	Mean	Std Deviation
Boys' Only	27	3.83	0.52
Girls' Only	24	3.52	0.63
Mixed Sex	40	3.66	0.51

From the overall results it is clear that, mathematics teachers teaching boys' only classes have a higher perception mean score of 3.83 out of a maximum of 5 followed by those teaching mixed sex classes with a mean score of 3.66 and lastly by teachers teaching girls' only classes with a mean score of 3.52. The findings generally indicate that teachers have higher and positive perceptions of teaching learners mathematics in their classes.

They believe that learners can be able to perform very well in mathematics despite the gender composition of the class. In order to determine whether there were statistically significant differences in the sub-county schools' mathematics teachers' perception mean scores, an ANOVA was computed and the results summarized in Table 2.

Table 2

Analysis of Variance (ANOVA) Results Showing the Differences in Sub-County Schools' Mathematics Teachers' Perceptions of Mixed and Gender Streamed (Girls' and Boys' Only) Classes

	Sum of squares	df	Mean square	F	P-value
Between groups	1.218	2	0.609	2.014	0.140
Within groups	26.601	88	0.302		
Total	27.818				

df=2,88; F-critical=3.07; P<0.05

The results show that there is no statistically significant difference in mathematics teachers perceptions of mixed and gender streamed (girls' and boys' only) classes within the sub-county co-educational secondary schools. This implies that there are no differences in perceived benefits of boys' only, girls' only and mixed sex classes in the teaching and learning of mathematics by teachers. Table 3 shows the descriptive results of the county schools' mathematics teachers' perceptions of gender streamed (girls' and boys' only) and mixed sex classes.

Table 3

Mean scores and SD of County Schools' Mathematics Teachers' Perceptions of Gender Streamed (Girls' and Boys' only) and Mixed Sex Classes.

Class Type	N	Mean	Std Deviation
Boys' Only	39	3.88	0.64
Girls' Only	24	3.85	0.65
Mixed Sex	40	3.95	0.37

The findings indicate from the overall mean scores that within the county co-educational secondary schools, mathematics teachers teaching mixed sex classes have a higher perception mean score of 3.95 out of 5 followed those teaching boys' only classes with a mean score of 3.88 and lastly those teaching girls' only classes with a mean score of 3.85. The results obtained indicate that teachers believe that learners in this school category can perform very well in the subject despite the class gender composition. However, the higher mean perception score obtained by teachers teaching mixed sex classes could imply that such classes are better than the others in preparing learners in mathematics.

In addition mathematics teachers' perceptions of girls' only classes were lower in both district and county schools. This could be explained by societal stereotypes which seem to allude to the fact that females may not be good mathematics students. It appears that mathematics teachers' still hold on to the view hence may not expect the girls to do well in the subject. In order to determine whether there were statistically significant differences in the county schools' mathematics teachers' perception mean scores, an ANOVA was computed and the results summarized in Table 4.

Table 4.

ANOVA Results Showing the Differences in County Schools' Mathematics Teachers' Perceptions of Mixed and Gender Streamed (Girls' and Boys' Only) Classes

	Sum of squares	df	Mean square	F	P-value
Between groups	0.168	2	0.084	0.277	0.759
Within groups	30.399	100	0.304		
Total	30.567	102			

df=2,100; F-critical=3.07; P<0.05

The ANOVA results indicate that there is no statistically significant difference in mathematics teachers perceptions of gender streamed (girls' and boys' only) and mixed sex classes within county co-educational secondary schools. Based on these findings the null hypothesis that states that there is no statistically significant difference in mathematics teachers' perceptions of gender streamed (girls' and boys' only) and mixed sex classes within county co-educational secondary schools is accepted.

4. Discussion

This study compared mathematics teachers' perceptions between those who teach gender streamed (boys' and girls' only) and mixed sex classes in sub-county and county schools. Findings show that mathematics teachers'

perceptions were higher in boys' only classes with a mean of 3.83 followed by mixed sex classes with a mean of 3.66 and lastly girls' only classes with a mean of 3.52 in sub-county schools out of the highest possible score of 5. In county schools teacher perception scores were higher in mixed sex classes with a mean of 3.95 followed by boys' only classes with a mean of 3.88 and lastly girls' only classes with a mean of 3.85. From the findings, it is clear that mathematics teachers' perceptions scores were lower in girls' only classes for both district and county schools.

Furthermore, the findings show that there are no statistically significant differences in mathematics teachers' perceptions of gender streamed (girls' and boys' only) classes and mixed sex classes in both the sub-county and county schools. The findings indicate that from the mathematics teachers' perspectives, there are no special benefits that may accrue to learners learning the subject in boys' only, girls' only and mixed sex classes. To them boys and girls can excel in the subject irrespective of the class type. These findings are in agreement with those of the American Association of University Women (1998), Chouinard (2008), LaFleur (2011) and Hyde and Allison (2014).

American Association of University Women (1998) reported that girls' achievement did not improve as a result of creation of single sex classes within co-educational secondary schools. The report further noted that the teachers did not notice boys' learning and writing problems in single sex classes. As a result, they inappropriately handled their emotional and social needs always interpreting their behavior as discipline problems. The findings further agree with those of LaFleur (2011) in a study on attitudes and participation in gender specific mathematics classrooms. The study findings showed that creation of single sex settings for boys and girls did not have a significant effect on student's participation and attitudes towards mathematics. Chouinard (2008) studied 340 girls in grades seventh to 11th for three academic years. By the end of the study Chouinard found that irrespective of the school type (single sex or co-educational), there was little impact on girls' achievement, motivation and attitudes towards mathematics. Finally Hyde and Allison's findings did not support the view that both males and females educational outcomes are better in single sex settings. They found little or no advantages of single sex classes over co-educational ones in mathematical performance, attitudes and self concept.

However, there are other studies which found contrary findings which indicate that single sex settings in coeducational secondary schools could be beneficial to the learners (Baker & Jacobs (1999; Ferrara & Ferrara 2004; Willis, Kilpatrick & Hulton, 2006). Willis, Kilpatrick & Hulton, (2006) conducted a study in a Tasmanian primary school to look at social and academic outcomes from gender – specific classrooms. The findings indicated that both the teachers and students benefited in gender specific classrooms. They discovered that single-sex classrooms improved students' attitude towards school and motivated them to do better in class.

Baker and Jacobs (1999) found that girls preferred the single-sex classes because girls were more supportive of each other and were comfortable in class without the boys. Their study also indicated that girls were more successful in the single sex classroom than the boys. Ferrara and Ferrara (2004) conducted a study in Ellenville central school district over a three year period. The students were placed in single-sex classrooms based on parents' permission. The findings indicated that the boys' classes were behind in the curriculum compared to girls' classes. Boys' behaviors were worse than the girls. However, boys and girls classroom participation increased and were less self – conscious about their academic work.

5. Conclusion

The perceptions of the teachers towards gender streamed and mixed sex classes in sub-county and county schools were favorable and positive. The perception mean scores obtained by teachers were higher in boys' only followed by mixed sex and lastly girls' only classes in sub-county schools. However, the mean scores were higher in mixed sex followed by boys' only and lastly girls' only in classes' county schools. In addition, these teacher perceptions in the two school categories did not differ significantly.

6. Implication

The results of the study have shown that the mathematics teachers perceptions of gender streamed and mixed sex mathematics classes in sub-county and county schools are favorable and positive. This implies that the teachers do not perceive any significant benefits of any of these classes over the others in the teaching and learning of mathematics. To the teachers, students can learn and excel in the subject in all the three types of mathematics classes (girls' only, boys' only and mixed sex classes).

7. Recommendation

The Ministry of Education through the Quality Assurance and Standards Officers should establish why mathematics teachers' perceptions are lower in girls' only classes. They should thereafter organize intensive in-service training for the mathematics teachers.

8. Areas for Further Research

- i. A qualitative study should be undertaken to establish the reasons for lower mathematics teachers' perceptions of girls' only classes.
- ii. A study to be conducted to determine the teachers' perceptions of gender streamed classes in co-educational secondary schools in the teaching of other subjects in the secondary school curriculum.

References

- American Association of University Women (1998). *Separated By Sex: A Critical Look at Single-Sex Education for Girls*. American Association of University Women Educational Foundation, Washington D.C.
- Baker, D., & Jacobs, K. (1999). *Winners and Losers in Single-Sex Science and Mathematics Classrooms*. Rep Boston
- Booth, A., & Nolen P. (2012). "Choosing to Compete: How Different are Boys and Girls?" *Journal of Behaviour & Organization*, Vol. 81(2), pp.542-555.
- Barmao, A.C., & Mondoh, H.O. (2006). Effect of Streaming by Gender on Students' Performance in Secondary School Mathematics in Nakuru District. In *Contemporary Development Issues in Kenya. Organization For Social Science Research in Eastern and South Africa (OSSREA) Kenya Chapter Journal*, 1, 153-175.
- Chouinard, R. (2008). Coeducational of Single-Sex School: Does it make a Difference on high School Girls' Academic Motivation? *Educational Studies*, 34(2), 129-144.
- Cohen, L., Manion, L., & Morrison, K. (2011). *Research Methods in Education* (5th ed). London & New York: Routledge Falmer.
- Eisenkopf, G.Z., Hessami, U., Fischbacher & Ursprung, H. (2012). *Academic Performance and Single-Sex Schooling: Evidence from a National Experiment in Switzerland*, University of Konstanz Working Paper.
- Eshiwani, G. S. (1975). *A Study of Sex Differences and Mathematical Abilities among Kenyan High School Children*. Unpublished Manuscripts Bureau of Educational Research, University of Nairobi.
- Ferrara, P.J. & Ferrara, M. M. (2004). Single-Gender Classrooms: Lessons from a New York Middle School. *Spectrum; Journal of School Research and Information*, 22 (3), 26-32.
- Gall, P.G., Gall, M.D & Borg, W.R. (2007). *Educational Research. An Introduction* (8th ed), Pearson Education. Inc.
- Githua B. N. (2002). *Factors Related to the Motivation to Learn Mathematics among Secondary School Students in Kenyan's Nairobi Province and three districts of the Rift Valley Province*. Unpublished Ph.D thesis, Egerton University, Njoro.
- Githua, B. N. & Mbugua, Z. K. (2004). Gender Preferences for Instructional Methods in Secondary School Mathematics Classrooms in Kenya. *Journal of Education and Human Resources*. Vol. 2 No ; 63 – 74.
- Hornby, A.S (Ed.). (2006). *Oxford Advanced Learner's Dictionary International Students Edition* (7th ed). London: Oxford University Press.
- Hyde, J.S., & Allison, C.M (2014). The Effects of Single-Sex Schooling Compared with Coeducational Schooling on Students' Performance and Attitudes: A Meta-analysis. *American Psychological Association*. DOI:10.1037/a0035740
- Kenya National Examinations Council (KNEC). *The year 2003 – 2014 Kenya Certificate of Secondary Examinations (KCSE) Candidates Performance Reports*. Nairobi: KNEC.
- Kreiter, R. & Kinicki, A. (2007). *Organizational Behavior*, Arizona: McGraw – Hill Ryerson
- LaFluer, K. (2011). *Attitudes and Participation in Gender Specific Math Classrooms. Math in the Middle Institute Partnership Action Research Project*. Unpublished Master's Thesis. University of Nebraska-Lincoln.
- Mondoh, H. O. (2002), Girls Poor Performance in Mathematics. A critical Review. *Egerton University Journal of Humanities, Social Sciences and Education Series Vol. 4 No. 1 May, 2002*.
- Mukwa, C. W. & Too, J. K. (2005). Gender and Classroom Challenges of Teaching Mathematics in Secondary Schools in Kenya. *Journal of Education and Human Resources*, Vol. 3 No. 2: pp 116 – 127, Egerton University.
- Mwendwa, P. (2014). Influence of Gender Based Streaming on Teaching and Learning Mathematics in Kasue Secondary School in Kitui West District, Kitui County Kenya. *Academia*
- Provincial Director of Education Office Nakuru (PDE, 2010). *Rift Valley Province Secondary Schools Statistics*. Unpublished Document.
- Rennie, L.J., & Parker, L.H. (1997). Students' and Teachers' Perceptions of Single-Sex and Mixed-Sex Mathematics Classes. *Mathematics Education Research Journal*, 9, (3), 257-273.
- Sadker, M., & Sadker, D (1995). *How America's Schools Cheat Girls*, Scribner (1st march 1995)

- Saitoti (2005). Poor Teaching Habits by Teachers. Speech delivered when launching the Association for the development of Education in Africa (ADEA) on 31 / 5 / 2005. *Daily Nation* 31 / 3 / 2005 pg 5.
- Smyth, E. (2010). Single-Sex Education: What does Research Tell Us? Social Research Division Economic and Social Research Institute (online) Available: www.ncgs.org/pdfs/Resources/RF171-5.pdf
- Suchia, S. M. (2001, April 9th). Girls Dismal Overall Academic Performance Explained. *Kenya times* PP.12
- Teo, (2008). Pre-Service Teachers' Attitudes towards Computer Use: A Singapore Survey. *Australian Journal of Educational Technology* 24 (4), 413 – 424 (online) Available: <http://www.ascilite.org.au/ajet/aget24/teo.html>.
- Younger, M., & Warrington, M. (2013) Single- Sex Teaching in a Coeducational Comprehensive School in England: An Evaluation Based on Students' Performance and Classroom Interactions. *British Educational Research Journal* Vol. 28 Issue 3 pp.353-374. DOI:10.1080/014/1920220137449
- Willis, R., Kilpatrick, S. J., & Hutton, B. (2006). Single-Sex Classes in Coeducational Schools. *British Journal of Sociology of Education*, 27 (3), 277-291.