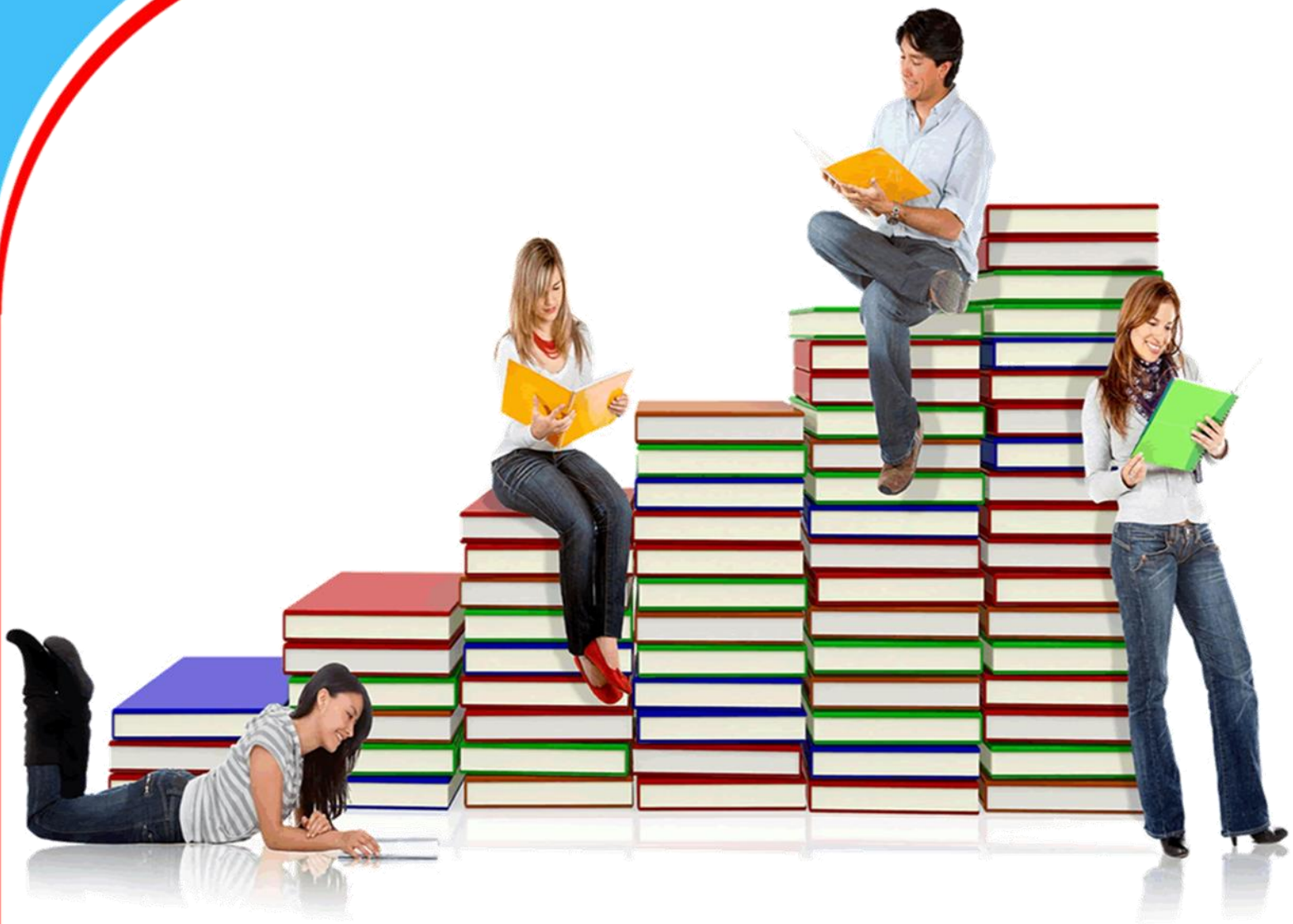
American Journal of
Education and Practice
(AJEP)



Teacher's Gender-Biased Attitude on Female Students Performances in Science Subjects in Secondary Schools in the Kumba Municipality

Efuetngwa Diana Fobellah

American Journal of Education and Practice
ISSN 2520-3991 (Online)
Vol.8, Issue 5, pp 66 – 78, 2024

www.ajpojournals.org

Teacher's Gender-Biased Attitude on Female Students Performances in Science Subjects in Secondary Schools in the Kumba Municipality

Efuetngwa Diana Fobellah[1*]
Department of Educational Psychology, Faculty of Education, University of Buea

Article history
Submitted 04.09.2024 Revised Version Received 05.10.2024 Accepted 04.11.2024

Abstract

Purpose: The purpose of this study is to examine the influence of teachers gender-biased attitude on female students performance in science subjects.

Materials and Methods: It was a survey study using three sets of questionnaire; Data were obtained form 172 parents, 298 students and 79 science teachers in Kumba Municipality. Descriptive and inferential statistical techniques were applied to obtain percentages, bar charts, means, standard deviation, x2 – and Z- values.

Findings: The data analysis showed that teachers attitudes towards the female students tend to affect these students' achievements in science subjects. More of the female students (38 out of 49) who said teachers had positive attitudes passed than those who said teachers attitudes were negative (7 out of 97).

Implications to Theory, Practice and Policy: Based on the results, the researcher recommends that; Teachers should be aware of the differences boys and girls bring to the learning of science, girls should be encouraged to observe female role models in science careers and strive to be like them.

Keywords: *Attitude, Gender – Biased, Performance, Science*

1.0 INTRODUCTION

It has been realized that girls education in general is one intervention which simultaneously brings family health, increased earnings and productivity (Fifth African Regional Conference on women , 1994). A girls education therefore benefits the girl herself, her family, the community and contributes to national development. It has been said "if you educate a woman, you educate a nation" (Kadri 2018).

Women make up more than 50% of the population of Cameroon in particular , and Africa in general, but often, they are absent or underrepresented in decision-making positions; and prestigious professions like piloting , engineering, medicine, high level administrative positions and others. The Cameroon Government adheres to the principle of nondiscrimination between sexes (Cameroon Education Law 1998). Though no official text discriminates against the education of the girl child or her access and retention in school, available statistics show that there is a gender gap in favour of boys, with the gap widening at higher levels and becoming alarming in mathematics, science and technical subjected. In order to reduce or close this gap, much attention must be paid to the education of female science students, starting right from the primary and secondary school levels. These levels are considered to be the basal stage for the development of science and technology.

Furthermore, African heads of states and governments at the 31st ordinary session of the Organisation of African Unity (OAU) held from 36-28 June 1995, in Addis Ababa, reinforced the Daka Conference declaration by requesting that "womens inadequate access to education and training in science and technology be reviewed". In this same vein, in 1999, the African Forum on Girls' Access to science and Technology" held in Burkina Faso drew up a plan of action which underlined the needs for the advancement of girls in education by providing the necessary mechanisms. With the same concern, in 1992, the African Academy of Science (AAS), in collaboration with the Task Force of Donors to African Education (DAE) Working group on female participation, set up the working group on female participation, set up the first research grants program , namely

"Research Priorities for the education pf girls and women in Africa " to encourage researchers to investigate various aspects of the female education (wasanga, 1997). Despite all the decorations, resolutions and research findings, the enrolment and achievement of girls in science subjects are still very low in secondary schools in Cameroon in particular an Africa in general. It is the concern about what to do to improve the situation that has led to this study. It was designed to investigate the contributions of the teachers to this poor achievement in science subjects among secondary school girls in the Kumba Municipality. Therefore, the main research question was; To what extent does Teacher's gender-biased attitude influence female students' performance in science subjects in secondary schools in the Kumba Municipality?

The Problem Statement

A close study of the records in some pubic secondary schools within Kumba Municipality reveal that more girls than boys are usually admitted into forms one of the most schools but after five years, more boys than girls write and pass in Science subjects at the Ordinary /Advanced Level GCE examinations. In addition, according to statistics available, at the GCE board office in Buea, female students have generally been performing lower than their male counterparts in

sciences in public secondary schools in Kumba. There is therefore, the need to encourage girls and young women to enter the scientific fields and succeed. If we expand opportunities for girls in science and technology programmes, we can open the doors to science careers for more women. There is also evidence that the gender gap in learning outcomes is significantly affected by social attitudes towards girls' education and by other forms of gender discrimination in society at large. In this regards, the gender gap in learning is further aggravated if such stereotypical beliefs are held by teachers. If teachers hold biased beliefs about the learning abilities of girls vis-à-vis boys, they may fail to be impartial while teaching students of both genders and this may hamper girls' performance.

There have nevertheless been some strives by the Cameroon Government to reduce this phenomenon. Actions have been taken by the establishment of a special fund to provide support to female students of scientific and technical subjects and other forms of assistance to deserving students of both sexes.

2.0 LITERATURE REVIEW

While participation of girls' education has substantially increased overtime, gender gap has persisted in various other forms. It is interesting to note that teachers generally see themselves as blame-free for the situation of girls in studying the sciences and seem unwilling to find any fault with the syllabuses, examinations or indeed, their own teaching approaches. These teachers tend to accept the situation as being almost inevitable and out of control. Zietsman and sproule(2004), in their article "girls attitude towards the teaching and learning of mathematics and science" have acknowledged how the study of mathematics and science classrooms in the west has elucidated the essential role that teachers can have on the development of attitudes and beliefs of students. Many researches have found that the attitudes of teachers have, by far, the greatest impact on the attitudes and actions of students, especially females. For example, these researchers have reported that there is a strong, all-prevailing, traditional conservative belief among teachers that, mathematics and science subjects are male preserve (Hari, 2002; Torto, 2002; Wasanga, 1997, Ndimbirwe, 1995). They observed that many teachers including female teachers, do not believe girls have the ability to study mathematics and science, thus the tendency is for these teachers to interact more positively and favorably with the "brighter" students (males) hence, the males receive positive expectation messages and tend to live these expectations and perform better than girls who have been receiving negative expectation messages.

Poor Teachers' Expectations of Female Students

According to Wineburg(1989) students intellectual development is largely a response of what teachers expect and how these expectations are communicated. one of the most important predictors of a academic performance of students in the attitude of the teachers. Santrock (2000) defines altitude as beliefs, and opinions about people, objects and ideas. Attitudes have also been defined as learned predispositions to respond in a favourable or unfavourable manner to a particular person, behavior, belief or object (Feldman) 1996; Crooks, and stein 1991). The term "attitude" is very significant in social psychology even though there are different definitions of the term offered by different psychologist. In more recent times social psychologist agree that

attitude has three components: cognitive, affective, and behavioral (Piaget, 1973; Azen and Frisbein, 1980); Kobella, 1989;

Shrigley & Kobella, 1987). The cognitive component or "mental" component consist of beliefs and perceptions, the "affective" components focuses on the emotions while the "behavioral" component is the action component. In this study, teachers attitude is concerned with the cognitive component and focuses on the belief and perceptions teachers have of boys and girls in classrooms and how he/she treats them as such. Research carried out by Bandura (1986) shows that the capabilities of an effective teacher are critically important to the construction of knowledge of the students. One such capability is communication. If the teacher communicates positive expectations effectively, she/he can assist the student in achieving his/her potential development. Another study carried out by Cohen (1986) in the US demonstrates that expectations by teachers lead to differences in interaction in school classrooms and thus in children's opportunities to learn and to choose careers.

The education of girls and women as well as their integration into the field of Science, Technology, Engineering and Mathematics (STEM) is increasingly attracting the attention of the international community, as well as that of Government. In line with this trend, some countries have decided to incorporate this issue into their educational policies so as not to be side-lined by the international community. The interest in taking into account the integration of girls in this field gives UNESCO the opportunity to include this objective "In a process of equal opportunity made necessary both from the scientific point of view and with a view to promoting development, particularly sustainable development (Yovance and Groleau, 2009, P. 25). In accordance with these international provisions, Cameroon has made girls' education and particularly science and technical education, one of the priorities of its Government Policy. Moreover, Cameroon's Ministry of Higher Education has implemented a quota for hiring women scientists as university lecturers. The ministry provides assistance to young women who enroll in science and technical studies, including scholarships for young women who excel in science. These moves by the Government are motivating enough for young girls to develop interest in sciences.

Theoretical Framework

The theoretical frame work of this study was Vygotsky's (1969) social constructivism and Bandura's (1986) social cognitive theories. Vygotsky (1969) opined that the primary function of speech is communication. The capabilities of an effective teacher are critically important to the construction of knowledge of students. One such capability is communication. If the teacher communicates positive expectations effectively, then she/he can assist the student in achieving his/her potential development. When the teacher communicates positive expectations for the female student in science subjects, this will motivate the student to work hard so as to meet up with these expectations and vice versa. Bandura's (1986) social cognitive theory consists of two important concepts: "self-efficacy" and "self-regulated learning". Self-efficacy refers to one's perceived beliefs and judgments about one's capability to complete a given task or activity necessary to attain designated levels of performance. Learning consists of developing self-efficacious behaviours through the mastery of learning, imitation, modeling and social persuasion techniques. According to Bandura, human leaving occurs when individuals observe the behaviuors of others, abstract information from those behaviours, make decisions as to

which ones to adopt, and later, enact those selected, while the meta-cognitive skills are essential, the affective factors such a beliefs, expectations, introspections, and even persistence play major roles in learning.

3.0 MATERIALS AND METHODS

This study investigated "Teacher's gender-biased attitudes and female students' performance in science subject in secondary schools in kumba municipality". The survey research design was used. The target population was made up of form three students in public secondary schools in kumba Sub Division. The study sampled 298 form three students, 79 teachers and 172 parents selected from the town of kumba. Data were collected using questionnaire and desk reviews were conducted on school records to determine students performance in the first and second terms. The first part of the questionnaire consisted of items for demographic data, the second part consisted of twenty five items in the form of a Likert-scale, ranging from (SA) Strongly Agree, (A) Agree, (SD)-Strongly Disagree, (D)Disagree, and the third part consisted of some open-ended questions. In order to validate these questionnaires, copies were submitted to a colleague for criticisms and suggestions. A pilot study was carried out with the form three students of St. Francis Secondary School Fiango Kumba. Since the face and content validity were assured, the researcher then administered the questionnaire personally. The administration of research instrument was done by the researcher. Data collected were analysed using both descriptive and inferential statistics.

4.0 FINDINGS

Table I (A): Female Students Performance in Sciences

Performance	Sample	Percentage
Passed	45	30.9%
Failed	101	69.1%
Total	**146**	**100%**

When the average score of female students in sciences was computed, 30.9% passed and 69.1% failed. These scores were obtained from their third term results.

Table I (B): Responses by Boys in Relation to their Second Term's Averages

Responses	Frequency	Percentage
14-16	9	06.85%
12-14	41	28.77%
10-12	52	36.30%
Below 10	40	28.08%
Total	**142**	**100%**

The Students' scores were obtained from the boys' responses to item 32 in the students' questionnaire. 6.88% of boys indicated that their averages fell within 14 and 16.28, while 77% indicated that their averages lied within 12-14, and 36.30% indicated that their averages were within 10 to 12. Finally, those whose averages were below 10 constituted 28.08%. A closer look

at the questionnaire showed that most of the boys with averages above 11-16 ticked the options C, D and E of questions 31.

Table I (C): Responses by Girls in Relation to their Second Terms Average

Responses	Frequency	Percentage
14-16	4	02.11%
12-14	13	08.45%
10-12	59	40.85%
Below 10	70	48.59%
Total	**146**	**100%**

Table I (C) above shows girls responses to item 32. 48.5% of girls in the sample had their last terms average ranging within 10-11, while 0.48% had their averages ranging within 12-14 and 2.11% had theirs ranging within 14-15. A closer look at the individual responses showed that almost all who responded to question (31) of the questionnaire by ticking either the (A) or (B) options, are those who scored averages within 0-12 as demonstrated on the table above.

Table I (D): Presentation of Scores and Calculation of the Mean and Standard Deviation for Performance of Boys in Sciences

Score (x)	f	fx	x^2	fx^2
18	10	180	324	3240
17	10	170	289	2890
16	08	128	256	2048
15	15	225	225	3375
14	12	168	196	2352
13	05	65	169	845
12	08	96	144	1152
11	10	110	121	1210
10	09	90	100	900
09	24	216	81	1944
08	22	176	64	1408
07	09	63	49	441
Total	**142**	**1687**	**2018**	**21805**

The above scores were obtained from school records at the end of third term.

Mean of boys $(x_b) = \frac{1687}{142} = 11.9$ –

Standard Deviation for boys $= \sqrt{\frac{21805 - \frac{(1687)^2 -}{142}}{141}} = 3.5$

American Journal of Education and Practice
ISSN 2520-3991 (Online)
Vol.8, Issue 5, pp 66 – 78, 2024
www.ajpojournals.org

Table I (E): Presentation of Scores and Calculations of Mean and Standard Deviation for Performance of Girls in Sciences

Score (x)	f	fx	x^2	fx^2
17	02	34	289	578
16	04	64	256	1024
15	05	75	225	1125
14	10	140	196	1960
12	10	120	144	1440
11	08	88	121	968
10	06	60	100	600
09	22	198	81	1782
08	25	200	64	1600
07	24	168	49	1176
06	15	90	36	540
03	15	45	09	135
Total	**146**	**1282**	**1570**	**12928**

The scores were equally obtained from school records.

Mean of girls in Sciences$(\bar{x_g}) = \frac{1282}{146} = 8.8$

Standard Deviation for girls $= \sqrt{\frac{12928 - \frac{(1282)^2 -}{146}}{145}} = 3 \cdot 4$

Using the Z-formula, $Z_{cal} = \frac{11 \cdot 9 - 88}{\sqrt{\frac{(2 \cdot 3)^2}{142} + \frac{(3 \cdot 4)^2}{146}}} = \frac{3 \cdot 1}{0.3} = 10 \cdot 3$

Results

Z calculated value= 10.3

∝-level =0.05

Degree of freedom (df) = 288-2 =286

Z-critical value = 1.645

Intepretation

Since Z-calculated value (10.3) is greater than Z-critical value (1.645), we reject Ho following the decision rule. Inference made leads us to conclude that Boys perform better than girls in sciences.

Research Question

Do teachers' attitudes towards females affect their achievement in science subjects?

Research Hypothesis

Null hypothesis (Ho): There is no relationship between teachers' attitudes towards female students and the performance of these students in sciences.

Alternative hypothesis (Ha): There is a relationship between teachers' attitudes towards female students and the performance of these students in Sciences.

Table I (F): Female Students' Responses of their Teachers' Attitudes towards Them

Teacher's attitude	**Sample**	**Percentage**
Positive	49	33.6%
Negative	97	66.4%
Total	**146**	**100%**

The information on the table above is obtained from girls' responses to Items 22 and 25. Most girls indicated 66.4% of negative attitude of teachers' toward them as opposed to 3 3. 6% with positive attitude. These were evaluation registered from the responses in their questionnaire.

Table I (G): Teachers Attitude towards Female Students

Female students attitude	Sample	Percentage
Positive	28	35%
Negative	32	65%
Total	**80**	**100%**

Teachers described most girls (65%) as having a negative attitudes towards sciences. The results were evaluated from the responses in the teacher questionnaire (items I, 3, 4, 7, 11, 15 and 16), and are similar to those registered on the students' questionnaire concerning female students' attitudes with a 95% confidence level.

Table I (H): Presentation of Observed and Expected Frequencies Relating to Teachers' Attitudes and Female Students' Performance in Sciences

Teachers Attitude	**Female Students Performance**		
	Passed	**Failed**	**Total**
Positive	38(15.1)	11(33.9)	49
Negative	7(29.9)	90(67.1)	97
Total	**45**	**101**	**146**

Figures in brackets represent the expected frequencies while those without brackets represent the observed frequencies. Out of 49 female students who attested that teachers' attitudes are positive, 38 passed while 11 failed. Out of 97 female students who indicated that teacher's attitudes are negative, 07 passed while 90 failed

American Journal of Education and Practice
ISSN 2520-3991 (Online)
Vol.8, Issue 5, pp 66 – 78, 2024
www.ajpojournals.org

Table I (I): Calculation of x^2 Value for Hypothesis

Observed Freq (0)	Expected Freq €	0 - E	(0 - E)2	$\frac{(0-E)^2}{E}$
38	15.1	22.9	524.3	34.7
11	33.9	-22.9	524.3	15.5
7	29.9	-22.9	524.3	17.5
90	67.1	22.9	524.3	7.8

$\frac{(0-E)^2}{E}$ =75.5

Results

X^2 calculated value= 75.5

Alpha (α) - level= 0.05

Degree of freedom (df) = 1

X^2 critical value = 3.841

Intepretation

Since x^2 calculated value (75.5) is greater than x^2 critical value, we reject Ho following the 'decision rule'. Inference made leads us to conclude that, there is a relationship between teachers' attitudes toward, female students and the performance of these students in sciences. This implies that teachers' attitudes affect female students' performance in sciences. The magnitude of the relationship is determined by comparing the contingency coefficient value (c.c) to the contingency maximum value (Cmax).

These are obtained using the formulae in Chapter 3.

$$C_C = \sqrt{\frac{75{\cdot}5}{221{\cdot}5}} = 0 \cdot 58 \qquad c_{nax} = \sqrt{\frac{1}{2}} = 0.71$$

Table I (G).These findings reveal that 32 teachers (65%) had negative attitudes towards female students studying the sciences, while 28(35%) had positive attitudes (table I(g)). These results are similar to those registered on the questionnaire (I(f) where 97 female students (66.4%) have a negative perception of their science teachers while only 49 male students (33.6%) had a positive perception. This same observation had been made by others (Torto, 2002a, Ndimbirwe, 1995; Fennema and carpenter, 1989): for example, Torto mentioned that because of the negative

attitudes of teachers towards girls studying the sciences, they (teachers) tend to interact more positively and favourable with the boys at the detriment of the girls. This positive interaction therefore raised the interest in boys, who eventually performed better than the girls in these subjects see pg13 in the same light, Jungwirth (1991), states that teachers negative attitude towards girl's decreases their perception of success and this results in low self-esteem and inability to undertake problems. In the works of Ann and Raleigh (1996) the data collected suggest that boys and girls achieve slightly better than girls in science, and tend to possess slightly more cognitive ability and positive affect. Moreover, the FEMSA studies show that fewer girls and boys have scientific, mathematical and technical skills and that girls generally perform less than boys and this state of affairs is linked to the attitudes and approaches of teachers.

They go further to re-iterate that there is a strong all-prevailing traditional conservative belief among teachers that mathematics and science subjects are a male preserved and many teachers including female teachers, despite much lip service to the equality of girls and boys just do not believe that girls have the ability to study the sciences. This means that these teachers believe girls are less intelligent than boys, and that science subject call for struggle and determination, and thus girls are incapable of coping with "difficult" subjects, and this scenario leads teachers to interact more positively and favourable with the "brighter" students (boys), positive expectation messages which are sin-qua-non to better performance while the girls who do not receive these positive feedbacks perform less.

Research Gaps

The existing literature on gender bias in education provides substantial evidence on how teacher attitudes towards gender can impact student performance, particularly in STEM (Science, Technology, Engineering, and Mathematics) subjects. However, despite these general findings, research focusing on the specific context of Cameroon particularly Kumba municipality remains limited. Most of the research on gender bias in science education has been conducted in Western and developed nations (Mullet et al., 2017). Studies specific to Sub-Saharan Africa, including Kumba in Cameroon, are sparse. While gender disparities in education are recognized in Cameroon (Ntembe et al., 2020), little attention has been paid to how teacher gender bias contributes to these disparities in science subjects. In science education, female students often receive less encouragement, resulting in lower self-esteem and performance (Breda et al., 2020). However, there is a gap in the literature exploring how these dynamics unfold in Cameroon, where cultural perceptions of gender roles may exacerbate such bias, especially in rural areas.

Gender bias does not operate in isolation but intersects with other socio-economic and cultural factors (Chisamya et al., 2012). In Cameroon, factors such as poverty, rural/urban disparities, and cultural expectations further compound the effect of gender bias in education. However, the existing literature often overlooks these intersectionalities, leading to an incomplete understanding of how teacher attitudes affect female students' science performance. Globally, teacher training programs aimed at mitigating gender bias have been shown to improve gender equity in classrooms (UNESCO, 2019). However, in Cameroon, there is limited research on whether teachers are receiving adequate training on gender sensitivity, particularly in STEM fields. Investigating the presence and effectiveness of such programs would provide insight into possible interventions to reduce teacher gender bias in science education. Most studies

examining gender bias and academic performance are cross-sectional, providing only a snapshot of the issue (Warrington & Younger, 2000). There is a need for longitudinal studies in Cameroon that track the long-term impact of teacher gender bias on female students' interest and achievement in science subjects. Such research would offer a more comprehensive understanding of how these attitudes affect academic and career trajectories over time.

5.0 CONCLUION AND RECOMMENDATIONS

Conclusion

This study has highlighted the poor performance of female students in the sciences. This was acknowledged by the students, teachers and parents and confirmed by examination results of some public secondary schools in Kumba municipality. The under achievement of female students has been attributed to their internalization of negative attitudes borne out of stereotyped thinking in the society and teachers negative attitudes toward female students. The study also revealed that teachers and parents have negative attitudes towards the female students and positive attitudes towards the male student studying the sciences.

Recommendations

i. Girls should be exposed to science related careers and there should be provision for career guidance to help them make appropriate decisions related to subject choices and available options or paths in the field of science.
ii. Opportunities should be given to girls to observe female row models in science careers.\
iii. Teachers should be aware of individual differences boys and girls bring to the learning of sciences and strive to encourage the girls and give equal treatment and expectations for both boys and girls.
iv. More qualified female science teachers should be employed where female students can easily admire and possibly choose to model them.

REFERENCES

Achievement in Science. *Research Math to the Science Teacher* No.9603

African Common Position for the Advancement of Women Dakar, Senegal. Hari, P. (2002a). Teacher's Attitude to the study of SMT subjects by Girls in

Ann, C.H & Raleigh, N.C (1996). Adolescents' motivation, Behavior and

Breda, T., Jouini, E., & Napp, C. (2020). Societal inequality and gender gaps in mathematical performance. *Science Education*, 104(5), 843-866.

Britannica Encyclopedia (1989) in (L. W. Trowbridge and R. W. Bybee). *Teaching secondary school. science: Strategies for developing scientific literacy* (6th ed). Englewood Cliffs. NJ: Prentice Hall, Inc.

Cameroon (1998). Law No 98/004 of April 1998 to lay down guidelines for education in Cameroon. Yaoundé: Ministry of National Education

Chisamya, G., DeJaeghere, J., Kendall, N., & Khan, M. A. (2012). Gender and education for all: Progress and problems in achieving gender equity. *International Journal of Educational Development*, 32(6), 743-755.

Fifth African Regional Conference on Women (1994). African Platform for Action.

Hari, P (2002b). Parents' Community Attitudes towards girls participation in and access to education in SMT subjects. *FEMSA Discrimination Report No. 13.* Forum for African Women Educationalists (FAWE), Nairobi

Mullet, D. R., Rinn, A. N., & Kettler, T. (2017). Catalysts of women's talent development in STEM: A systematic review. *Journal for the Education of the Gifted*, 40(3), 225-247.

Ntembe, A., Orock, R. C., & Mokake, S. E. (2020). Gender inequality and educational outcomes in Cameroon: Empirical evidence. *Education Economics*, 28(5), 476-493.

Oben, D. (2004). Gender and Science education: Issues and concerns. In A paper presented at the Training workshop on Gender Equity in the Teaching of Science.

Secondary Schools. *FEMSA Discrimination Report No. 7*. Forum for African Women Educationalists (FAWE), Nairobi.

Torto, R (2002a). Status of Girls participation and Performance in SMT subjects in secondary schools. *FEMSA Discrimination Report No. 10.* Forum for African Women Educationalists (FAWE), Nairobi

Torto, R (2002b) Status of Girls participation and Performance in SMT subjects in secondary schools. *FEMSA Discrimination Report No. 13.* Forum for African Women Educationalists (FAWE), Nairobi

UNESCO. (2019). *Global Education Monitoring Report 2019: Gender Report*. United Nations Educational, Scientific and Cultural Organization.

Vygotsky, (1969). Thought and Language Edited and translated by Eugenia Hanfmann and Gertrude Vakar. Cambridge: M.I.T. press.tz

Warrington, M., & Younger, M. (2000). The other side of the gender gap. *Gender and Education*, 12(4), 493-508.

Wasanga C.M (1997). The attitude towards science among primary and secondary school students in Kenya: Abridged Research Report No. 23. Nairobi: Academy Science Publishers.

Wineburg, S.S (1987). The self-fulfillment of the self-fulfilling prophecy.

Zietsman, A & Sproule, S.(2003). Girls Attitude towards the teaching and learning of mathematics and science . *Journal of Educational Psychology, 56, 243-256.*

License