



## Statistical Analysis of Gender Disparities in Learning Outcomes among Senior Secondary School Students in Ilorin, Nigeria

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### Abstract

The study looked at the impact of gender on senior secondary school students' confidence and performance in school in Ilorin, Nigeria. The study's sample included 346 students (129 men and 217 females) from four secondary schools in Ilorin. This study's data was collected using the State Self-esteem Scale (SSES). The SSES has high internal consistency, with Cronbach's alpha coefficients ranging from 0.85 to 0.91. The mean scores of male and female students were compared using an independent sample t-test, and the results showed that male students had significantly higher mean scores on total self-esteem and academic performance than female students. Based on these findings, teachers, the government, education policymakers, researchers, and other educational stakeholders should pay more attention to these inequalities in order to boost female students' self-esteem and academic performance.

**Keywords:** Gender disparities, Learning outcomes, Statistical analysis, Academic performance, Education

### Introduction

The educational landscape is continuously changing, with an increasing emphasis on developing well-rounded individuals who are not just academically competent but also have a strong sense of self-esteem. Self-esteem, a key component of emotional well-being, is critical for educational success. It effects one's motivation, learning style, and overall sense of accomplishment. In this setting, knowing the elements that influence student self-esteem is critical. Gender has been a topic of discussion for some time now. Traditional prejudices and cultural expectations can influence how students see themselves and their talents. This is especially true in subjects like physics, which may be seen as conventionally masculine. Gender is a multidimensional notion that includes biological, social, and cultural components. While sex refers to the biological classification of male, female, and intersex individuals based on chromosomes and genitalia, gender dives further into the social and cultural implications associated with masculinity and femininity. Gender roles and expectations are socially constructed and vary across cultures and across time. These expectations can influence anything from apparel selection to behaviour and job options. For example, the colour blue may be linked with masculinity in one culture but not in another. Gender roles are prevalent in our culture. Gender refers to the social and cultural qualities, rituals, or behaviours that males and females are known for in society (Okeke, 2008). Gender roles are determined by society, which assigns men and women separate responsibilities. As a result, gender roles may evolve over time and vary from one community to another. Gender roles, according to the experts, are positions assigned to men and women by a society based on its culture and traditions. Researchers have long recognised gender as a factor impacting a person's capabilities and developmental capacities (Grover & Kaur (2019)). As a result, there has been significant debate concerning whether or not a person's gender influences their abilities and skills. In most fields, some research determined that men outperformed women, while others concluded the opposite (Abubakar & Oguguo, 2011). However, current patterns indicate that the gap that previously indicates that women are more exposed to societal activities than ever before.

Oludipe (2012) noted that in Nigeria, some occupations and professions have historically been seen as belonging to men (medicine, engineering, architecture, and business), while others have been seen as belonging to women (nursing, catering, and typing). Onyegegbu (2008) describe gender as an innate biological difference between women and men. So, both female and male differ by their physiology. Research findings present a mixed picture. In some subjects,

particularly math and science, boys have historically scored higher on standardized tests. However, the gap appears to be narrowing, and girls are excelling in other areas like reading and writing. Additionally, girls tend to outperform boys in overall graduation rates. The dominant trend over the years assured male superiority while female are seen as weak, subordinate and inferior.

According to Kauffman (1997), gender refers to the behaviours associated with masculinity and femininity, as well as how individuals perceive their roles. According to Berk (2010), male and female children are treated differently at birth, which is consistent with Kauchak and Eggen (2011), who stated that male children are regarded as handsome and seen as tougher and harder, and parents are rougher with male children and involve them in more physical stimulation than their female counterparts. For this reason, the American Association of University Women (AAW) contended that the differential treatment of male and female students by professors and society jeopardised females' scholastic advancement, self-esteem, and career options.

Self-esteem, or the way we see and value ourselves, is a critical component of mental health and wellbeing. It includes our ideas about our worth, ability, and sense of belonging. Healthy self-esteem influences many parts of our lives, including motivation, decision-making, relationships, and emotional resilience. A social psychologist defined self-esteem as our overall attitudes towards us. Self-esteem refers to how positively or negatively we regard ourselves (Baron et al., 2010). According to Debra (2008), self-esteem is the process by which people evaluate themselves and acquire information, skills, and attitudes that allow them to participate effectively in society. : Kariuki (2021) stated that self-esteem is a life skill that is highly valued by all societies at all stages of growth. Demidenko et al. (2010) define self-concept as three components: self-esteem, stability, and self-efficacy. Self-esteem is the evaluative component in which a person judges his or her own worth. Early thinkers believed that self-esteem is a fundamental human desire and motivator. Maslow (1987) emphasised self-esteem in his hierarchy of needs theory. Maslow also proposed two separate sorts of esteem: "the need for respect from others and the need for self respect, or inner self-esteem". Respect from others includes acknowledgment, acceptance, status, and praise, and it was thought to be more fragile and readily lost than the desire for inner self-esteem. Individuals will be motivated to seek it while being unable to evolve and reach self-actualization. There are many levels of self-esteem. This has an impact on adolescent self-esteem and its growth.

- Appearance is more significant to girls' self-esteem than it is to boys', with body image being a stronger predictor of global self-esteem in women than in men (Allgood-Merten et al., 1990). Girls' self-esteem is more susceptible in adolescence than guys' because they are more concerned with their bodies. If not rectified, this may cause the lady to lose additional weight in maturity.
- Athletics: Even among children who participate in sports, boys have higher self-esteem than girls. They consider themselves to be more competitive. Males have higher athletic self-esteem than girls, according to theoretical theories.
- Academics: Females prepare more, perform better academically, and obtain higher grades than their male counterparts (Pomerantz et al., 2002). However, this is not always the case; when boys outperform girls, the lady's self-esteem falls, and when females outperform boys, their self-esteem does not rise. It has been observed that girls surpass boys in brilliant children.
- Social Acceptance: Friendships, social ties, and peer relationships are all crucial in developing self-esteem.
- Family: The family can play an important role in the formation of self-esteem and in validating it.
- Personal Self: one's own assessment of oneself apart from one's physical body and relationships with others.

Some research found that gender had an impact on self-esteem. A vast variety of cross-sectional, longitudinal, and cohort-sequential studies have produced evidence spanning cohorts, populations, and metrics. (a) Males have stronger self-esteem than females, and (b) both genders have increases in self-esteem from adolescence to middle age (Huang, 2010; Orth & Robins 2014). Females have lower self-esteem than men, which can be attributed to society's lower judgement of the conventional female role and a stronger cultural emphasis on female physical appearance (Zuckerman et al., 2016). Butterfield (1999) found statistically significant differences in self-esteem between genders on the academic competence, peer popularity, and personal security scales. Investigators highlighted how girls outperformed boys in several aspects of self-esteem; in one study, Schestatsky et al. (2007) found that adolescents with high self-esteem and girls had higher scores in peer bonds and more pro-social peers. According to Kearney (1999), an adolescent's personal growth and self-esteem are influenced by biological, cognitive, social, and environmental factors. He explains that adolescent girls have poorer self-esteem and more unfavourable perceptions of their physical and intellectual talents than boys. According to Frome and Eccles (1998), perceiving oneself as

feminine was favourably associated to female self-esteem, while perceiving oneself as masculine was positively related to male self-esteem.

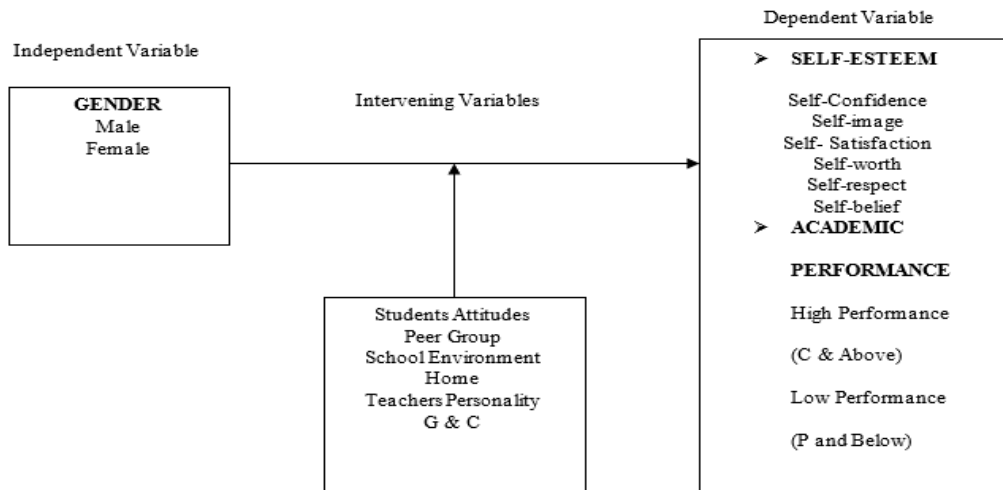
Williams and Best (1990) examined the self-concepts of men and women. McMullin and Cairney (2004) found that women have lower self-esteem than men. Some research found no substantial difference between men and women in terms of self-esteem. Patton et al. (2004) found no significant differences in self-esteem between men and women. Major et al. (1999) discovered that there are fewer inequalities between men and women in the professional classes, but more in the middle and lower classes. According to Borum (2011), males did marginally better than females in sciences, while females excelled in languages and humanities. Akpochafo (2009) discovered a gender bias in which structural arrangements benefited males over females, resulting in greater academic achievement for boys. Okoro (2008) also discovered significant disparities in male and female interests, academic achievement, and career choices. This study aimed to compare males and females in terms of self-esteem and academic performance in secondary schools in Ilorin. Okeke (2008) found that gender had no substantial effect on scientific achievement. Several researches on the influence of gender on self-esteem and academic performance produced conflicting results, necessitating the current investigation. Furthermore, information from the literature accessible to the researcher indicates that no conclusion has been made about the influence of gender on self-esteem and students' academic achievement.

### Vygotsky's Social-cultural Theory

Sociocultural theory, developed by Lev Vygotsky, is an important perspective on human learning and cognitive development. In contrast to Piaget's stage-based theory, which emphasised individual cognitive processes, Vygotsky believed that social interaction and cultural context are the most important factors in moulding our thoughts and talents. The social cultural theory emphasises the need for cooperative or supported learning. According to the hypothesis, every child has some knowledge that they can grow on with the help of their peers and adults. This means that kids can boost their self-esteem, adjust their discipline, and improve their academic achievement with the help of people who are more talented in society. The approach emphasises the value of play, teacher-student conversation, cooperative learning, collaborative problem-solving, coaching, mentoring, and support learning. Vygotsky suggested that children's experiences are enriched by contact with adults and peers. He went on to say that the school is used for socialisation, and students benefit greatly from their peers and teachers. This aided learning improves learners' academic achievement, which in turn boosts their self-esteem. The discussion between teachers and learners helps students' scaffold' that is, develop new notions and think at a higher level.

Even when the teacher is not present, the child can apply the concepts they have learned to address difficulties in their daily lives. Cooperative learning, joint problem-solving, coaching mentorship, and supported learning are all examples of Vygotsky's theory in action in educational institutions. This idea explains how students who receive support from their parents, instructors, and peers develop self-esteem, which can have a favourable impact on their discipline and academic performance. It also emphasises how play, discussion, role modelling, and aided learning may help secondary school children develop self-esteem, which in turn can improve their discipline and academic achievement. Vygotsky's Socio-Cultural Theory provides an important framework for understanding how social interaction, language, and culture influence human learning and development. By recognising the significance of the social world and cultural context, educators may design more effective learning settings that enable all students to attain their full potential.

The conceptual framework guided the data-collecting process by informing the questions to be asked in the questionnaires. This conceptual framework describes the relationship between gender, self-esteem, and academic achievement among senior secondary school students in Ilorin. The relationships among the variables are represented in Figure 1.



**Figure 1: Conceptual framework for the study.**

Source: Adapted from Kariuki (2021)

The dependent variables are students' self-esteem and academic performance, while the independent variable is their gender. The studies contain several intervening variables, which include the students' attitudes, the environment, the household, and the teachers' personalities

### Aim and Objectives of the Study

The main purpose of this study is to investigate the influence of gender on senior secondary school students' self-esteem and academic performance in Ilorin. Specifically, the study determined:

- i. The influence of gender on senior secondary school students' self-esteem.
- ii. The influence of gender on senior secondary school students' academic performance in physics.

### Research Questions

The following research questions were raised and answered:

- i. What is the influence of gender on senior secondary school students' self-esteem?
- ii. What is the influence of gender on senior secondary school students' academic performance in physics?

### Research Hypotheses

The following null hypotheses were tested at a 0.05 level of significance

H<sub>01</sub>: There is no significant difference in senior secondary school students' self-esteem based on gender; and

H<sub>02</sub>: There is no significant difference in senior secondary school students' academic performance in physics based on gender.

### Material and Methods

The study used a causal-comparative research design. According to Johnson and Larry (2014), this research strategy aims to establish cause-and-effect relationships without allowing the researcher to change the variables under study. Causal comparative research design is a design that can be used instead of experimental research to test hypotheses regarding cause and effect when both independent and dependent variables cannot be manipulated or controlled simultaneously. In a causal-comparative study, the independent variable(s) are always categorical (s), whereas the dependent variable(s) are quantitative (s). Researchers may only describe what has occurred while examining the data to determine causes, relationships, and their implications (Cohen et al., 2011).

The population for the study was 6909 students in senior secondary school two (SS2) in Ilorin, and the sample was 5% of the population, therefore the sample consisted of 346 students, 129 males and 217 females, drawn from four secondary schools in Ilorin. Because of the gender status of the pupils, a purposeful sampling strategy was employed to pick the four schools for this study, which were co-educational. Senior School Three (SS III) students participated

in the study since the concept (Simple A.C. Circuit) covered is scheduled for the second term of the third year in the most recent edition of the senior high school physics curriculum (Federal Republic of Nigeria, 2014).

**Table 1: Frequency Distribution of Sample for the Study**

Gender	N	%
Male	129	37.3
Female	217	62.7
Total	346	100.0

This study used the State Self-Esteem Scale (SSES) and annual physics test results to analyse student performance. Heatherton and Polivy (1991) created SSES, which was used in this investigation. The SSES consists of 20 items that have been adapted from the Janis-Field emotions of inadequacy scale (Janis & Field, 1959). The psychometric investigation found that the SSEC has three associated factors: Academic Performance Esteem, Social Self Esteem, and Appearance Self Esteem. All questions were answered on a five-point scale (1-not at all, 2-a little bit, 3-somewhat, 4-very much, 5-extremely). The data gathered was analysed using descriptive and inferential statistics. Specifically, mean and standard deviation were utilised to answer research questions 1 and 2, and hypotheses 1 and 2 were examined using a t-test at the 0.05 significant level. The study's data was analysed using the Statistical Package for Social Science (SPSS) software, version 23.0.

## Results

**Table 2: Summary of descriptive statistics and independent t-test analysis of the influence of gender on Senior Secondary School Students' Self-Esteem.**

Gender	N	Mean Score	SD	Df	t-cal.	Mean diff.	Sig. (2-tailed)
Male	129	12.38	3.19	176	7.99	3.64	0.00
Female	217	8.77	2.44				

P<0.05

Table 2 presents the independent t-test Analysis of the influence of Gender on Senior Secondary School Students' Self-Esteem. The mean score of male students on self-esteem was 12.38, while the mean score of female students on self-esteem was 8.77. The mean score of the male was 3.64 greater than that of the female, indicating that gender has some influence on male and female students' self-esteem. Table 2 shows a t-value of 7.99 with a degree of freedom of 176 and a p-value of 0.00. Since the p-value is less than 0.05 level of significance i.e.  $0.00 < 0.05$ , the hypothesis is rejected. Thus, there was a significant difference in senior secondary school students' self-esteem based on gender in favour of males.  $t_{(176)}=7.99, p < 0.05$ .

**Table 3: Summary of descriptive statistics and Independent sample t-test Analysis of the Influence of Gender on Secondary School Students' Academic Performance in Physics.**

Gender	N	Mean Score	SD	Df	t-cal,	Mean diff.	Sig. (2-tailed)
Male	129	84.58	8.38	230	2.77	2.67	0.01
Female	217	81.91	10.73				

The result presented in Table 3 shows that the mean score of male students' performance in physics was 84.58 with a standard deviation of 8.38, and that of the female students was 81.91 and 10.73 respectively. The difference between the mean score of male and female students was 2.67 indicating that gender has some influence on male and female students' academic performance in favour of the male students that have higher mean scores. Table 3 also revealed that a t-test value of 2.77 was obtained with an associated probability value of 0.01. As the associated probability is

less than 0.05 i.e.  $0.01 < 0.05$ , hypothesis two was rejected. So, it was concluded that gender has a significant influence on the academic performance of secondary school students in physics.

### Discussion

The study revealed a score of 3.64 in favour of males. This shows that gender influences male and female self-esteem. Thus, there was a significant difference in senior school students' self-esteem. This is in line with the study McMullin and Cairney (2004) that showed that women have lower levels of self-esteem than men. Some studies did not show any significant difference between males and females in self-esteem. In a study, Patton et al. (2004) revealed that there were no significant differences between males and females in self-esteem. This showed that the study on gender and its influence on students' self-esteem is inconclusive. Furthermore, there is an influence of gender on senior school students' academic performance in physics since the study concluded that gender had a significant influence on the academic performance of senior school students in physics. This is in line with the study In his study on students' academic performance depending on gender in Nigeria, Akpochafo (2009) discovered a gender bias in which structural arrangements benefited males over females, resulting in greater academic achievement for boys. However, studies on the relationship between students' gender and academic performance have yet to be resolved due to research disparities.

### Conclusion

This study investigated the influence of gender on senior secondary school students' self-esteem and academic performance in physics within the Ilorin, Nigeria context. The findings revealed a significant difference in self-esteem, with males exhibiting higher levels compared to females. Additionally, gender was found to have a significant influence on academic performance in physics. These results suggest a potential need for interventions that address gender disparities in both self-esteem and academic achievement in physics education. Future research should delve deeper to explore the underlying reasons behind these disparities and develop targeted strategies to foster a more equitable learning environment where both male and female students can thrive in physics and reach their full potential.

### Recommendations

Based on the findings of this study, the following recommendations are made:

1. Complement these quantitative findings with qualitative research to understand the lived experiences of male and female students in physics classrooms. This can provide deeper insights into the factors influencing self-esteem and academic performance.
2. Conduct longitudinal studies to track students' self-esteem and physics performance over time. This can help evaluate the effectiveness of implemented interventions and identify any long-term trends.

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