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**Gender as a Predictor of Physics Students' Academic Performance in Senior Secondary School External Examinations in Ekiti State, Nigeria**<sup>1</sup>Adebisi O. AWODUN (Ph.D), <sup>2</sup>Ajoke D. OYENIYI (Ph.D)<sup>1,2</sup>Department of Science Education, Bamidele Olumilua University of Education, Science and Technology, Ikere-Ekiti, Ekiti State, Nigeria.**Corresponding Author\***

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**Abstract:** This study examined gender as a predictor of Physics students' academic performance in Senior Secondary School external examinations in Ado Local Government Area of Ekiti State, Nigeria. An ex-post-facto research was employed for the study. The entire Physics students in Ado-Ekiti that sat for the West African Examination Council (WAEC) external Examination between 2017 to 2019, were used for the study. A total of three hundred candidates (300) were randomly selected as a sample from five (5) senior secondary schools for the study. Frequency and t-test were used to test the four formulated null hypotheses. The result indicated that; there was a significant difference in the academic performance of male and female Physics students in mixed senior secondary schools, also there was a significant difference in academic performance of male and female Physics students in single-sex senior secondary school, similarly, there was a significant difference in academic performance of female students in

Physics in single-sex and mixed senior secondary schools. There was a significant difference in academic performance of male students in Physics in single-sex and mixed senior secondary schools. Based on the findings, appropriate conclusions and recommendations were made.

**Keywords:** Gender, Predictor, Physics students, academic performance, external examination

**INTRODUCTION**

Physics is the bedrock of the technological development of a nation. This implies that, high level of scientific and technological attainment of a nation depends on the Physics education of the citizenry (Akinbobola, 2016). Nigeria as a country suffers from persistent power failure, insufficient food, medical care, portable water as well an unconducive living and working environment that indicate the low level of scientific-technological development (Akinbobola, 2015). The standard of education in Nigeria is of great concern compared to other developing countries. It is generally believed that, a good education is the gateway to success and the cornerstone of social emancipation, economic achievement, and natural development. It is one of the responsibilities of government to provide relevant and adequate educational opportunities to her people.

Akinleye (2014) opines that inspirations ginger actions, counteractions, and their directions. Therefore, a number of factors motivated this study. The first of such factors is related to gender inequity. Thus, the

educational growth and development especially in the northern part of Nigeria, is suffering from the problem of educational inequity between females and males in terms of educational opportunities.

The problem of students' under-performance in secondary schools in Nigeria has been a much-discussed educational issue. In solving any problem however, it is pertinent to understand the causes of such problems. Many causes or agents have been studied as the etiological starting point for investigating the phenomena of school failure or success. These causes are looked into from several perspectives including the role of the students, teachers, parents or family, school environment, society, government, etc.

Gender is one of such factors that have considerable effects on students' academic performances, especially in science subjects. Gender is the range of physical, biological, mental and behavioural characteristics pertaining to and differentiating between the feminine and masculine (female and male) population. The importance of examining performance in relation to gender is based primarily on the socio-cultural differences between girls and boys. Some vocations and professions have been regarded as men's (engineering, arts and crafts, agriculture, etc.) while others as women's (catering, typing, nursing, etc.).

In fact, parents assign a task like car washing, grass cutting, bulbs fixing, climbing ladders to fix or remove things, etc. to the boys. On the other hand, chores like dishes washing, cooking, cleaning, and so on are assigned to the girls. In a nutshell, what are regarded as complex and difficult tasks are allocated to boys whereas girls are expected to handle the relatively easy and less demanding tasks. As a result of this way of thinking the larger society has tended to see girls as a weaker sex". Consequently, an average Nigerian girl goes to school with these fixed stereotypes.

According to Alex (2012), gender inequity is manifested in the low level of enrollment, alarming withdrawal rate resulting in low completion rate, poor or lack of attention and support for the female child education by parents, and lack of or inadequate attention being given to female students by teachers particularly in co-educational classrooms especially when taught by male teachers.

Another motivating factor for embarking on this research is the assertion that females have better aptitude and competence in learning the language than their male counterparts (Algoe, 2012). Closely related to this assertion is the desire to investigate the performance of students based on sex in the Senior Secondary Certificate Examinations (SSCE). One may not, however, be wrong to attribute the reasons for the gender disparities in educational opportunities to the historical development or evolution of western education in Nigeria. Later, due to the realization of equality of human creation and in appreciation of the role of females in social development and the need to educate them arose though on separate grounds initially (Amin, 2016).

With the complexity of our society as it develops, coupled with the struggle for equality of gender, especially by women themselves and human rights activists, the idea of co-education evolved and gradually became very popular and acceptable in most countries of the world (Wexler, 2011). In most cases, the advocates of mixed gender consider it is a valuable means of ensuring inter-gender socialization, integration, and enhancement of equity in human beings and it is believed to be highly cost-saving. They also argued that it enhances better academic performance.

Anderman & Young (2014) stated that the dynamic nature of any given society and its challenges on educational development consequently affects both the theoretical and practical aspects of the school curriculum implementation as a whole. This is due to the fact that, as the values of society change, so also does the goals and objectives of education. A formal education system necessarily reflects the values of society since its very purpose is to implement those things that the general community or society considers important and valuable, particularly for their development and survival.

Therefore, if the general community changes with regard to what is and what is not appropriate, the educational system also must change and this seems to be vitally relevant to the question as to whether a coeducational or single-gender schooling system is in the best interest of students, parents and the wider society (Annika, 2013).

Bandura (2014), Equally too, they will be more likely to concentrate on their academic engagements since they will be free from the distraction of male-female relationships that inevitably, tempts adolescents for explorative reasons (Philiem, 2016 and Farley, 2015). In addition, since moral values were clearly defined several years back, to most people, it was practically seen and acceptable to be appropriate to separate boys and girls in their formal schooling.

In fact, it has been the general belief in most parts of the country that male students tends to perform better compared to female students in mathematical-related or technology-based subjects. This study, therefore, intends to investigate gender as a predictor of students' academic performance in external examinations physics in senior secondary schools in Ado Local Government Area of Ekiti State.

Nigeria as a country has been suffering from a disgustingly high rate of students 'failure in key subjects among which Physics is one (Eze, 2014). The Principal Assistant Registrar of West Africa Examinations Council (WAEC), Uduh, cited by Eze (2014) reveals that the results of West African Senior School Certificate Examinations (WASCE) of candidates who obtained credit passes in, at least, five subjects, including Physics, English Language and Mathematics over a period of five years. Unfortunately, not much consideration has been given to the gender factor among secondary school students as a possible vital variable that can impact on students' academic performance.

This factor is often conspicuously absent in such enumerations. Consequently, of recent, a deliberate and drastic shift from coeducation, much more to single-gender education is gaining ground and has prompted several studies, especially outside the shores of Nigeria (Alejolowo, 2015). This shift to a single-gender system today in other parts of the world is attributable to a number of research findings that that male and female genders are different in several respects such as the rate of brain development brain lateralization (Harriet, Robert & Marvin, 2009 and Burman, Tali, James, 2008), brain tasks execution strategies (Gomez, 2011), seeing and hearing endowed capabilities and activeness in the brain (Algoe, 2012).

Other differences reported include learning strategies or styles (Vernon-Gestenfeld, 2012 & Hodgins, 2014); and classroom learning climatic conditions (Hodgins, 2008). Each of these poses some pedagogical challenges and consequently, constraining students' academic performance if not addressed. In this study, the word gender is used to differentiate or create the group dichotomy (male and female)

as the variables for comparison in the researcher's analysis. Thus, the word gender is more preferable to be used in the present study.

This study, therefore, investigated gender as a predictor of Physics students' academic performance in senior secondary schools' external examination in Ado Local Government Area of Ekiti State. In other words, the researcher investigated the academic excellence of mixed gender and single school students to find out the most system of effective school that can be best yield academic excellence of students at the senior secondary school level particularly in Physics.

### **Research Hypotheses**

The following null hypotheses were formulated and tested at 0.05 level of significance:

1. There is no significant difference in the academic performance of male and female Physics students in mixed senior secondary schools.
2. There is no significant difference in academic performance of male and female Physics students in single-sex senior secondary school.
3. There is no significant difference in academic performance of female students in Physics in single-sex and mixed senior secondary schools.
4. There is no significant difference in academic performance of male students in Physics in single-sex and mixed senior secondary schools.

### **Literature Review**

Physics is an essential part of the educational system and of an advanced society. At this scientific and technological revolution age, these objectives underscore the importance of the study of Physics. The distinct role of Physics in the achievement of these objectives cannot be over-emphasized that is why Physics has been found to be useful in all human endeavour, Physics has contributed immensely to the development of society.

The choice of Physics as a major field of study or taking higher Physics courses is shaped by students' interest, motivation, and prior achievement (Hoffmann, 2002). Lawernz (2009) found out that students who underwent "Active Physics" scored higher for the greater part of the year compared to those who did not undergo the same experience.

While at the same time, the study claims that the achievement gap between boys and girls narrowed for those groups who took "active Physics". On the other hand, the existing literature show that interest in Physics is strongly related to Physics self-concept (Hannover & Kassels, 2012). Hoffmann's study among German school children ranging from grades 7 to 10 revealed that self-concept in Physics is the best predictor of interest in Physics as a school subject for both boys and girls. However, gender differences in interest emerge when other factors come into play which can compromise the self-concept of performance in Physics. According to Hoffmann, the gender difference in interest seems to be sufficiently explained by the gender differences of other variables, especially by differences in self-concept. In a similar study, Ziegler, Broome & Heller (2009) found out that interest and achievement in Physics are also affected by parental cognition and gender stereotypic beliefs among boys and girls.

The burgeoning body of literature regarding the pattern of major choice as a function of gender shows a consistent pattern. Maehr (2014) found out that men's achievement and attitude towards science tends to be higher than women while at the same time noting a discernable pattern of differences between the sexes in motivational orientation in particular areas of science.

Accordingly, females are inclined more to life sciences while males are oriented towards physical sciences. According to Payne (2015) confirmed that women choosing quantitative fields were likely to major in Physics and Engineering. Further, there is evidence to suggest that intervention through curriculum innovation that addresses the interest and experiences of females positively impacted girls' motivation, achievement, and interest in Physics (Hannover, 2001). However, Hoffmann (2002) found that interest and motivation to study Physics declined with an increase in grade level for both sexes. Other studies which applied innovative curriculum that considered female interest and employed constructivist teaching methodology came out with conflicting results. In this connection, unlike Lawrenz (2013) and Lorenzo (2014) conducted a similar study on a relatively larger sample failed to yield consistent results.

Lawrenz (2013) claimed that males and females have significantly different prior understandings of Physics and Mathematics with females less likely to take high school Physics and making more negative shifts in attitude towards Physics. Similarly, self-efficacy is viewed as an important factor of students' major choices. Porter & Umbach (2016) claimed a strong link between subject-specific self-efficacy with the choice of a particular discipline such as high Mathematics self-efficacy with a pursuit to major in mathematics, and high scientific and technical self-efficacy related with choosing engineering as an undergraduate major.

These findings offer partial empirical support to Zhus (2011) claim regarding the link between Physics self-efficacy (PSE) and personal experience in the form of the content of Physics learning and knowledge structure as offered in school. In the study of the role of high school Physics to succeed in introductory college Physics, Sadler & Tai (2001) found out that students' high school preparation is an important predictor of achievement in college although those who were without a high school Physics course, yet with a strong academic background or have previously taken calculus, can also succeed in college Physics.

### **Concept of Gender**

The terms sex and gender are often perceived to mean the same thing. They are, therefore, often used interchangeably or used confusedly due to the difficulty involved in getting the clarity in the difference in their meaning. Thus, the World Health Organisation (WHO) (2013) defines sex as the biological characteristics which define humans as female or male. These sets of biological characteristics are not mutually exclusive as there are individuals who possess both, but these characteristics tend to differentiate humans as males and females (WHO 2013).

WHO (2013) goes further to enumerate some aspects of sex characteristics asserting that they are universally the same as follows:

1. Women menstruate while men do not.
2. Men have testicles while women do not.

3. Women have developed breasts that are usually capable of lactating, while men have not.
4. Men generally have more massive bones than women.

Men are taller than women. But of course there are some women who are taller than some men. Differences are statistical, not categorical (Grobman, 2012). Other biological sex characteristics on the top scale include external genitalia, internal reproductive structures, chromosomes, hormone levels, and secondary sex characteristics such as breasts, facial and body hair, voice, and body shape (Ruchismita, 2013). Everyone is born female or male. Biological and physiological conditions as indicated above help us in classification as belonging to either female sex or to male sex.

Only the sexual and reproductive organs are different and all other organs are the same. This is to say that girls and boys are not too significantly different; rather there are more similarities than differences between them. These biological or physiological differences are creations of nature and are the same in all families, every community, and in every country.

However, even sex may not be wholly dichotomous as it is made evident by inter-sexed individuals. It is ideal to note that at this point, biology is influenced by environmental, social, economic, and cultural factors which are understood as gender (Ruchismita, 2013). Gender is defined as a set of characteristics or traits that are associated with certain biological sex (male/female). These characteristics are generally referred to as —masculine or feminine. This concept of gender goes close to the WHO's definition of sex above. WHO (2013) defined gender as —the socially constructed roles, behaviours, activities, and attributes that a given society considers appropriate for men and women. WHO (2013) has also enumerated some gender characteristics to include the following:-

1. In the United States (and in most other countries), women earn significantly less money than men for similar work.
2. In Vietnam, many more men than women smoke, as female smoking has not traditionally been considered appropriate.
3. In Saudi Arabia men are allowed to drive cars while women are not.

Gender is relational and refers not simply to women or men but to the relationship between them. According to Mills (2011), "gender is cultural and is the term to use when referring to women and men as social groups. Sex is biological; use it when the biological distinction is predominant". Sex is something one is born with, whereas gender is imbibed and learnt through a process of socialization. Sex does not change and it is constant, whereas gender and gender roles and norms change and vary within and between cultures, and with time, (Ruchismita, 2013). Gender has been highly controversial in many scientific fields because of the controversies on the different perspectives on how much of gender is due to biological, neurochemical, and evolutionary factors (nature) how much is due to culture and socialization impact. The controversy is due to political implications and the claim of by either side as being right.

### **Impact of Gender on students' academic Performance**

Academic performance is commonly measured by examinations or continuous assessment but there is no general agreement on how it is best tested or which aspects are most important. According to Annie, Howard, Stoker & Mildred (2016) academic performance is the outcome federal the extent to which a student, teacher or institution has achieved their educational goals.

Bossaert, Doumen, Buyse & Verschueren (2014) defined academic performance as a student's success in meeting short or long-term goals in education in the big picture according to the authors, academic performance means completing high school or earning a college degree. Lassifer (2015) looked at students' academic performance as referring to a students' strong performance in a given academic area. A student who earns good grades or awards in science has achieved in the academic field of commercial studies. He further stated that education associations and schools monitor the overall level of student academic performance to decide what, if any challenges, need to be made in the educational system.

Boys often face many areas of difficulty, such as lower achievement scores in most classes. These difficulties exist because of particular problems in literacy and skills deficient in such areas as note-taking and listening. Boys tend to struggle more with homework and have lower grades in all classes, except some math and most science classes. Because boys sometimes find little relevancy in the curriculum, they become less motivated to learn the subject matter.

However, as a group, boys are much more likely than girls are to be graphic thinkers and kinesthetic learners and to thrive under competitive learning structures (King, Gurian & Stevens, 2010). Research suggests that greater group cohesion may occur in a single-gendered group, as opposed to the divisions that frequently result from the in-group/out-group phenomenon so evident in the coeducational classes (Wills, 2012).

The development of an apparent disenchantment with school by many boys frequently begins in primary schools; or, as argued by Hickey & Keddie (2014), "the antecedents for this problem [of high school resistance] are set in place long before this time [adolescence]" (Hickey & Keddie, 2014). Boys from low socioeconomic areas are all too often the least likely to conform to the precise, middle-class norms of their teachers and schools (Wills, 2012).

Working-class boys in coeducational classes are frequently drawn into a contest with girls that the boys simply cannot win (Thorne, 2013). Predictably, this one-sided competition results in boys becoming consciously aware that "the game" is rigged against them (Slade, 2012). Some teachers feel that boys are much less mature than girls are. Therefore, when boys and girls are in school together at the preadolescent/adolescent phase, boys will not perform as well as girls.

For years, research has provided evidence of achievement amongst girls. According to Whyte (2016), the oppositional climate between the genders that occurs in some primary school classrooms may have its origins in the nature of the tasks that are given to primary school children. For example, girls are considered to be "good at the forms of writing valued in English classrooms" (Whyte, 2016). Such forms of writing are, typically, the frequently requested fictional narrative in which "girls do seem to be very proficient" (Gilbert & Rowe, 2009).

Frequently, the *best work* in primary school classrooms is that of a girl (Thorne, 2013). Furthermore, Poynton (2013) argued, "Girls write about topics that their teachers can approve of, while boys" topics can and do upset teachers". By way of explanation, Kenway & Willis (2016) noted that the highly regarded abilities of girls derive from their socialization rather than a natural aptitude. Indeed, it may be the validation of their behavior that particularly encourages girls to strive for neatness, tidiness, even

prettiness; getting it right is what counts in the controlled space of the home and the classroom (Kenway & Willis, 2014; Wills, 2012).

## **Methodology**

The research design for the study was an ex-post factor design. That is, all the research variables have already existed before the commencement of the study and hence, the researchers neither controlled nor manipulated the research variables, the data were just collected and used as they occur naturally.

The target population of the study consisted of all the Physics students that sat for West African Examination Council (WAEC) External Examinations between 2017 to 2019 in senior secondary schools in Ado LGA of Ekiti State, Nigeria.

Five senior Secondary were selected as samples. The sample comprises of 20 candidates from schools for each of the 3 consecutive WAEC examination results (that is, 2017, 2018 & 2019) examination results. This makes a total of 60 candidates' results per school and 300 candidates' result for 5 senior secondary schools selected. Two (2) single-sex schools and three (3) Mixed-schools.

The instrument for this study is scores obtained by Physics students from West African Examination Council (WAEC) Examinations 2017 to 2019.

The West African Examination Council (WAEC) Examinations 2017 to 2019 results was assumed to be valid since they are standardized examinations and the teachers-made examinations externally by the specialist in that field.

Data was collected directly from the Teaching Service Commission academic records in Ekiti State, Nigeria. The scores of students in Physics were obtained directly from the Senior Secondary School Certificate Examination result sheets from Teaching Service Commission (TSC). These were used as measures of academic performance.

The letter grades of A, B, C, D, E, and F were converted to numerical grade points of 5, 4, 3, 2, 1, and 0 respectively. The interpretation of these are 5 – Distinction, 4 – Merit, 3 – Credit, 2 – Pass and 1- Fail.. The data collected were coded and analysed using the Statistical Packages for Social Sciences (SPSS). The descriptive statistics, t-test was used.

## **Results and Discussion**

### **Hypothesis 1**

There is no significant difference in the academic performance of male and female students in Physics in mixed senior secondary schools.



Table 1: A t-test Analysis comparing the academic performance of male and female students in Physics in mixed senior secondary schools.

Group	N	Mean	SD	df		$t_{tab}$
Male	102	27.80	3.14	178	10.42	1.65
Female	78	33.82	4.38			

$P < 0.05$  (Result Significant at 0.05 level)

The analysis in table 1 shows that the calculated t-value of 10.42 is higher than the critical value 1.63 on the basis of this, the difference is statistically significant.

Hence, the null hypothesis which states that ‘there is no significant difference in the academic performance of male and female students in Physics in mixed senior secondary schools,’ was rejected ( $t_{cal} = 10.42$ ,  $df = 178$ ). The result reveals that there is a significant difference in the academic performance of male and female students in Physics in mixed senior secondary schools.

### Hypothesis 2

There is no significant difference in academic performance of male and female Physics students in single-sex senior secondary school.

Table 2: A t-test analysis comparing the academic performance of male and female Physics students in single-sex senior secondary school.

Group	N	Mean	SD	df	$t_{cal}$	$t_{tab}$
Male	60	41.63	4.62	118	7.28	1.65
Female	60	36.21	3.44			

$P < 0.05$  (Result Significant at 0.05 level)

The analysis in table 2 indicates that the calculated t-value of 7.28 is greater than the critical value of 1.65. On the basis of this, the difference is statistically significant. Hence, the null hypothesis was rejected ( $t_{cal} = 7.28$ ,  $df = 118$ ). This result clearly reveals that there is a significant difference in the academic performance of male and female Physics students in single-sex senior secondary school.

### Hypothesis 3

There is no significant difference in the academic performance of female students in Physics in single-sex and mixed senior secondary schools.

Table 3: A t-test Analysis comparing the academic performance of female students in Physics students in single-sex and mixed senior secondary schools

Group	N	Mean	SD	df	$t_{cal}$	$t_{tab}$
Mixed school	78	38.21	6.21	136	3.84	1.65
Single School	60	34.28	5.76			

$P < 0.05$  (Result Significant at 0.05 level)

The analysis in table 3 indicates that the calculated t-value of 3.84 is higher than the critical t-values of 1.65. On the basis of this, the difference is statistically significant. Hence, the null hypothesis which states that “there is no significant difference in academic performance of female students in Physics students in single-sex and mixed senior secondary schools” was rejected ( $t_{cal} = 3.84$ ,  $df = 136$ ). This implies that there is no significant difference in the academic performance of female students in Physics in single-sex and mixed senior secondary schools

#### Hypothesis 4

There is no significant difference in academic performance of male students in Physics students in single-sex and mixed senior secondary schools.

Table 4: A t-test Analysis comparing the academic performance of male students in Physics in single-sex and mixed senior secondary schools.

Group	N	Mean	SD	df	$t_{cal}$	$t_{tab}$
Mixed school	102	38.52	5.31	160	9.16	1.65
Single School	60	31.68	4.11			

$P < 0.05$  (Result Significant at 0.05 level)

The analysis in table 4 indicates that the calculated t-value of 9.16 is higher than the critical t-values of 1.65. On the basis of this, the difference is statistically significant. Hence, the null hypothesis which states that “there is no significant difference in academic performance of male students in Physics students in single-sex and mixed senior secondary schools was rejected ( $t_{cal} = 9.16$ ,  $df = 160$ ). This implies that there is a significant difference in academic performance of male students in Physics students in single-sex and mixed senior secondary schools.

#### Discussion

The research investigated gender as a predictor of Physics student academic performance in senior secondary schools in Ado Local Government Area of Ekiti State. Thus, four research questions and four hypotheses were formulated and tested. The results are discussed below.

The first major finding in this study was that there was a significant difference in the academic performance of male and female students in Physics in mixed senior secondary schools. The result indicated that even after controlling for students' academic ability and other background factors, both girls and boys did significantly better in single-sex schools than in coeducational schools in all subjects.

This is in consonance with the finding of King, Gurian & Stevens (2010).

Secondly, there was a significant difference in the academic performance of male and female Physics students in single-sex senior secondary school. The study reported no significant evidence to show any difference in performance between males in the single-gender stream and males in a mixed gender stream.

Thirdly, there was a significant difference in the academic performance of female students in Physics in single-sex and mixed senior secondary schools. The result also indicated that the single-gender female students performed better than the mixed-gender stream female students. Consequently, hypothesis 3 was equally rejected. Some previous findings which are in consonance with the findings of this study are those of Dianne (2012), Henry (2011) and ACER (2012) which revealed that the single-gender stream female students did better than those in the mixed-gender stream schools.

Fourthly, there was a significant difference in academic performance of male students in Physics in single-sex and mixed senior secondary schools. The four findings above on performance differences between the single-gender stream and mixed-gender stream have been justified by Harvey (2011) and Dweck (2013) who asserted that gender differences impact on learning due to differences in terms of reinforcement strategies, socio-cultural environmental variables, and gender learning due to differences in male and female genders. The reported significant difference between single and mixed stream students' performances in this study was also justified by the conceptual propositions on gender difference on language acquisition and brain structural, developmental process and functional differences (Hodgins, 2012 and Gomez, 2011).

### **Conclusion**

For the fact that a significant difference was found between the performance of single-gender and mixed-gender school with a more encouraging performance by the former, it is concluded that single-gender school proves to be more effective in attaining better academic performance than mixed-gender school in Physics in Senior Secondary Schools in Ado Local Government Area of Ekiti State.

Furthermore, since a significant difference was found between the performance of male students in single and mixed-gender schools with a more encouraging performance by those in the single-gender school, it is concluded that single-gender streaming proves to be more effective in attaining better academic performance for male students in Physics.

In view of the fact that a significant difference was found between the performance of female students in the single and mixed-gender school with those in the former performing better, it was concluded that single-gender school proves to be more effective in attaining better academic performance for female students. In addition, since a significant difference was found between the performance of male and female students in single school though the males performing slightly better than the females and that the two genders did well, it was concluded that single-gender school proves to be more effective in attaining better academic performance for both male and female students in Physics. The male students, however, were slightly more favoured.

The significant difference was found between the performance of male and female students in mixed-gender school though the females performing slightly better than the males. The two genders performed differently. It is then concluded that the mixed-gender school was less effective in enhancing good academic performance for both genders and was more detrimental to male students.

### Recommendations

Based on the findings of this study, it is recommended that:

1. Government should train teachers, especially for single-gender education particularly if it is to be adopted. In so doing, teachers should be equipped with the knowledge and pedagogical skills to work with both boys and girls under differing learning styles, conditions, and environments.
2. Government should implement gradually the single-gender education programme in the state with every sincerity and dedication, based on deliberate and feasible policy on its planning and implementation as recommended in 1 above.
3. Teachers should not place preference on any gender. Parents and guardians should encourage both males and females to be educated and desire the great thing in life. Government should de-emphasize the use of mixed gender stream environment to deliver instruction due to the overall poor performance of both male and female students in them.
4. Government should adopt appropriate means to enhance the improvement in particular of male students' performance in mixed-gender schools. Above all, society at large should campaign against gender disparity.

### REFERENCES

1. ACER (2012). *You Just Don't Understand: Women and Men in Conversation*, Morrow, New York.
2. Akinbobola, A.C (2016). Towards a Problem-Solving Approach in Teaching and Learning Science. *Journal of science and Mathematics in South East Asia*.16 (2), pp.3.
3. Akinbobola, A.C. (2015). In a Difference Voice: Psychological theory and women's development. Cambridge, Ma: Harvard University Press.
4. Akinleye, A.S. (2014). Self-perception profile of adolescent girls at a single-gender and a mixed-gender school. *Journal of Genetic Psychology*, 60, 210.
5. Alejowo, M. L. (2015). *Issues on curriculum*. Nigeria: Sankore Educational Publisher Ltd.
6. Alex, F. A. (2012). Attributions of female and male adolescents for real-life failure experiences. *Journal of Experimental Education*, 58(2), 127–140.
7. Algoe, C. O. (2012). Classrooms: Goals, structures, and student motivation. *Journal of Educational Psychology*, 84, 261–271.
8. Algoe, F. A. (2012). *Social Studies: A Sociological Approach*. Lagos: Pumark (Nig) Ltd.
9. Amin, A.E. (2016). *Mixed or Single-gender Schools? (Vol. III): Attainment, Attitude and Overview*. London: Routledge.
10. Anderman, J. E., Youngs, J.O. (2014). Motivation and its relevance to school psychology: An introduction to the special issue. *Journal of School Psychology*, 44, 325– 329.
11. Annita, E.T. (2013). Male/female brain differences. Medical Education Online
12. Bnadura, E.A. (2014). Historical change in the language use of women and men: Gender differences in dramatic dialogue. *Journal of Physics Education*, 28, 21-37.

13. Bossaert, B.A., Doumaen, K.O., Buyse, H.O. & Verschieren, M.O. (2014).Curriculum. Retrieved December, 1, 2012 from [www2.aau.org/wghe/gender/toolkit/Toolkit-module4.pdf](http://www2.aau.org/wghe/gender/toolkit/Toolkit-module4.pdf).
14. Dianne, T.O. (2012). Science, Gender, and power: Analysis of theme and topic\ management in Arabic conversational discourse. *The Humanities and Social Science*, 61: 591.
15. Dweek, E.A. (2013). Impact of school-type and sex of the teacher on female students' attitudes toward Mathematics in Nigerian secondary schools. *Educational Studies in Mathematics*, 24(2), 223-229.
16. Eze, C. A. (2014). Physics in India: Loyalty and Attitudes. [Http://www.languageinindia.com/may2003/annika.html](http://www.languageinindia.com/may2003/annika.html)
17. Eze, C. A. (2014). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84,191–215.
18. Farley, A. J. (2015). Motivation and strategy use in science: Individual differences and classroom effects. *Journal of Research in Science Teaching*, 31(8), 811–831.
19. Gilbert, S.O. & Rowe, N.O. (2009). *Feminism and Linguistic Theory (second edition)*, McMillan, London.
20. Gomez, O.A. (2011). The Effects of Single-Sex Compared With Coeducational Schooling on Students' Performance and Attitudes: A Meta-Analysis.. *Psychological Bulletin*, DOI: 10.1037/a0035740.
21. Grobman, M. Y. (2012). *Introduction to research and statistics*. Debis-co Press and Publishing Company, Kano.
22. Hannover, P.A. & Kassels, M.K. (2012). Performance and Attitude of Male and Female Students in Physical Geography in Urban and Rural Schools of Ogun State, Nigeria. *African Journal for the Study of Educational Issues*, 4(3, 4), 195-198.
23. Hannover, W. A. (2001). Optimal full matching and related designs via network flows. *Journal of Computational and Graphical Statistics*, 15(3), 609-627.
24. Harvey, E. A. (2011). *Help for the boys helps the girls*. *Times Educational Supplement*. London, UK.
25. Henry, J. D. (2011). Effects of a girls-only curriculum during adolescence: Performance, persistence, and engagement in Science. Retrieved on January 1,2016 from [aer.sagepub.com/content/40/4/929.abstract](http://aer.sagepub.com/content/40/4/929.abstract).
26. Hoffmann, J. (2002). How about those boys? In: Oakland County Speech Language Hearing
27. King, J.E., Gurian, K.O. & Sterrems, N.K. (2010). Effect of concept map on students Achievement, interest and retention in selected unit on organic Chemistry.Unpublished Ph.D Thesis, University of Nigeria, Nsukka.
28. Lorenzo, D.S. (2014). Science, gender, and sexuality: *Current issues and new directions*. *Applied Linguistics*, 26(4), 482–502.
29. Lassifer, J. L. (2015). Creativity and Birth Order/Sex Differences in Children. *Education*, 114(2), 224-226.
30. Lawernz, P.A (2009). Assessment of Students' Numerical Proficiency in Solving Physics Problems in Senior Secondary Schools in Kwara State. Unpublished Ph.D Thesis, University of Ilorin, Ilorin.
31. Lawrenz, A. D. (2013). History and Philosophy of Science. Enugu: Hacofam Educational Books.
32. Maehr, R. A. (2014). *Mixed or Single-gender Schools? (Vol. I): A Research Study about Pupil Teacher Relationships*. London: Routledge.
33. Mills, E. O. (2011). Functional sex differences in the human brain. Retrieved August 28, 2011 from [www.singlesexschools.org/evidence/html](http://www.singlesexschools.org/evidence/html).

34. Payne, A. A. (2015). Effect of streaming by gender on students' performance. *Journal of Science Education*, 5 (2), 23-45.
35. Philem, G.O. (2016). Senior Secondary School Students' Knowledge Misconceptions and Alternative Conception of a Major Physics Proportion. Unpublished M.Ed. Thesis, University of Ilorin, Ilorin.
36. Porter, R.A. & Umback, A. A. (2016). Sexual dimorphism of brain developmental trajectories during childhood and adolescence. Retrieved August, 10,2011 from [www.ncbi.nlm.nih.gov/pmc/articles/PMC2040300](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2040300)
37. Poynton, K. A. (2013), Classroom climate that support male and female Differences. Retrieved March 10, 2014 from [languagelog.ldc.upenn.edu/myl/llog/Hodgins2.pdf](http://languagelog.ldc.upenn.edu/myl/llog/Hodgins2.pdf) · PDF file
38. Ruchimita, G.A. (2013). Co-education and sex roles. *Australian Journal of Education*, (30)117-131
39. Sadler, J. C. and Tai, A.U. (2001). Multidimensional adolescent self-concepts: Their relationship to age, sex and academic achievement. *American Educational Research Journal*, 25, 237-69.
40. Slade, M. A. (2012). Effects of single-gender schools on achievements and attitudes. *Journal of Educational Psychology*.381-395.
41. Thorne, C.A. (2013). *Girls and boys in school: together or separate?:* New York, Teachers College Press.
42. Wexler, A.D. (2011). Senior Secondary School Students' Knowledge Misconceptions and Alternative Conception of a Major Biology Proportion. Unpublished M.Ed. Thesis, University of Ilorin, Ilorin.
43. Whyte, G.A. (2016). Revisiting Analogy as an Educational Tool: PBL and the Game of Basketball. *Medical Education*, 34(12), 1029-1031.
44. Wills, J.E. (2012). Single-Gender Education versus Coeducation for Girls: A Study of Mathematics Achievement and Attitudes toward Mathematics of Middle-School Students, Paper presented at the Annual Meeting of the American Educational Research Association, Montreal, Quebec.
45. World Health Organisation (WHO) (2013). Effect of Framing and Team Assisted Individualized Instructional Strategies on Students' Achievement in Mathematics. *African Journal For The Study Of Educational Issues*, 4(3,4), 75-89
46. Zhus, R. E. (2011). Psychology of learning Theories into Classroom practices. Onitsha: Onimax. *Journal of Social Science Education*, 2 (4), 23-53.
47. Ziegler, D.A., Broome, S.O.& Heller, J.O. (2009). Definition of education. Retrieved January 27, 2014 from [www.teach-kids attitude-1st.com/definition-of-education](http://www.teach-kids attitude-1st.com/definition-of-education).