ISSN NO. 2320-5407

Journal homepage:http://www.journalijar.com

INTERNATIONAL JOURNAL OF ADVANCED RESEARCH

RESEARCH ARTICLE

INFLUENCE OF GENDER EXPECTATIONS ON STUDENTS' ATTITUDES TOWARDS LEARNING OF SCIENCE IN SECONDARY SCHOOLS IN KEIYO DISTRICT, KENYA

Barmao Paul Kipkorir,Chemjor Kibet Peter,Kirui Grace Jerotich.
Department of Administration and Policy Studies, School of Education, Moi University.

Manuscript Info *Abstract*

Manuscript History:

Received: 12 June 2013
Final Accepted: 18 June 2013
Published Online: July 2013

Key words:
Influence, Gender Expectations, Students Attitudes, Learning, Science, Secondary Schools, Keiyo District, Kenya

The proportion of women pursuing science and mathematics related course in Kenyan institutions of higher learning has been noted to be low. The study, therefore, sought to find out the extent to which gender perceptions and expectations contribute to attitudes towards learning of science at the Kenya Certificate of Secondary Education level in Keiyo District. The study employed descriptive research design and was based on the gender relations theory. Data was collected by use of questionnaires from 300 Form Three students from 30% of secondary schools in Keiyo District. Stratified sampling was used to select among the different types of schools. Simple random sampling was used to select the individual student respondents. Science teachers from sampled schools were also involved. Descriptive and inferential statistics were employed in data analysis. Chi-square tests were used to test degree of association between perceptions and expectations and attitude while t-tests were used to check the significance of the difference between mean responses by different group. The study established the students in Keiyo District have a positive (good) perception of the need and benefits of learning science but no significant difference in perception between boys and girls. So, the stereotype that boys perceive science more positively than girls does not hold in Keiyo District. The students also seem to hold high expectations with respect to learning science without any significant difference between boys' and girls' expectations.

Introduction

The evidence in the literature suggest that it is difficult to attribute lack of participation by girls to inferior performance; rather it is the negative attitude towards science that has often been cited as one factor that has contributed to lower participation of girls in science courses, and less success in these courses (Wills, 1995, Fullorton, 1993, as cited in Leder & Taylor, 1995). These scholars believe that interest in science is a significant predictor of which being experimented may increase attained grades in science and increase chances of perusing a science course and a science career. It is evident that gender issues pertaining to participation are linked to effective variables and this topic remains of importance.

Among the causes for gender differences in participation are sex role, stereotyping and students' perception of their own abilities. Studies on this topic point to the commonly held perception that science is consistent with male self image and inconsistent with female self image. Boswel (as cited in Fennema, 1981) asserts that peer pressure is a very powerful force in the formation of stereotypic concept. Fennema and Sherman (1977) further claim that boys were stereotyped with respect to science that the subject has been a male domain. For example, Sherman (1982) found that a considerable proportion of girls in secondary schools play dumb in their science classes because it is boys. This is supported by Ethington (1932).

Moon and Mages (in Owiti, 2001), argue that Membership of and adherence to the norms and values of, a particular peer group makes a difference in the school attainment and involvement of students. Beal (1994) found that children tend to adhere to peer group expectations if they have to fit in with the

student-girls believe that science is not theirs, while boys think that science is important for their future careers. In Kenya, Jepkoech (2002) seems to agree with this when she asserts the girls' poor performance in Mathematics is due to gender discriminative attitude in peer culture. Karanja (1996) confirms that if one thinks that the subject is hard, it becomes hard. But if one is positive about it, it becomes simple; there is need to relate student expectations and students attitude towards learning of Mathematics and science.

Even though the stereotypes have been highlighted by many studies, it is also important to appreciate the fact that the world is dynamic and what is held true today may not be true tomorrow because of advancement in how people behave and how things are done.

Teachers' Influence on Attitude towards Learning of Science

In a classroom, the teacher sets the standard discourse, their reliance on teaching methods that adhere to traditional norms and beliefs about male students can create a chilly climate for girls (Sandler, 1982). Teachers believe that participate less than males in the classroom. Moreover, teachers are often unaware that they concentrate on teaching males because the process of classroom instruction is unconscious and they respond automatically to students' demand for attention. Analysis of classroom discussion involving children between the ages of 9 and 11 in different settings reveals that male students dominate discussions. Even when female students do participate in classroom talk, their approach may suggest to teachers that they have less command over the subject matter than their male counterparts. Girls are more likely to ask questions, acknowledge the comments from previous discussions and refrain from interruption exchange while discussion is in progress. In other words, their classroom conduct is constant with accepted sex-role behaviour compromise women's assertiveness (Sandler, 1982).

Bosire (1997) asserts that most male teachers are prejudiced against girls and do not involve them in the classroom activities such as answering questions or conducting experiments when they are with boys. Attitude associated with science appear to be affecting students participation in science as a subject (AAAS, 1989). An international assessment of nine and thirteen-year-old students in twenty countries (IAEP, 1992) revealed that positive attitude towards science influence students performance by the majority of 13 year old students in 15 countries.

A study by Faye (2005) showed that a significant majority of the twenty countries had positive attitude about the utility of science learning for both males and females despite a gender performance gap that was prevalent in nearly all of the countries. The performance of male and female was equivalent in only two participating countries, Taiwan and Jordan. In Russian speaking schools, 74% of the students believed science was equally important for males and females and this was one of the few countries in which fewer than 90% of the students perceived science to be equally appropriate for males and females (IAEP, 1992).

An examination of the major goals for science education reveals a unanimity of opinion than the development of scientific literacy includes the development of positive attitudes towards science (Lederman, 1992; Linn, 1992). One of the goals for school science that underlies the National Science Education Standards (1996) is to educate students who are able to experience the riches and excitement of knowing about and understanding the natural world. The development of positive attitude towards science is a critical component of science instruction (NAEP, 1987). It is judged imperative that student develop, at an early age, favourable attitude towards science and that this favourable orientation be maintained (Anderman & Maehr, 1994).

Research regarding relationships of attitude with science achievement consists of studies that have examined the attitudes of students from various perspectives (Cannon & Simpson, 1985; Harms & Yager, 1979). The data obtained from the study revealed a higher correlation between positive attitude towards science and higher achievement scores for females enrolled in the basic and advanced classes and for males enrolled in general science classes (Cannon & Simpson, 1985).

A study by Yager and Yager (1985), on attitudes of intellectually gifted and average students, has revealed a significant difference between average and gifted student's attitudes towards the usefulness of science. According to Barrington and Hendricks (1986) in their study they realized that there is no gender difference with respect to attitudes towards science. Simpson and Oliver (1985) have reported that males demonstrated significantly more positive attitude towards science than females.

Studies on gender roles and school subjects reveal the avoidance of additional science courses by females (Maple & Slage, 1991; Archer & McDonald, 1991). Schibeli (1984) reported that females exhibit more positive attitudes towards Biology and males towards physics. Current data from American Association of University women indicate the need to focus more attention on the development of positive attitude towards science with females (AAUN, 1992), As females progress through secondary grades they

become less confident of their academic skills thus their career aspirations are narrowed (AAUN, 1992; Linn & Hyde, 1989). Data from the national science foundation (NSF, 1994) indicate that females comprise 46% of the labour force with only 22% of the scientist being female.

From a national survey (Weiss, 1987) student attitude towards science seem to decline as the student progress through school. Further studies have shown that students maintain a poor attitude towards science with that attitude declining from the junior to the senior high school (Hofstien & Welch, 1984). There was need also to establish whether or not the same findings could hold true for Keiyo District Kenya.

Statement of the Problem

There has been an interest in the development of positive students' attitudes towards the learning of science and mathematics. The objective of any science curriculum includes fostering favourable feelings towards learning of science as well as imparting cognitive knowledge. Therefore, the author was prompted to undertaking this study because of the fact that fewer girls excel in science while majority under achieve. Fewer girls than boys continue with the study of science and related courses at higher levels of education and that girls are underrepresented in areas requiring certain qualification in sciences (Karanja, 2004).

While releasing the KCSE results for the years 2004, 2005, 2006, 2007 and 2008, the then minister for education pointed out that girls underperform when compared to the boys, especially in sciences and mathematics. Over the same years the District Education officers and the provincial Directors of Education have complained that there has been a disparity between boys and girls in practical science subjects. The study sought to examine if the gender perceptions and expectations on students affect their attitudes towards science subjects.

A negative attitude can have a far reaching implication on the learners' academic life in that, a student may be discouraged from putting an extra effort in a given academic subject leading to poor achievement. A learner in such a situation may not be attentive when the teacher is teaching, in such a case there is also likelihood of hating the subject as well as the teacher.

Limitations of the Study

The study was conducted in Keiyo District only. As such, the findings on gender expectations in science subjects by students and teachers may not be generalisable to other areas in Kenya. Nevertheless, the study provides a framework on which similar studies could be conducted in other areas.

MATERIALS AND METHODS

The study was carried out among students and teachers of secondary schools in Keiyo District of Rift Valley Province of Kenya. The area is highly populated with 25 secondary schools out of 35 secondary schools in the District. The people of Keiyo have a conviction that Education is a tool of empowerment, leading to self reliance. Education is the core business of schools, indeed the child is the reason that any school exists. Keiyo District has 35 secondary schools, 10 of them are on the arid lowlands of the escarpment while the rest are on the highlands. The District was convenient to researcher in times of proximity and accessibility to those schools. Poor performance in KCSE Examinations and the general low female scientist from the District in various careers compared to male is evident.

The study population was form three students, science teachers, and heads of science departments of the selected school in Keiyo District. Purposive sampling was used to select the form three classes. At Form Three students select the science subject to the examined and the Form Four students were busy preparing for the final examinations. Stratified random sampling was used to select school which participated in the study. Stratification was done according to gender composition of the schools. Simple random sampling technique was used to select 30% of schools from each category. A class from each category was selected using simple random sampling in schools with more than one stream. To select 20 students from a class, simple random sampling technique was used. Convenient sampling was used to select the science teachers for interviews. Out of the 300 students, efforts were made to ensure that the boys and girls were included in equal numbers of 150. Teachers of both sexes were also chosen.

The study adopted an exploratory approach using a descriptive research design. The researcher designed a questionnaire, which was used in the collection of data from the respondents. Two types of questionnaires were prepared. Students' questionnaire to indicate how different people feel about science filled the first questions. The items were concerned with how students, parents and the teachers are perceived by the students. The responses were scored in the Lickert scale. Teacher's questionnaires comprised items, which captured the teacher's feelings towards science teaching. The items were designed to secure teachers' opinion of their expectations.

Data was analyzed using descriptive and inferential statistics. The questions in the questionnaire were analyzed using statistical package for social science (SPSS) and computer excel program. Lickert scale

was also used to place items at part that is either negative or positive. The negative responses and positive responses took positions 1 and 5 respectively. The descriptive statistics, mean frequencies, percentage, tables, graphs were used to analyze data.

RESULTS

Ability to learn something is often thought of as a function of perception and expectations that evolve into attitudes. It was important to find out what students think in terms of value and possible outcomes of learning sciences. This paper looks at the students' perception on sciences, what their expectations are when choosing to take or not to take sciences and the effect such perceptions and expectations have in shaping students' attitudes towards science subjects in secondary schools in Keiyo District.

Students Perception of Science Subjects

Students were asked to rate several indicators of perception of science subjects and the rating are as summarized in Table 1.

Table 1: Distribution of Respondents according to Perception on Learning Sciences

Perception indicators	Strongly agree		Agree		Undecided		Disagree		Strongly disagree	
	f	%	f	%	f	%	f	%	f	%
My father/mother think science is a useful subject	94	31.6	144	48.5	22	7.4	11	3.7	9	3
My father/mother encourages me to learn science	121	40.7	115	38.7	21	7.1	13	4.4	10	3.4
Science is a booster to art subject performance	48	16.2	91	30.6	27	9.1	63	21.2	53	17.8
Always do well in science	55	18.5	150	50.5	31	10.4	37	12.5	12	4
I would like to pursue science career after school	161	54.2	69	23.2	22	7.4	9	3	27	9.1
Learning science is a waste of rime	11	3.7	15	5.1	8	2.7	33	11.1	222	74.7
Science is boring subject	33	11.1	22	7.4	11	3.7	57	19.2	162	56.2
It is important to know science in order to get a good job.	112	37.7	117	39.4	23	7.7	26	8.8	13	4.4
Together with my peers like exploring the unknown	65	21.9	139	46.8	47	15.8	23	7.7	7	2.7

On the whole, students had an encouraging perception of the role of science in their lives and tended to agree on the many issues/items used to gauge perception. To check whether or not their gender difference on perception, an independent t-test was carried out and the result tabulated in Table 2.

Comparing the mean responses on items/indicators of perception seems to suggest that there are real differences in perception on learning sciences across gender. A t-test on all these items confirms that the difference is not significant meaning that both boys and girls have the same perception towards learning sciences.

Students Expectations in Learning Sciences

When students have high expectations and positive outlook towards gains to be made from an accomplishment, they tend to have high positive attitude and to put more efforts. It was necessary for the study to gauge the students' expectations when pursuing science subjects in secondary schools in Keiyo District. Students were asked to rate several items/indicators of expectation using Lickert scale by ticking the extent to which they agreed/disagree with the statement. The overall responses were as shown in Table 3.

Table 2: Independent Sample T-test on Perception on Learning Sciences according to Gender

Perception indicators	Gender of respondent	N	Mean	Std. Deviation	Std. Error Mean
My father/mother think science is a useful subject	Male	115	1.84	.9605	8.96E-002
	Female	117	2.04	.9134	8.45E-002
My father/mother encourages me to learn science	Male	116	1.97	1.1	.1024
	Female	116	1.82	.9193	8.54E-002
Science is a booster to art subject performance	Male	114	3.13	1.4	.1316
	Female	121	2.97	1.43	1.30E-001
Always do well in science	Male	116	2.18	1	9.29E-002
	Female	121	2.26	.9897	9.00E-002
I would like to pursue science career after school	Male	116	1.82	1.32	1.23E-001
	Female	122	1.9	1.29	1.17E-001
Learning science is a waste of rime	Male	118	4.61	.8871	8.17E-002
	Female	122	4.42	1.21	0.11
Science is boring subject	Male	117	4.05	1.39	0.13
	Female	123	3.97	1.47	0.13
It is important to know science in order to get a good job.	Male	117	2.09	1.11	1.03E-001
	Female	124	1.98	1.13	0.1
Together with my peers like exploring the unknown	Male	112	2.13	.8608	8.13E-002
	Female	119	2.27	1.03	9.45E-002

Table 3: Distribution of Respondents according to Expectations in Learning Sciences in Keiyo District

Expectations Indicators	Strongly agree		Agree		Undecided		Disagree		Strongly Disagree	
	F	%	F	%	F	%	F	%	F	%
Science is a booster to art subject performance	37	12.5	98	33	49	16.5	78	26.3	23	7.7
I love science than any other subject	60	20.2	100	33.7	44	14.5	55	18.5	30	10.1
I am disappointed when I miss science lessons	95	32	123	41.1	18	6.1	26	8.8	25	8.4
I cooperate with others in science work	88	29.6	101	56.2	15	5.1	9	3	9	3
I like asking questions concerning science concepts.	89	30	140	47.1	31	10.4	24	8.1	7	2.4

Table 4: Comparison of the Means of the Boys' and Girls' Responses on each Expectation Indicator

Expectation Indicators	Gender of respondent	N	Mean	Std. Deviation	Std. Error Mean
Girls choose jobs requiring science background	Male	114	30351	12332	1155
	Female	122	26557	11554	1046
I love science than any other subject	Male	116	24569	12043	1118
	Female	123	28130	13571	1224
I am disappointed when I miss science lessons	Male	115	26783	472668	4408
	Female	124	21613	12257	1101

I cooperate with others in science work	Male	116	19655	9950	9.24E-002
	Female	122	19098	8332	7.54E-002
I enjoy exploring in scientific work responsibly	Male	117	20684	10399	9.61E-002
	Female	125	19920	9713	8.69E-002

The students seemed undecided on whether or not taking sciences would help to boost their ability in art subjects. They were, however, on the whole in agreement with other indicators of expectations as shown in the Table 3. On comparing boys' to girls' responses on the expectations, there seemed to be no significant differences in the means of both boys and girls in each item in Table 4.

A test of the significance of the difference between the means shows that only one indicator (I love science more than other subjects) has a significant difference between means (t=-2.141, p=0.03) with female being more attracted towards sciences contrary to expectation.

Influences of Perceptions on Attitude towards Sciences among Students

Having established that there seems to be no significant difference between perception of girls and boys towards learning of sciences in secondary schools in Keiyo District, the next challenge was to try and establish whether or not perception influences students' attitude towards sciences. A perception index was established foe each student in as much the same way as the students' attitude was developed.

While it would be expected that the higher the perception the more positive the attitude towards learning sciences, the findings seemed to suggest that it does not matter the level of perception as it can be seen that almost as many respondents with high perception of sciences have positive attitudes (158) with almost an equal number (101) having negative attitude.

This confirms the earlier deduction that there does not seem to be an association between, perception and attitude towards science subjects by students in Keiyo sciences.

Influence of Expectations on Attitude towards Sciences among Students

Similarly, it was necessary to find out whether or not expectation score and index were computed for each item/indicator of expectation on the instruments.The distribution of students in these cells does not seem to suggest a clear pattern such as would be expected that, higher the expectations the more positive the attitude towards sciences would be. The entries (154) in high expectations the more positive attitude does not seem to be very high compared to 96 who have high expectations, yet the attitude was negative. A Chi-square test confirms this lack of sufficient evidence to suggest that there is an association between expectation and attitude towards sciences in Keiyo District.

Since the computed Chi-square value (0.110) was less than the Chi-square (alpha = 3.841 and p=0.740) was greater than 0.05 the alpha value, the null hypothesis that there is no association between students expectation and attitude in learning science was accepted. It was concluded therefore that there is no sufficient evidence to suggest that in Keiyo District the student's expectation influences their attitude towards learning science subjects.

Teachers' Perception of the Student's Attitude towards Science Subjects

Teachers were asked to indicate on a five point Lickert scale their perception of the students' attitude towards studying subjects on several indicators of attitude as shown in Table 5.

Table 5: Teachers' Perception on Students' Attitude towards Learning Science Subjects

Indicator of attitude	Perception									
	Strongly agree		Agree		Undecided		Disagree		Strongly disagree	
Science is easy for girls	1	3.8	12	46.2	3	11.5	8	30.8	1	3.8
Science is easy for boys	2	7.7	14	53.8	2	7.7	5	19.2	3	11.5
Science is meant for boys only	1	3.8			1	3.8	5	19.2	19	73.1
Science is interesting to teach	4	15.4	18	69.2			1	3.8	3	11.5
Science is boring to teach					1	3.8	17	65.4	8	73.1
Girls are poor in retaining	1	3.8	3	11.5	2	7.7	12	46.2	8	11.5

scientific concepts than boys										
Science is useful for both boys and girls	20	76.9	5	19.2			1	3.8		30.8
Girls are fast in gasping scientific concepts than boys			4	15.4	5	19.2	13	50	4	30.8
Science teaching is interesting for various activities	4	15.4	21	80.8	1	3.8				
I always allow the learners to explore the unknown	3	11.5	17	65.4	2	7.7	3	11.5		15.4
Learners habit of answering questions is a joy when teaching	6	23.1	15	57.7	2	7.7	2	7.7		
I allow learners to exercise responsibility especially in the lab	8	30,8	15	57.7	2	7.7			1	3.8
I always present student reports honestly	9	34.6	16	61.5	1	3.8				
I encourage learners to demonstrate self confidence	12	46.2	13	50			13	50		

Most of the teacher respondents had a general perception as expected. Where the respondents were expected to agree they did so and where they were expected to disagree with the statement they responded as expected. A one sample t-test showed that except for the statements, science was easy for girls, was easy for boys and interesting to teach where respondents were undecided whether to agree or not to agree; all the others were significantly different from indifference. This implies that the teachers have no biases in attributing learning of sciences and ability to the students in Keiyo District; that they generally expected all students to have a difference in perception between male and female teachers.

An independent sample t-test was run. It was noted that the perception of male teachers was more or less the same as their female counterparts on the students' attitude and ability to learn to learn sciences except for two indicators such as "Science is boring to teach" and "I allow learners to exercise responsibility especially in the lab". The male teachers held significantly different opinion on these two indicators of attitude. Male teachers agreed that it was boring to teach sciences while female teachers disagreed ($t=2.168$, $p= 0.04$) at 95% confidence level. This was unexpected since male teachers would be exercise responsibility in the lab, again male teachers disagreed more the female teachers did ($t=3.288$, $p=0.03$). This suggests that female teachers were more liberal than the male teachers were when it comes to teaching sciences and supports the perception that they enjoy more when teaching sciences. This signifies a fundamental difference in their teaching methodology.

In summary, there is not much difference in the perception of teachers on the student's attitude when it comes to learning sciences although there might be slight differences in their teaching approaches.

DISCUSSION

The study sought to find out what the students' perception and expectation in learning science were and how they affected attitudes towards learning science subjects. The findings indicated a positive perception of the role of science in the students' daily lives. The students tended to agree on the indicators of perceptions such as: parents think of science as a useful subject, parents encouraged students to learn science, would like to pursue science based career after school, and it is important to know science in order to get a good job. On the other hand, when perception indicators are stated negatively, the students' respondents are able to note it and adjust accordingly. This include 'learning science is a waste of time' where the majority disagreed and 'science is a boring subject'. Some indicators such as 'always do well in science' resulted in interesting responses with most agreeing yet it is generally known that performance in science is poor. Perhaps, since the question in exploring perception, what the student respondents considers "do well" is what is considered by others (external observers) to be poor.

On gender differences in perception, a t-test on responses on all indicators showed that there is no significant difference between the mean responses of boys and girls. This implies that there is no sufficient data to suggest that there is a difference in perceptions between boys and girls as regards learning science in Keiyo District. Moreover, this is contrary to the common notion that boys generally

perceive science positively while girls have a negative perception. Leder and Taylor (1995) observe that science is consistent with male self image and inconsistent with female self image. This does not seem to be the case among secondary schools in Keiyo District. Attempts have been made to explain away gender differences in participation in science subjects as due to sex role stereotyping and students perception of their own abilities.

There was simply no difference in perception among boys and girls at secondary schools level in Keiyo District as regards learning of science subjects. Nzuve (1999) states that people perceive things differently and behave accordingly and that people behaviour is based on their perception. Since there are no differences in perception among boys and girls on learning science in Keiyo District, perception cannot be used to explain low scores in sciences in the district.

As regards expectations, students on the whole agreed with the indicators of expectation. Most agreed they love science more than any other subject, majority agreed that they get disappointed when they miss science lessons, majority of others agreed that they cooperate with others in science work and majority agreed that they asked questions concerning science concept. The students were, however, undecided as to whether taking sciences help boost abilities in art subjects.

An attempt to check gender differences in expectation showed that only one indicator (I love science more than any other subject) has a significant difference between means with girls being attracted more to science than boys contrary to expectations. Really, it is not possible to say girls lack participation or have lower participation in science than boys in Keiyo District. This cannot be used to explain lower participation or lesser success in science subjects by girls as Wills (1995) and Fullorton (as cited in Leder & Taylor, 1995). Karanja (1996) seems to suggest that perception and expectations influences attitude towards science which in turn influence performance. The study therefore sought to test this notion.

On whether or not perception influences attitude towards science among students in Keiyo District, the study showed there does not seem to be an association between perception and attitude ($X2\ c = 1.173$, $p = 0.279$). Similarly, there is no relationship between students expectation and attitude towards learning science ($X2\ c = 0.110$, $p = 0.740$) at the 95% confidence level as would have been expected.

This findings challenge a fundamental concept in education to the core; that in general good perception and high expectation fires an individual determination, attitude and efforts towards fulfilment of a desired goal. Owiti (2001) notes that membership of and adherence to the norms and values of a particular peer group makes a difference to the school attainment and involvement of students. This is supported by Beal (1994) who observes that the children tend to adhere to peer group expectations if they had to fit in with the students. However, the major challenge here is perception and expectation of students built on real life experiences that would tend to shape their determination so as to attain high and improved quality of life based on role models in the society. This seems to be lacking in Keiyo District so that perception and expectation as captured here are only learnt in classes and therefore do not go beyond to real world the students live in.

On teachers' perception of students attitude and ability to learn science in Keiyo District, the study established that the perception of male teachers is more or less the same as their female counterparts on the students attitude and ability to learn science except for two indicators, namely 'science is boring to teach' and 'I allow learners to excise responsibility especially in the lab'. The male teachers held significantly different opinions on these two indicators of attitude. Male teachers agreed that it is boring to teach science while female teachers disagreed. This was unexpected since male teachers would be expected to be more at home teaching science and thus enjoy it. On allowing learners to exercise responsibility in the lab, again male teachers disagree more than female teachers. This suggests that female teachers are more liberal than male teachers when it comes to teaching sciences and supports the perception that they enjoy more when teaching sciences. This signifies a fundamental difference in their teaching methodology. Sandler (1982) notes that teachers tend to rely on standard norms and beliefs that are often informed by stereotypes that science is for boys thus set a climate for girls in a classroom situation. This did not seem to be the case in Keiyo District. Bosire (1997) also asserts that male teachers are prejudiced against girls and thus do not involve them in classroom activities such as answering questions and/or conducting activities.

CONCLUSION AND RECOMMENDATIONS

From the study it has been established that students in Keiyo District have a positive (good) perception of the need and benefits of learning science but no significant difference in perception between boys and

girls. So, the stereotype that boys perceive science more positively than girls does not hold in Keiyo District. The students also seem to hold high expectations with respect to learning science without any significant difference between boys' and girls' expectation. On whether or not perception and expectation influence attitude towards learning science, the findings are categorical that there is no association between the two variables, perception and expectation on the one hand, and attitude on the other.

The study has also established that there is no significant difference in perception of students' attitude towards learning sciences by both male and female teachers. There, however, seems to be a significant difference in the approaches adopted for teaching science subjects by male and female teachers.

Having established that there is not much of a problem with perception, expectations and attitude in the learning of science subjects in Keiyo District, nor are there marked differences in perception, expectations and attitude among gender, it is recommended that the search for cause of poor performance in science subjects be redirected to school type, facilities and teaching methods.

References

American Association for the Advancement of Science (1989). *Project 2061: Science for all Americans*. Washington, DC: Author.

American Association of University Women Educational Foundation. (1992). *How schools shortchange girls: Executive summary.* Washington, DC: Author.

Anderman, E.M., & Maehr, M.L. (1994). Motivation and schooling in the middle grades. *Review of Educational Research*, 64: 287-309.

Archer, J., & McDonald, M. (1991). Gender roles and school subjects in adolescent girls. *Educational Research*, 33: 55-64.

Barrington, B. L., & Hendricks, B. (1986). *Attitude towards science and science knowledge of intellectually gifted and average students in 3th, 7th and 11th grades*, Vol 6.

Beal, C. (1994). Boys and Girls: The Development of Gender Roles. McGraw-Hill, Inc. Gender Bias in Preschool. (November 1996). *Parents*, 71(11): 180.

Bosire, J. (1997, March 15). Grim Statistics on Girls Education. *Daily Nation*, pp. 16-17. Nairobi: NMG.

Cannon, R. K., & Simpson, R. D. (1985). Relationship among attitude, motivation and achievement of ability grouped 7th grade life science students. *Science Education*.

Caroline, M. (1996). Negative attitudes towards girls must change. *Kenya Times,* Nairobi Kenya.

Faye, M. N. (2005). Elementary and Secondary Students' Perceptions toward Science: Correlations with Gender, Ethnicity, Ability, Grade, and Science Achievement. *EJSE,* 2(1). Retrieved from http://wolfweb.unr.edu/homepage/jcannon/ejse/neathery.html

Fennema, E., & Sherman, J. (1977). Sex-related differences in mathematics achievement, spatial visualization, and affective factors. *American Educational Research Journal*, 14: 51-71.

Fennema, E. (1981). The Sex Factor: Real or not in Mathematics Education. In Fennema, E. (Ed.). *Mathematics Education research for SOS*. Washington: Association for Supervision and Curriculum Development.

Harms, N. B., & Yager, R. E. (1979). *Science and society.* A review of NAEP data with implication for policies and researcher interpretative summary. National Assessment of Educational progress (NAEP). Denver.

Hofstein, A., & Welch, W. W. (1984). *The stability of attitudes towards science between junior and senior high school. Research in science and technological Education.* International assessment of educational progress (1992) Learning science Princeton. N J.

International Assessment of Educational Progress (1992). *Learning Science*. Princeton, NJ: Educational Testing Service.

Jepkoech, S. (2002). *A Survey of Factors that Influence the Performance of Students Economics in KCSE* (Unpublished M. Phil Thesis). Moi University, Eldoret.

Karanja, D. (2004). Kenya takes steps to develop women Scientist. Retrieved from http/www.women.news.org/archieve.cfm.htm

Karanja, J. (1996, April 6). Girls/Boys to Get Equal Chnces. *Kenya Times*. Nairobi, Kenya.

Leder, G. C., & Taylor, P. (1995). Gender and mathematics performance: A question of testing? In B. Grevholm, & G. Hanna (Eds.), *Gender and mathematics education: An ICMI study in Stifsgarden, Akersberg, Hoor, Sweden, 1993* (pp. 271-280). Lund: Lund University Press.

Lederman, N. (1992). Students and Teachers Conception of the Nature of Science A Review of the Research. *Journal of Research in Science Teaching*, 13(2): 124-135.

Linn, M. C. (1992). Science education reform: Building the research base. Journal of Research in Science Teaching, 29: 821-840.

Linn, M. C., & Hyde, J. S, (1989). Gender, mathematics, and science. *Educational Researcher*, 18: 17-19.

Maple, S. A., & Slage, F. K. (1991). Influence on the device of Maths/Science major by gender and ethnicity. *American Education Research Journal*, 28(1): 37-60.

National Assessment of Educational Progress. (1987). *Science objectives: 1985-86 assessment*. Princeton, NJ: Educational Testing Service.

National Science Education Standards (1996). Washington, DC: National Academy Press.

National Science Foundation (1994). *Women, minorities, and persons with disabilities in science and engineering*. Washington, DC: Author.

Nzuve, W. M. (1999). *Elements of Organizational Behaviour*. Nairobi: Nairobi University press.

Owiti, D. (2001). *A Study of Gender Difference and Attitudes towards Maths* (Unpublished MEd Thesis). Moi University, Eldoret.

Sandler, B. (1982). *The classroom climate: A chilly one for women?* Washington, DC: Association of American Colleges.

Schibeci, R. A. (1984). Attitudes to science: An update. *Studies in Science Education*, 11: 26-59.

Sherman, J. A. (1982). Mathematics the critical filter: A look at some residues. *Psychology of Women Quarterly,* 6(4): 428-444.

Simpson, R. D., & Oliver, J. S. (1985). Attitude toward science and achievement motivation profiles of male and female science students in grades six through ten. *Science Education*, 69: 511-526.

Weiss, I. R. (1987). *Report of the 1985-86 national survey of science and mathematics education*. Research Triangle Park, NC: Research Triangle Institute.

Yager, R. E., & Yager, S. O. (1985). Changes in Perception of Science for Third Seventh and Eleventh Grade Students. *Journal of Research in Science Teaching*, 9.

****