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Gender Difference in the Relationship between Self-Efficacy and Performance in Science among Secondary School Students in Migori County, Kenya

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Abstract

The purpose of this study was to investigate the gender difference in the relationship between self-efficacy and performance in science. A sample of 327 Form Four students in Migori County was used. Questionnaires, focus group discussion guide and interview schedules were used for data collection. Quantitative data were analyzed using descriptive statistics and correlation. Qualitative data were organized into themes and interpreted. Overall, boys had higher levels of performance in science (Mean=39.21) than girls (Mean=30.80) and the mean difference was statistically significant (t=3.89, p=.00). Boys had higher levels of self-efficacy (Mean=2.89) than girls (Mean=2.81) and the mean difference was not statistically significant (t=1.56, p=.12). Further, the overall correlation between self-efficacy and performance was statistically significant with r=.236 (p=.002, n=327). The correlation between self-efficacy and performance for boys was significant with r=.250 (p=.005, n=200) and non-significant for girls with r=.085 (p=.558, n=127). It is concluded that boys outperform girls in science and record higher scores in self-efficacy than girls. In addition, the variance shared in common between self-efficacy and performance is higher for boys than girls. To improve performance and also reduce the gender gap in science performance, self-efficacy should be enhanced for students but more particularly so for girls.

Keywords

self-efficacy, performance in science, gender, Kenya

1. Introduction

Gender bias in Mathematics and science classrooms has been and still continues to be a problem (Diane, 2003). Despite improvements in the past two decades, girls are still less likely than boys to take physics and higher-level Mathematics and science courses in high school. As a consequence, fewer female students may study Mathematics and science at the college level. The types of courses taken in high school and how students perform in these courses can impact acceptance into college, choice of college major, and subsequent career choice (Diane, 2003).

A growing demand for professionals in Science, Technology, Mathematics and Engineering (STEM) is met with a significant labor shortage in these fields as women account for just 28 percent of global researchers but the figure masks wide variations between countries and regions (UNESCO, 2016). Women are often underrepresented in STEM, and their low levels of participation can be traced back all the way to their school years, where a number of influences from society and culture, education and the labor market are all at play (UNESCO, 2016).

Statistics Canada (2007) reports that as of 2006 only 22% of professionals in natural sciences, Engineering, and Mathematics are women, an increase of a mere 2% from 1987; and since women continue to account for a small sector of the student population in these fields, there will probably be little change to this statistic in the near future (Fried & MacCleave, 2009; Statistics Canada, 2007). Similar situations are visible in the United States and Europe. In the United States, women comprise 50% of the workforce but only 15% of scientists are female (Weinburgh, 2000). While more women are receiving PhDs in science nowadays there still is no equity as far as their career is concerned (Burrelli, 2008; UNESCO, 2007).

At the end of the 20th century, still fewer than 6% of the highest attainable academic positions were held by women (Fox, 2001). This trend is also seen in other parts of the world. In Europe, although women represent more than half of the student population, only 11% of top academic science positions are held by women (Dewandre, 2002; European Commission, 2009). While women represent 52% of professionals and technicians, only 32% of scientists and engineers are women. Efforts in Europe to encourage more women to obtain their PhDs have been successful in life sciences and humanities, where women are 41% of PhD holders; however, in Engineering and physical science, only 25% of PhD holders are women (European Commission, 2009). Women scientists attribute this skewed representation to small discriminations along the way that finally end up creating this gender gap (Baker & Leary, 2003; Ceci & Williams, 2007).

Studies in Nigeria have however revealed mixed reports on gender difference in science performance. Some researchers have provided reports that there are no longer distinguishing differences in the cognitive, affective and psychomotor skill achievements of students in respect of gender (Abayomi & Mji, 2004; Bilesanmi- Awoderu, 2006 & Din, Ming & Ho, 2004). Girls are being encouraged and sensitized into developing positive attitudes towards science. Other researchers have reported differently on this issue. For example, in one study carried out by Eriba and Sesugh (2006), they found that boys outperformed girls in integrated science and mathematics achievements. Some other research studies reported that males are becoming the disadvantaged gender in schools, and that fewer males are interested in science (Omoniyi, 2006).

In Uganda, a study conducted by the Female Education in Mathematics and Science in Africa project, found that women's performance in science subjects (which is the gateway to computer science studies) in the Uganda Certificate Examinations is very low compared to that of men (Ochwa-Echel, 2011). He further reckons that although there has been some rhetoric from politicians and educators in Uganda about improving the teaching of mathematics and science courses to women, not much has been done and the deficiencies and inadequacies continue. The concern this raises is that women are not participating fully in the sector, meaning that their potential is not being fully realized and their capabilities to participate in the development of the country in particular, and in the human development process in general, are being curtailed.

The situation in Kenya is no better as recent literature show that there has been a big problem of poor performance in STEM subjects in the country as a whole as girls perform even worse in comparison with the boys (Forum for African Women Educationalists, 2008). The same position is held by Wambua (2007) in his study as he found that boys performed better than girls in STEM subjects. This has caused a lot of public outcry as poor performance by girls in STEM would automatically translate to fewer women enrolling for STEM courses (FAWE, 2008). Wambua (2007) reckons that as a result of the gender gaps in performance in STEM subjects, fewer girls as compared to boys qualify to join Science, Mathematics, Engineering and Technology related courses.

The situation in the Kenyan universities is no better. The figures from the Commission for University Education indicate that a third (33 percent) of university students enrolled in STEM courses are women. The presence of women varies according to the field of study. In 2015, at the undergraduate level, the share of female students' enrolment was particularly low in the clusters of Manufacturing (16 percent), Engineering (17 percent) and Computing (22 percent). But there was near gender parity in the health and welfare cluster (49 percent) (CUE, 2018). Consequently, at the Kenya Certificate of Secondary Education (KCSE) examination, boys continue to outshine girls in Science and Mathematics. In 2019 boys defeated girls in all the science subjects. In the 2018 Kenya Certificate of Secondary Education examination girls defeated boys in Metal Work only and lagged behind the boys in the other science and technology-related courses, including Biology, Chemistry, Computer Studies, Electricity, General Science, Mathematics, Physics, Power Mechanics, Agriculture, and Aviation. A similar result was evident in the 2017 KCSE results where, of the examinable subjects, boys scored better than girls in 23 subjects, defeating girls in all Sciences, whereas girls only defeated boys in 6 subjects of; English, Kiswahili, CRE, Home Science, Art, and Design and Electricity (KNEC, 2019).

Migori County in Kenya has not done any better in terms of science performance as well. The County had girls scoring an average of 22.63% for all sciences against the boys' 26.65%, giving a gender disparity of 4.02%. Consequently, just 10.22% of girls in comparison with 20.46% of boys who sat for 2019 KCSE examination did all the 4 Science subjects (Migori County Education Office Records, 2019). Migori county risks lagging behind in contributing to scientific development, since STEM subjects contribute towards industrialization, environmental conservation, medical research, food management and improved agricultural production. As a result, Kenya risks losing out on her aspirations to achieve the Sustainable Development Goals and attainment of Vision 2030. Subsequent to the conflicting research findings regarding gender differences in sciences, it is important to conduct more studies in this area, particularly at secondary school level.

One possible explanation of gender disparity in performance in sciences is that girls tend to have lower levels of self-efficacy in science than boys. Titilayo, Oloyede and Adekunie (2016) explained that self-efficacy reflects the extent to which students believe that they can successfully perform in school. Thus, science self-efficacy may be defined as the extent to which students believe that they can successfully perform in science. Consequently, if a girl believes she is unable to succeed in science, her perception may be subsequently altered and this is likely to manifest in lower scores or in avoiding science subjects altogether (Corbett, Hill, & Rose, 2008). Previous research has established that science self-efficacy is associated with science achievement and science-related choices across grade levels (Kiperman, 2002; Lau & Reeser, 2002).

Titilayo, Oloyede and Adekunie (2016) sought to establish whether the dismal performance of Nigerian candidates in School Certificate Chemistry could be traced to their self-efficacy. The study however found no significant relationship between self-efficacy and chemistry students' academic achievement in chemistry.

The above notwithstanding, the relationship between self-efficacy and performance in science subjects cannot be underscored (Ochieng, 2015). In his study on the relationship between self-efficacy and Mathematics achievement, the results showed that male students had higher levels of self-efficacy than their female counterparts. His study further observed that there was a significant gender difference in self-efficacy.

While some studies showed a relationship between self-efficacy and performance in science (Corbett, Hill, & Rose, 2008; Kiperman, 2002; Lau & Reeser, 2002; Ochieng, 2015); others have shown no significant relationship between these two constructs (Titilayo, Oloyede, & Adekunie, 2016). Based on these conflicting findings, one cannot conclusively posit whether or not self-efficacy is related to performance in science, and if it does, it would be worthwhile to explore the nature of such a relationship across gender.

Whereas Corbett, Hill and Rose (2008), Kiperman (2002) and Lau and Reeser (2002) assessed the relationship between self-efficacy and performance in physics, Titilayo, Oloyede and Adekunie (2016) assessed the relationship between self-efficacy and performance in chemistry while Ochieng (2015) investigated the relationship between self-efficacy and performance in mathematics. These studies did not examine the relationship between self-efficacy and science as a combined subject area. Rather, they each focused on one science subject only. This may lead to inaccurate findings as each science subject is unique in its own way. This study therefore sought to fill this gap by looking at gender difference in the relationship between self-efficacy and performance in science among secondary school students in Migori County, Kenya.

1.1 Objectives of the Study

The study was guided by the following objectives:

i. To establish secondary school students' level of performance in science subjects across gender.

ii. To establish secondary school students' level of self-efficacy in science across gender.

iii. To determine the overall relationship between self-efficacy and performance in science among secondary school students.

iv. To examine gender difference in the relationship between self-efficacy and performance in science among secondary school students.

1.2 Limitation of the Study

One limitation is that the Science Achievement Test used in the present study tested the theoretical aspects of the science subjects only, leaving out the practical segment. Therefore the results of the test could be slightly inaccurate as the practical segment makes a reasonable part of science as a subject. To remedy this, qualitative data were collected from the Heads of Science Department on the level of performance in science with respect to both theoretical and practical aspects to complement the results obtained from the Science Achievement Test.

1.3 Significance of the Study

The findings of this study may be useful to both teachers and students as it would seek to provide ways of improving confidence in science, particularly for female students who have consistently shown a weaker performance in science. The findings would also be useful to curriculum developers and teacher trainers in the development of content and methodology that may improve learners' confidence in science.

2. Method

2.1 Research Design

A mixed methods research design which includes both quantitative and qualitative paradigms was adopted in the study. More specifically, the convergent parallel mixed methods approach was used.

2.2 Study Population

The population for this study consisted of Form Four students of the year 2020 and the Heads of Science Department in Migori County, Kenya. The Form Four students in this target population were those who took all the four science subjects, namely, Mathematics, Biology, Chemistry and Physics.

They were approximately 2,200 in total, i.e., 1550 boys and 650 girls spread out in the 240 public secondary schools in the County (Migori County Director of Education Office Records, 2019). The population of the Heads of Science Department (HOSD) was approximately 240 since the 240 public secondary schools were believed to have one HOSD each. The HOSD were selected because they were perceived to have a better understanding of student performance in the four science subjects.

2.3 Sample Size and Sampling Technique

Fisher et al. (1991) formula was used to arrive at a sample size of 327 students. The study used stratified sampling method and simple random sampling technique to sample the students for study. In this regard, schools were divided into 4 strata; national, extra-county, county and sub-county. Of the 240 public secondary schools in the County, 2 are national schools, 8 are extra-county, 14 are county and 216 are sub-county schools. To get the number of students to be sampled from each stratum, a proportion was worked out based on the following formula:

$$N=\frac{\text{Number of schools in a particular cluster}}{\text{Total number of schools}} \text{ x Sample size}$$

Where N is the number of students in each stratum.

From this formula, 294 students were randomly selected from Sub-county schools, 19 from County schools, 11 from Extra-County schools and 3 from National schools.

Ten groups comprising of 6 participants each were selected to take part in the Focus Group Discussion. Thirty Heads of Science Department from 30 schools were also selected for the study.

2.4 Research Instruments

Four tools were used for data collection; Science Self-Efficacy Scale (SSES), Science Achievement Test (SAT), Focus Group Discussion Guide and Head of Science Interview Schedule (HOSIS). The tools are described below.

2.4.1 Science Self-Efficacy Scale (SSES)

The Science Self-Efficacy Scale was used to measure the level of Science self-efficacy. The scale is an adaptation from Capa Aydin and Uzuntiryaki (2009), High School Chemistry Self-Efficacy Scale. The scale was modified to capture science in general rather than just focus on Chemistry which was the case with the original scale. The scale has 12 items scored in a 4-point Likert-type scale ranging from no confidence at all (very low level)=1, Very little confidence (moderately low level)=2, Much confidence (moderately high level)=3 to complete confidence very high level)=4. The original instrument gave a reliability of .90 (Uzuntiryaki, Capa Aydin, Ceylandag & Cömert, 2011). The current scale was subjected to reliability tests to ascertain its suitability in the local environment.

2.4.2 Science Achievement Test (SAT)

Science Achievement Test was used to measure the students' performance in science subjects. The test was developed from the 2012 Kenya Certificate of Secondary Examination from which questions drawn from the Forms 1 and 2 syllabi were selected. The test was made up of 4 subjects; Physics, Biology, Chemistry and Mathematics with each subject having a total of 25 marks. The items in the scale fell under 4 sub-scales of Physics, Biology Chemistry and Mathematics. The total score for the 4 sub-scales was 100 with scores below 50 being weak performance while scores above 50 being good performance. The scale was subjected to a pilot study to ascertain its reliability before being adopted for use in the main study. Experts from the Department of Educational Psychology, Maseno University advised on the face and content validity of the instrument.

2.4.3 Focus Group Discussion Guide (FGDG)

The Focus Group Discussion Guide was used to get more information from the students on the study variables and was meant to give more insight to the quantitative data got from the questionnaire. The discussion served to complement the quantitative data and also provide peripheral information that may have not been covered by the study questionnaires. Focus Group Discussion Guide was used due to its ability to give a more detailed and in-depth insight of the issues provided. Consequently, it allows for integration of the quantitative and the qualitative data (Creswell, 2013). The instrument was be administered to groups from 10 randomly sampled schools. The groups will be made up of 6 students each who will have completed the questionnaires. The scale was subjected to content validity tests to remove the irrelevant or redundant content.

2.4.4 Head of Science Interview Schedule (HOSIS)

The Head of Science Interview Schedule was used to obtain qualitative data on the variations in science performance across gender from the teachers' point of view. The schedule is made up of 5 open ended questions which seek to find out the factors responsible for gender disparity in science performance.

2.5 Procedure for Data Collection

Permission for data collection was first sought from the Maseno University School of Graduate Studies (SGS) and Maseno University Ethics Review Committee. Thereafter, the Migori County Director of Education (MCDE) was provided with information about the intended study. The Principals of the samples schools were then requested to seek permission from the Parents Association (PA) to allow students participate in the study. It was at this point that actual data were collected through administering questionnaires and interview schedules as well as conducting focus group discussions.

2.6 Methods of Data Analysis

Descriptive statistics, correlation analysis and simple linear regression were used to analyze quantitative data. The software used for quantitative data analysis was the Statistical Package for the Social Sciences (Version 24). Qualitative data was analyzed thematically.

2.7 Ethical Considerations

All the protocols for conducting research in psychology were observed. The study was approved by Maseno University Ethics Review Committee prior to data collection.

3. Results

3.1 Reliability Analysis

Cronbach's alpha gave a reliability index of 0.78 for Science Achievement Test and 0.77 for Self-Efficacy Questionnaire. Thus, both tools were reliable because their reliability exceeded the threshold of 0.70.

3.2 Students' Performance in Science across Gender

Table 1 contains mean scores in the Science Achievement Test sub-scales as well as the overall mean score across gender. The overall mean score for boys (Mean=39.21) was higher than for girls (Mean=30.80). Boys consistently outperformed girls in all the four science subjects. The best done subject Mathematics followed by Biology and then Physics. The worst performance was in Chemistry.

Table 1. Level of Performance in Science across Gender

	Mean Score by Gender	
	Boys	**Girls**
Physics	9.90	7.02
Chemistry	7.39	5.78
Mathematics	11.25	9.08
Biology	10.66	8.92
Overall Mean	**39.21**	**30.80**
Valid N (listwise)	200	127

The highest gender disparity was recorded in Physics followed by Mathematics. Biology had the third highest gender disparity in performance while Chemistry had the lowest gender disparity T.

In order to establish if the mean difference in science performance between the mean for boys and that for girls is statistically significant or not, the independent samples t-test was used at α=.05 (two-tailed). Table 3 shows the outcome of the analysis which indicates that the fundamental assumption for t-test regarding the equality of variances was satisfied at α=.05 (F=.83, p=.37). With equal variances, the difference in science performance between boys and girls was statistically significant at α=.05 (t=3.89, p=.000). Therefore, the mean difference in science performance between boys and girls was a true difference in the population from which the sample was drawn and not a result of chance or sampling error.

Table 2. Test of Significance for Gender Difference in Science Performance

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	**Sig.**	***t***	***df***	**Sig. (2-tailed)**
Performance in Science	Equal variances assumed	.83	.37	3.89	173	.000
	Equal variances not assumed			4.08	100.60	.000

When asked whether there was a gender disparity in science performance, the Heads of Science Department all agreed that girls have been performing poorer than boys in sciences. As an example, one teacher who had served as Head of Science Department for 12 years observed that:

> *"Generally, for the time I have served as a head of science department, I have seen a consistent gender gap in science performance. The girls show a weaker performance in sciences that the science field appears as a preserve of the males. Although there is a slight improvement in girl performance in science, that doesn't mean that girls are now performing any better than boys in sciences, actually there still exists a significant gap in the performance and I think something should be done to improve the female student's performance in science."*

This observation further confirms that girls tend to perform at a lower level than boys in science. During focus group discussion, students were asked which science subject has the highest disparity in performance in terms of gender. All the students who took part in the discussion were in agreement that Physics was better performed by boys than girls unlike other science subjects where participants gave conflicting opinions. For example, one student responded as follows:

> *"The answer is definitely Physics. Boys by far perform better than the girls in Physics and the subject is actually considered a male subject. Even the number of girls who select Physics is so low in comparison with the boys. But above all, all the science subjects show a remarkable difference in science performance with boys topping the girls in these subjects."*

3.3 Level of Self-Efficacy across Gender

Table 3 presents mean scores for science self-efficacy across gender. The overall mean score for boys is 2.89 and the overall mean for girls is 2.81. This implies that the level of self-efficacy for boys was higher than that for girls.

Table 3. Mean Scores for Self-efficacy across Gender

	Mean	
	Boys	**Girls**
Explain Scientific terms	2.74	2.62
Choose an appropriate formula to solve a scientific problem	2.86	2.66
Carry out experimental procedures in the laboratory	2.87	2.76
Describe scientific processes	2.60	2.54
Correctly write scientific formulas and terms	2.78	2.56
Interpret findings during laboratory practical	2.72	2.56
Solve Mathematical problems using a log table	3.14	3.08
Interpret various equations	2.70	2.76
Explain the particulate nature of matter	3.22	3.08
Solve Mathematical problems	3.14	3.18
Correctly answer various questions in science subjects	2.92	2.68
Correctly observe results of laboratory experiments	2.99	3.22
Overall Mean	**2.89**	**2.81**
Valid N (listwise)	200	127

In order to establish if the mean difference in self-efficacy between the mean for boys and that for girls is statistically significant or not, the independent samples t-test was used at α=.05 (two-tailed). Table 5 shows the outcome of the analysis which indicates that the fundamental assumption for t-test regarding the equality of variances was violated at $\alpha < .05$ (F=11.724, p=.001). This notwithstanding, and assuming equal variances, the difference in self-efficacy between boys and girls was not statistically significant at $\alpha < .05$ (t (173)=1.564, p=.120).

Table 4. Test of Significance for Gender Difference in Self-efficacy

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	**Sig.**	***t***	***df***	**Sig. (2-tailed)**
Self-efficacy	Equal variances assumed	11.724	.001	1.564	173	.120
	Equal variances not assumed			1.862	136.37	.065

3.4 Relationship between Self-Efficacy and Performance in Science

The overall correlation between self-efficacy and performance in science was found to be statistically significant at α=.05 with *r*=.236 (*p*=.002, *n*=327). Thus, an increase in self-efficacy is associated with an increase in science performance. When data were disaggregated by gender, the correlation between self-efficacy and performance in science for boys was statistically significant at α=.05 with *r*=.250 (*p*=.005, *n*=200). The correlation between self-efficacy and performance in science for girls on the other hand was not statistically significant at α=.05 with *r*=.085 (*p*=.558, *n*=127). Thus, self-efficacy explained 6.25% of the variance in science performance for boys and a meagre 0.72% for girls. Put differently, the correlation between the two variables was positive, significant and stronger for boys but positive, weaker and non-significant for girls. This outcome suggests that it is accurate to predict performance in science from self-efficacy for boys. However, predicting performance in science using self-efficacy as the predictor is inaccurate for girls.

Considering that the correlation between science self-efficacy and performance in science was statistically significant for boys, Table 5 is a linear regression output for predicting performance in science from self-efficacy for boys.

Table 5. Prediction of Performance in Science from Self-efficacy for Boys

	Unstandardized Coefficients		**Standardized Coefficients**	**t**	**Sig.**
	B	Std. Error	Beta		
(Constant)	16.598	7.966		2.084	.039
Self-Efficacy	7.823	2.727	. 250	2.869	.005

a. Dependent Variable: Performance in Science

The Table indicates that the regression coefficient is B=7.823 (*p*=.005). Therefore, the slope of the regression line for predicting boys' performance in science from their self-efficacy scores is significantly different from zero at α=.05. This means that a change of 7.823 units in science performance by boys is associated with a corresponding change of one unit in science self-efficacy. This finding affirms the FGD responses where participants were of the opinion that the level of confidence one has in science determines their level of performance in science. One male participant reported that:

> *"You see, there is no way one can do what he or she feels is difficult. I do well in sciences since I am quite confident about my ability. At times I come across very challenging tasks but the fact that I believe in my capabilities, makes me go out of my way and succeed. And therefore self-efficacy is key in science performance and that is why those who doubt their abilities in science always fail in very simple tasks that don't require much effort."*

4. Discussion

The fact that boys did better than girls is consistent with the findings of Eriba and Sesugh (2006) and KNEC (2019). Eriba and Sesugh (2006) found that boys outperformed girls in integrated science and mathematics achievement. KNEC (2019) also found that boys scored better than girls in all Sciences in the 2017 KCSE examination. Similarly, the finding corresponds with that of Ochwa-Echel (2011) in Uganda in a project, dubbed Female Education in Mathematics and Science in Africa. The study found that girls' performance in science subjects (which is the gateway to computer science studies) in the Uganda Certificate Examinations is very low compared to that of boys.

Likewise, the finding is a true reflection of the situation in Kenya as recent literature shows that there has been poor performance in STEM subjects as a whole with girls performing even worse compared to boys (Forum for African Women Educationalists, 2008). The same position is held by Wambua (2007) who found that boys performed better than girls in STEM subjects.

With the Science Achievement Test being developed from science questions in the KCSE examination, the study finding mirrors the true performance scenario on the ground as recent national KCSE examination results of 2017, 2018 and 2019 have shown that boys continue to perform better than girls in all the science subjects. For instance, in the 2017 KCSE results, of all the examinable subjects, boys scored better than girls in 23 subjects, defeating girls in all sciences, whereas girls only defeated boys in 6 subjects; English, Kiswahili, CRE, Home Science, Art, and Design and Electricity (KNEC Report, 2018). Similarly, in the 2018 KCSE examination, girls lagged behind the boys in all the science and technology-related courses, including Biology, Chemistry, Computer Studies, Electricity, General Science, Mathematics, Physics, Power Mechanics, Agriculture, and Aviation.

The current finding also corroborates other studies done in the local environment. According to the records at the Migori County Office, boys have continued to perform better than girls in the sciences. For instance, in the 2018 KCSE results, Migori County had girls scoring an average of 22.63% in all the sciences against the boys' 26.65%, giving a gender disparity of 4.02% (Migori County Education Office Records, 2019).

These outcomes are congruent with other reports that have found that among the other science subjects, Physics is normally the worst performed subject by girls. As observed by Carlone (2003), the gender gaps in Physics are among the most pronounced.

The above notwithstanding, the current findings contradict that of Omoniyi (2006) who found that males are becoming the disadvantaged gender in schools, and that fewer males are interested in science. However, the result of his study was based on qualitative reports from respondents and not on actual performance of students. Therefore it is difficult to authenticate Omoniyi's findings because students tend to exalt themselves before an interviewer thereby masking their true ability.

The present study found that male students had higher levels of self-efficacy in science than their female counterparts. This is consistent with that of Ochieng (2015) who sought to establish the gender differences in mathematics self-efficacy. In his study, Ochieng (2015) found that male students had higher levels of self–efficacy than female students.

The relationship between self-efficacy and performance in science was found to be statistically significant in the present study. This is in agreement with Simpkins, Davis-Kean and Eccles (2006), Britner (2002, 2008); Britner and Pajare (2001, 2006); Zeldin and Pajares (2000), Hu,and Garcia (2001) and Silver, Smith and Greene (2001) who also found a significant relationship between the two variables. The studies have established that science self-efficacy has the ability to influence performance in science. In particular, they have argued that self-efficacy predicts intellectual performance better than skills alone, and it directly influences academic performance through cognition. Further, they suggest that although past achievement raises self-efficacy, it is student interpretation of past successes and failures that may be responsible for subsequent success, and self-efficacy predicts future achievement better than past performance.

Similar to the findings of the current study, Diane (2003), Yazachew (2013), Aurah (2017), Farkota (2003) and Mustafa, Esma and Ertan (2012) found that self-efficacy is an important factor influencing students' performance in science, and it affects their achievement positively. It is imperative that students with high science self-efficacy are likely to perform well in academic tasks. It may be argued that this happens because their high level of self-efficacy makes them approach challenging tasks with confidence and are therefore able to learn by practice. As a result, they are able to register high scores on tests.

Noteworthy is that the finding in the current study is inconsistent with that of Titilayo, Oloyede and Adekunie (2016) who found that there was no significant relationship between self-efficacy and academic achievement of students in Chemistry in Nigeria. The Nigerian study however focused on Chemistry alone and left out other science subjects which may have led to the inconsistent results. The failure to have a relationship between the two variables could therefore be explained by the fact that Chemistry alone does not represent the entire science domain. Thus, lack of a significant relationship in the Nigerian study could have occurred due to focus on just one segment of science.

5. Conclusion

In light of the findings of the study, it is concluded that male students perform better than female students in science subjects in Migori County, Kenya. In addition, science self-efficacy influences performance in science, and an increase in the level of self-efficacy translates to a corresponding increase in the level of performance. However, there was more variance shared in common between the two variables for boys than for girls. It is recommended that teachers and counselors should work towards building the students' level of science self-efficacy by providing extrinsic motivation. This should apply more particularly to the female students. It is through such an approach that gender disparity in science performance may be minimized.

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