

APPRAISING GENDER DIFFERENCES IN TEACHER ATTRIBUTES EXHIBITED BY CHEMISTRY TEACHERS IN IMO STATE SECONDARY SCHOOLS

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Abstract

This study explored if the teaching attributes exhibited by Imo state senior secondary chemistry teachers are associated with gender. The attributes used in this study are classified into three areas: Mastery of subject matter, Classroom behaviour and Students/teacher interaction. 30 items, 10 from each of the three areas of chemistry teacher attributes were constructed and validated. The study is an inferential survey. Chemistry teachers and their students in Imo state government managed schools constitute the population. The sample consisted of 200 SSII chemistry students, 20 male and 20 female chemistry teachers randomly and purposively drawn from 20 co-educational secondary schools in which there are at least one female and at least one male chemistry teacher. In each school, ten students rated the male and female teachers. Four-point likert-type scale was used as an instrument for data collection. The hypotheses were tested. Hypothesis one was rejected while hypotheses two, three and four were not rejected. The general rating indicates that teachers' effectiveness is significantly independent of the chemistry teacher's gender. It is therefore recommended among others that there is need to know whether really male and female persons perform differently in science subjects and find out the reasons, otherwise one would build up the psyche of the female students to the effect that gender has no basis for male to be better. Also, equal job opportunities should be given to both male and female teachers in teaching profession.

In spite of the recent developments, the gender issue remains something of a bottleneck in the development of the 6-3-3-4 education programme in Nigeria. Gender in this study simply means "sex", male and female teachers in chemistry. Most people believe that gender matters a lot in chemistry teaching. Some chemistry students prefer to be taught by a male teacher, while some by a female teacher.

However, the interest of students in chemistry depends on how well students learn the subject, and its learning depends on how well the subject is being taught. If a chemistry teacher (male and female) teaches well, the students will learn and get interested in the subject. In the contrary, if the chemistry teacher (male or female) does not teach well, little or no learning occurs, and the students will not be interested in the subject.

If a teacher must teach well, he/she must possess those teaching attributes that suites the teaching of chemistry as a school subject so as to motivate the students interest in learning the subject. The attributes in this study includes:

- a) Mastery of subject matter
- b) Good classroom behaviour
- c) Good students/teacher interaction.

Some studies have been written relating to gender studies. Igbokwe (2009) in her work noted that that her major finding was that males performed better than females in expository writing.

Ibabor (2009) is of the opinion that the National gender policy introduced in 2006 cannot be accomplished unless the Nigerian government makes elimination of gender inequality in education a top priority with social workers involved in the policy implementation.

Also Nnorom (2009) in her study found a persistent disproportion by gender. More males than females for three consecutive years enroll in the two faculties and the status quo had remained even with improved access to education by both genders. Gender consideration is vital in any academic environment, said Defrantz (2009). Students understand instinctively, gender and sexuality are implicated in the construction of science and technology, he concludes.

Lykke (2006) is of the opinion that “gender studies are applicable to all forms of bias including bias found in academics”

Gender inequalities exist in every sphere of human development in Nigeria. In our schools today, some people claim that male teachers teach better than female teachers, while some, the opposite. Even among students, their views indicate a general lower status for the female students. It is claimed that male learn faster than female. Based on this, the following questions arises

- Does gender affect quality teaching?
- Does teaching attributes in chemistry depend upon gender of the teacher?
- Could student’s rating of chemistry teachers be dependent upon the gender of the teachers?

Generally, the study set out to investigate the influence of gender on teaching effectiveness attributes of chemistry teachers. Specifically, the researcher aimed at ascertaining:

- The extent to which mastery of subject matter depend on the gender of chemistry teachers
- The extent to which classroom behaviours depend upon gender of chemistry teachers
- The extent to which students/teacher interaction depend upon gender of the chemistry teachers.

Research Questions

- 1) To what extent does mastery of subject matter depend upon gender of the chemistry teacher?
- 2) To what extent does classroom behaviour depend upon gender of the chemistry teacher?
- 3) To what extent does students/teacher interaction depend upon gender of the chemistry teacher?
- 4) To what extent does teachers' effectiveness depend upon gender of the chemistry teacher?

Research Hypothesis

HQ1. The category of student's rating scores of the teacher's mastery of subject matter content are significantly independent of the chemistry teacher's gender ($p < 0.05$).

HQ2. The category of the student's rating scores of the teacher's classroom behaviour are significantly independent of the chemistry teacher's gender ($p < 0.05$)

HQ3. The category of the student's rating scores of the teachers' interaction with the students is significantly independent of the chemistry teacher's gender ($p < 0.05$)

HQ4. The category of the rating scores of students on the teaching effectiveness attributes of chemistry teachers are significantly independent of their genders ($p < 0.05$)

Method

The study is a survey focusing on dependent/independent teaching effectiveness attributes of Imo state senior secondary school chemistry teachers on their gender.

The population comprised of about 200 chemistry teachers and about 1200 SSII chemistry students in government managed senior secondary schools in Imo state.

The sample was made up of 200 chemistry students in SSII from 20 schools. A total of 40 chemistry teachers were drawn. The sampling technique is a mix of random sampling technique and purposive. The 20 schools are co educational and the 40 teachers are made up of one male and one female chemistry teacher per school. Each school has at least two chemistry teachers made up of at least one male and one female chemistry teacher.

The instrument for data collection is a four-point scale that has 30 items (see appendix). The reliability of the instrument was established through a trial administration on 55 students who were excluded from the sample and Cronbach α -coefficient of 0.87 was obtained. The scoring guide of the responses to the scale is given below

- I) For positive keyed items, strongly agree (SA)=4, agree (Ag)=3, disagree (Da)=2 and strongly disagree (SD)=1
- II) For negative keyed items, the reverse is the case. Distribution table was used for data organization to show the number of respondents whose rating scores belong to each category of the rating scores.

Categories of students' rating scores for each of the sections of the scales are:

- I) 10-20 → low teaching effectiveness level
- II) 21-30 → moderate teaching effectiveness level and
- III) 31-40 → high teaching effectiveness level

The overall scale; (i) 30-60 → low, (ii) 61-90 → moderate and (iii) 91-120 → high.

The data were finally presented in 2x3 contingency tables showing frequencies of male and female teachers by the categories into which their rating scores fall. Based on the contingency tables, the chi-square tests of independence were employed to test the hypotheses.

Results

1) Summary of the analyses and results of the independence or otherwise of students' ratings of their teachers mastery of chemistry content and their teachers' gender.

Table 1: Observed (and expected) frequencies of categories of teachers' mastery of content rating scores by their gender

Categories of Rating Scores

Gender	High	Moderate	Low	Total
Male	(5.5) 9	(8) 6	(6.5) 5	20
Female	(5.5) 2	(8) 10	(6.5) 8	20
Total	11	16	13	40

Table 1.1: Table Showing the Test of HQ 1

N	Dimension	Df	X²cal	X²tab	Decision
40	3 x 2	2	6.16	5.99	Reject HQ1

From table 1.1, the calculated value of chi-square is 6.16 (see appendix 2). Since the calculated chi-square value, 6.16 is greater than the tabulated chi-square value 5.99, the null hypotheses one is not upheld, so the teachers' mastery of chemistry content as rated by their students is significantly dependent upon the teacher's gender. A closer look at the table one indicates that more of the male teachers have greater mastery than the female teachers.

2) Analyses and results concerning the independence or dependence of students' ratings of their teachers' classroom behaviour on their teachers' gender.

Table 2: Observed (and expected) contingency table of frequencies of levels of rating scores of the teachers by the teachers' gender categories.

Teachers' Gender Levels of Rating Scores

	High	Moderate	Low	Total
Male	4 (4)	13 (12)	3 (4)	20
Female	4 (4)	11 (12)	5 (4)	20
Total	8	24	8	40

Table 2.1: Table Showing the Test of HQ2

N	Dimension	df	X ² _{cal}	X ² _{tab}	Decision
40	3x2	2	0.67	5.99	HQ2 not rejected

The calculated chi-square value from table 2.1 is 0.67 while the corresponding chi-square value from tables is 5.991. Since the calculated X² value, 0.67, is less than the tabulated X² value 5.991, the null hypothesis that the level of students' rating scores of their teachers' classroom behaviour is significantly independent of their teachers' gender.

3) Analyses and results concerning the independence or dependence of the levels of the students' rating scores of their teachers' interaction with the students is significantly independent of the teachers' gender category.

Table 3: Observed (and expected) contingency table of the frequencies of levels of the rating of the students' about their teachers' interaction with the students by their teachers' gender.

Levels of Ratings

	High	Moderate	Low	Total
Male	5 (5.5)	12 (8.5)	3 (6)	20
Female	6 (5.5)	5 (8.5)	9 (6)	20
Total	11	17	12	40

Table 3.1: Table Showing the Test of HQ3

N	Dimension	Df	X ² _{cal}	X ² _{tab}	Decision
40	3x2	2	5.97	5.99	HQ3 not rejected

Since X²_{cal} 5.970 is less than X²_{tab} 5.991, the null hypothesis is not rejected.

4) Summary of analyses and results concerning independence of students' ratings of their chemistry teachers' effectiveness on the teacher's gender.

Categories of Rating Scores

Gender	High	Moderate	Low	Total
Male	(5) 6	(7) 9	(8) 5	20
Female	(5) 4	(7) 5	(8) 11	20
Total	10	14	16	40

Table 4.1: Table Showing the Test of HQ4

N	Dimension	Df	X²cal	X²tab	Decision
40	3X2	2	4.04	5.99	HQ4 not rejected

The value of X^2_{cal} from table 2 is 4.04 (see appendix III). The calculated chi-square value, 4.04, is therefore less than the tabulated chi-square value, ($X^2_{(2,0.05)} = 5.991$). The null hypothesis is therefore upheld. With respect to the entire scale used to estimate teacher effectiveness, in this study, the result is that students' rating of their teachers' effectiveness is significantly independent of their teachers' gender.

Summary

- 1) More of the male chemistry teachers have greater mastery of content than female teachers.
- 2) Teachers classroom behaviour is significantly independent of the teachers' gender.
- 3) Teachers interaction with the students is significantly independent of the teachers' gender.
- 4) Chemistry teachers' effectiveness is significantly independent of the teachers' gender.

Discussion

In the three attributes exhibited by chemistry teachers in this study, it was only in one (mastery) that the males are rated higher than the females. Of course, the finding is true and agrees with Igbokwe (2009) probably because students who rated these teachers may have seen chemistry as a mathematical subject, thereby associating the male teachers as doing better in that aspect.

In the other two attributes (classroom behavior and teacher interaction with students), both of them are independent of gender(male and female) chemistry teachers.

Also, when we combine the entire scale to see the effectiveness of the teachers(male and female), it was found that both male and female chemistry teachers handle chemistry teaching very effectively, therefore, gender does not in any way affect quality teaching which also is in line with Iboror (2009).

Recommendations.

Based on the results, it is recommended that:

1. There is need to know whether really male and female persons perform differently in science subjects and find out the reasons, otherwise, we should build up the psyche of the female students to the effect that gender has no basis for male to be better.
2. Equal job opportunities should be given to both male and female in teaching profession since teachers' effectiveness is not dependent upon gender.
3. Students should disregard the belief/claim that quality teaching depends upon gender of the teacher. Students should first be interested in the subject before they can be able to learn.

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Appendix 1: Section a (Classroom Behaviour) Your Chemistry Teacher

	SA	Ag	Da	SD
1) Writes legibly on the chalkboard				
2) Speaks audibly while teaching				
3) Arranges work orderly on the chalkboard				
4) Moves around while students do their class work				
5) Is always aggressive				
6) Makes lesson very interesting by using instructional materials				
7) Does not often want to explain things that prefer giving notes to students to copy				
8) Makes lesson boring				
9) Maintains peace and order during lesson				
10) Does not make use of the chalkboard at all				
Section B (Mastery)				
1) Relates problems to real life				
2) Explains lessons very well				
3) Teaches from known to unknown				
4) Often confused when students ask questions				
5) Answers questions with ease & correctly				
6) Skips many topics				
7) Tell stories which are not related to the topic				
8) Solves only examples in the textbook				
9) Contradicts self when teaching and answering questions				
10) Give unnecessary excuses to be absent from lessons				
Section C (students/teacher interaction)				
1) Calls students by their names				
2) Flogs too much even when there is no need for it				
3) Provides counseling to students				
4) Demands gratification for any extra help rendered to students				
5) Not easily approachable				
6) Does not motivate students				
7) Is partial in relating to students				
8) Does not care about students' poor performance				
9) Understands students' problems and situations				
10) Exchanges ideas with students to make them feel acceptable				

Appendix II

O	E	O-E	(O-E) ²	(O-E) ² /E
9	5.5	3.5	12.25	2.23
6	8	-2	4.00	0.50
5	6.5	-1.5	2.25	0.35
2	5.5	-3.5	12.25	2.23
10	8	2	4.00	0.50
8	6.5	1.5	2.25	0.35
40	40	00.0	-----	6.16

$\chi^2_{(2, 0.05)}$ is 5.99.

Appendix III

O	E	O-E	(O-E) ²	(O-E) ² /E
4	4	0	0	0.00
13	12	1	1	0.083
3	4	-1	1	0.250
4	4	0	0	0.00
11	12	-1	1	0.083
5	4	1	1	0.250
40	40	00.0	-----	0.666

$\chi^2_{(2, 0.05)} = 5.991$