



## EXTERNAL EXAMINATION RESULTS AS PREDICTORS OF DEGREE PERFORMANCE AMONG PHYSICS EDUCATION STUDENTS IN UNIVERSITIES IN SOUTH-EAST NIGERIA

<sup>1</sup>Egolum Evelyn Obianuju  
[eo.egolum@unizik.edu.ng](mailto:eo.egolum@unizik.edu.ng)

&

<sup>2</sup>Ndubueze, Jeremiah Chukwurah  
[chukwurahndubueze95@gmail.com](mailto:chukwurahndubueze95@gmail.com)

<sup>1, 2</sup> Department of Science Education  
Faculty of Education  
Nnamdi Azikiwe University, Awka

### ABSTRACT

*The study investigated external examination results as predictors of degree performance among Physics Education students in universities in South-East Nigeria. The study was guided by two research questions and two hypotheses were tested at 0.05 level of significance. Correlational research design was adopted for the study. Simple random and purposive sampling techniques were used to select 84 graduated Physics students selected from a population of 254 Physics education students from Departments of Science Education in Public Universities in South-East Nigeria during 2023/2024 session. The instruments for data collection were students' SSCE Physics scores and Final Cumulative Grade Point Average (FCGPA) obtained from academic records in the offices of directors of examinations and records of the sampled institutions. Standardized instruments were used. Data were analysed using simple linear regression analysis. To answer the research questions,  $R^2$ , which is the coefficient of determination was used. The hypotheses were tested at 0.05 level of significance. The findings revealed that there is a moderate predictive value of external examination results on Physics graduates' degree performance. Also, male students showed slightly stronger predictive relationships compared to female students. It was concluded that students' external examination results in Physics are important predictors of graduates' degree results in Physics education programmes. It was recommended amongst others that Universities offering Physics education programmes in the South-East should continue to give considerable weight to SSCE Physics results during admission and student placement, as these results have been shown to be significant predictors of their graduates' degree performance.*

**Keywords:** Physics degree result, SSCE scores, Gender, Universities, Physics.

### Introduction

Science Education represents the integration of science and education with the aim of presenting scientific concepts in a simplified and comprehensible manner that can be understood by individuals beyond the traditional scientific community (Ayeni, 2021). It involves the application of educational and learning theories particularly those grounded in philosophical, sociological, and psychological perspectives in the continuous pursuit of knowledge. Through systematic processes such as careful observation, deduction, and empirical testing, Science



Education promotes the development of learners' intellectual and psychomotor domains (Igbaji, Bello & Sanusi, 2017). Furthermore, Science Education fosters creativity and originality by actively engaging students in problem identification and solution-seeking activities (Izugbe, 2020). According to Pember and Humbe, as cited in Ayeni (2021), it is a process of teaching and training especially within the school system which is aimed at enhancing learners' understanding of their environment, developing skills of systematic inquiry, and nurturing positive scientific attitudes. Consequently, Science Education emphasizes critical thinking and exploration, which are essential for sustainable development (Sani & Ikpe, 2019). The field encompasses various disciplines, including Physics, Chemistry, Biology, and Integrated Science.

Physics, one of the major options within science education, is a branch of physical science concerned with the study of nature particularly matter, its behaviour, and its interactions with energy and time. These interactions form the foundation of modern innovations and technological advancements. Farinde, Ehimetalor, and Dada (2015) describe physics as a physical science that focuses on the behaviour of matter and energy, emphasizing its role as a science of measurement. Historically referred to as natural philosophy, physics is concerned with aspects of nature that can be explained using fundamental principles and laws. Its primary aim is to describe the constituents of the universe, their properties, and the changes they undergo. As a fundamental science discipline, physics underpins the development of science and technology in any nation and has wide-ranging applications across numerous fields. Career opportunities associated with physics include air traffic control, automobile technology, broadcasting, computer programming, dentistry, dairy technology, medicine, metallurgy, metrology, pharmacy and pharmacology, quantity surveying, radio and television technology, and medical physics, among others.

Physics plays a vital role in fostering innovation and technological advancement in society. The study of physics equips individuals with essential scientific knowledge and skills that promote self-reliance in today's technologically driven world. Consequently, physics serves as a central resource for socio-economic, scientific, and technological development. Given its fundamental importance, physics education has attracted sustained research attention, particularly due to its role in advancing scientific understanding and technological innovation. As contemporary societies increasingly depend on science and technology, ensuring quality physics education at all levels has become imperative, making proficiency in physics a matter of national concern.

In Nigeria, physics is taught as a core science subject at both secondary and tertiary levels of education. Students' performance in physics at the secondary school level commonly assessed through the Senior Secondary Certificate Examination (SSCE) is often regarded as a predictor of success in physics-related university programmes (Akanbi & Kolawole, 2015). In Anambra State, for example, there has been a steady increase in student enrolment for physics examinations conducted by the West African Senior School Certificate Examination (WASSCE) and the National Examinations Council Senior School Certificate Examination (NECO). In recent years, many candidates have taken both examinations. However, to the best of the researcher's knowledge, a systematic evaluation of the relationship between students' performance in these examinations has not been conducted. Given the similarities of the two examinations and the fact that they are taken by the same cohort of students within the state, it is therefore considered worthwhile to investigate the correlation between students' performance in WASSCE and NECO physics examinations and their degree results in higher institutions.



Despite the efforts of these examination bodies, some graduates are not employable after they have completed their degree programmes (Ajaja, 2018). Using students' performance in NECO examinations as a predictor of their performance in university is characterized by negative/low and moderate correlation coefficients. In the realm of physics education, previous research has yielded mixed findings. A study by Johnson, Williams, Thompson, García-Lópe and Chen (2019) demonstrated a strong correlation between advanced high school physics courses and first-year university physics performance. Conversely, research by Williams and Brown (2020) suggested that the predictive power of high school Physics grades diminished as students progressed through their university studies, indicating the influence of other factors on long-term academic success. However, the relationship between SSCE Physics grades and final degree performance in Physics programmes has not been extensively studied, particularly in the context of Nigerian Universities. These conflicting results underscore the need for more comprehensive and context-specific research in this area. This study aims to contribute to this body of knowledge by focusing specifically on the correlation between SSCE Physics grades and final degree achievement in Physics.

Academic achievement is an outcome-oriented construct that explains the extent to which a student or a programme has attained either a short- or long-term learning goal or task. It is often measured through examinations or continuous assessments and is communicated through descriptive grades, marks, results, and graduation rates (Horvath, 2016; Mberekpe, 2018). Academic achievement is referred to as the knowledge acquired or skills created in school subjects. It is expressed as a result given by the teacher (Azubuike, 2016; Topping, 2017). It is a measure of what an individual has accomplished after exposure to an educational programme. The relationship between academic achievement and education can vary significantly across different genders.

Gender is a concept that refers to the roles, behaviours, identities, and expectations that societies and cultures associate with individuals based on their perceived or assigned sex at birth. It is distinct from biological sex, which refers to physical and physiological differences like chromosomes and reproductive anatomy. Gender has been noted by researchers over the years as having an impact on achievement in Physics and its related disciplines. Akumah (2018) stressed that science, technology and their related disciplines are male-reserved while Art and Humanities are female-reserved. This belief makes boys appear to have a naturally positive attitude towards science and technical subjects, while girls show more inclination to the Arts and Humanities.

The problem is even compounded by the fact that most science educators give a masculine outlook to science subjects such as Chemistry and Physics, this discrepancy was evident in the student's achievement in Physics (Ezeano, 2017); encouraging females to go rather for biology, agricultural science and home economics which they consider to be more female-friendly science subjects. Orefor (2016) opined that gender does not influence students' achievement in the sciences. All these and related treatments make girls have a phobia for science and science-related subjects, which affects their future career choices and eventual achievement. Due to a lack of consensus regarding the issue of gender and science, there is a need therefore for correlation between male and female students' achievements in Physics. While gender remains a significant factor in shaping students' educational experiences and learning outcomes, the type of school



attended whether public or private also plays an important role in influencing academic achievement and access to resources.

Despite the critical role of predictive external examinations in determining university degree result, there is a noticeable limited or lack of empirical research examining this issue within the context of South-East, Nigerian Universities. Without concrete data, educational institutions may continue to rely on potentially inadequate metrics, which could hinder the selection of candidates best suited for success in Physics Education. Hence, it becomes imperative to investigate whether students' external examination results in Physics can reliably predict their academic achievement in university Physics Education programmes. This study therefore sought to investigate students' external examination result in Physics as predictors of their degree result in Physics Education Programme in Universities in South-East, Nigeria. The findings aimed to provide insights that could inform admission policies and curriculum development, ensuring that students are better prepared and will be more likely to succeed in their chosen fields.

### **Purpose of the Study**

The purpose of the study was to investigate the prediction of degree results by senior secondary school certificate examination (SSCE) Physics scores of Physics Education students in Universities in South-East Nigeria. Specifically, the study sought to determine the:

1. Predictive value of senior secondary school certificate examination (SSCE) Physics scores on physics education graduate students' degree results.
2. Predictive value of senior secondary school certificate examination (SSCE) Physics scores on male and female Physics education graduate students' degree results.

### **Research Questions**

The following research questions guided the study

1. What is the predictive value of senior secondary school certificate examination (SSCE) Physics scores on Physics education graduate students' degree results?
2. What is the predictive value of senior secondary school certificate examination (SSCE) Physics scores on male and female Physics education graduate students' degree results?

### **Hypotheses**

The following hypotheses were tested at 0.05 level of significance to guide the study

1. Senior secondary school certificate examination (SSCE) Physics scores do not significantly predict Physics education graduate students' degree results.
2. Senior secondary school certificate examination (SSCE) Physics scores do not significantly predict male and female Physics education graduate students' degree results.

### **Methodology**

The study adopted a correlational research design and was conducted in public Universities in South-East Nigeria. The population of the study comprised of 254 graduate students of Physics Education programmes in the 2023/2024 academic session from the Department of Science Education. Simple random and purposive sampling techniques were used to select 84 graduated Physics education students from four universities in the south-east. The instruments used for data



collection consisted of scores from WASSCE grades and the final cumulative grade point average (FCGPA) of the sampled students. Since the instruments were standardised instruments, there was no need for validation and reliability establishment of the scores. Data for the study were collected from students' files kept in the office of the director of examinations and records, this was achieved by the assistance of three research assistants. The collected data were analysed using simple linear regression. In order answer the research questions,  $R^2$ , which is the coefficient of determination was used. The interpretation of  $R^2$  values is as follows: 0 – 0.1 = low predictive value, 0.1 – 0.3 = weak predictive value, 0.3 – 0.5 = moderate predictive value, and above 0.5 = strong predictive value, according to cohen (2007). To test the null hypotheses at 0.05 level of significance, if  $p \leq 0.05$ , the null hypothesis ( $H_0$ ) is rejected, indicating a statistically significant relationship, otherwise, the null hypothesis is not rejected.

### Presentation Results

**Table 1:** Linear regression analysis on the predictive value of Physics graduates' external examination results on graduates' students' degree results in Physics education programmes in South-East universities

Variable	R	R <sup>2</sup>	Adjusted R Square	B	BETA	%var. added
SSCE Physics Scores	0.634	0.402	0.400	0.352	0.634	40.2

The result presented in table 1 reveals that Physics graduates' external examination results have a moderate predictive value on graduates' degree results in Physics education programmes in South-East universities. The results show a positive relationship between SSCE Physics scores and degree results ( $R = .634$ ), with SSCE Physics scores explaining 40.2% of the variance in graduates' degree results ( $R^2 = .402$ ). This indicates that performance in the external examination contributes substantially to predicting graduates' academic outcomes in Physics education programmes. In addition, the standardized beta coefficient ( $\beta = 0.634$ ) and the regression coefficient ( $B = 0.352$ ) indicate that SSCE Physics scores make a positive and meaningful contribution to predicting degree results.

**Table 2:** Linear regression analysis on the predictive value of Physics graduates' external examination results on graduates' male and female students' degree results in Physics education programmes in South-East universities

Variable	Gender	N	R	R <sup>2</sup>	Adjusted R Square	B	BETA	%var. added
SSCE Physics Scores	Male	47	0.649	0.421	0.417	0.374	0.649	42.
	Female	37	0.617	0.380	0.374	0.325	0.617	38.0

The result presented in Table 2 reveals that both male and female students' external examination results in Physics have a moderate predictive value for graduates' degree results in Physics education programmes in Universities in the South-East. For male students, there is a positive relationship between SSCE Physics scores and degree results ( $R = .649$ ), with SSCE Physics scores explaining 42.1% of the variance in graduates' degree results ( $R^2 = .421$ ). This



indicates that male students' performance in the external examination contributes substantially to predicting their academic outcomes in Physics education programmes. Similarly, for female students, SSCE Physics scores show a positive relationship with degree results ( $R = .617$ ) and account for 38.0% of the variance in graduates' degree results ( $R^2 = .380$ ). This suggests that female students' external examination performance also makes a meaningful contribution to predicting their degree results. Overall, while the predictive value is slightly higher for male students than for female students, external examination results remain an important predictor of degree performance for both groups in Physics education programmes in Universities in the South-East.

**Table 3:** Linear regression analysis on the significant prediction of Physics graduates' external examination results on graduates' students' degree results in Physics education programmes in South-East universities

Variable	N	R	R <sup>2</sup>	Adjusted RSquare	B	BETA	df	Cal. F	P-value
SSCE Physics Scores	84	0.634	0.402	0.400	0.352	0.634	83	169.284	0.000

The regression analysis presented in Table 3 revealed that SSCE Physics scores significantly predicted graduates' degree results ( $F(1, 83) = 169.284, p < .05$ ). This indicates that the predictive effect of external examination results on graduates' degree performance is statistically significant. Therefore, Physics graduates' external examination results significantly predict graduates' degree results in Physics education programmes in South-East universities.

**Table 4:** Linear regression analysis on the significant prediction of Physics graduates' external examination results on graduates' students' degree results in Physics education programmes in South-East universities

Variable	Gender	N	R	R <sup>2</sup>	Adjusted R	B	df	Cal. F	P-value
SSCE Physics Scores	Male	47	0.649	0.421	0.417	0.374	46	103.287	0.000
	Female	37	.617	0.380	0.374	0.325	36	67.432	

The regression analysis presented in Table 4 showed that SSCE Physics scores significantly predicted male graduates' degree results,  $F(1, 46) = 103.287, p < .05$ . Similarly, SSCE Physics scores significantly predicted female graduates' degree results,  $F(1, 36) = 67.432, p < .05$ . These results indicate that external examination results have a statistically significant predictive effect on the degree performance of both male and female graduates in Physics education programmes in South-East universities.

### Discussion of Findings

The finding of this study revealed that Physics graduates' external examination results have a moderate predictive value on graduates' degree results in Physics education programmes in South-East universities. The corresponding hypothesis revealed that SSCE Physics scores significantly predicted graduates' degree results. The finding indicates that Physics graduates' external examination results are a meaningful but not exclusive predictor of graduates' degree results in Physics education programmes in South-East universities. The moderate



predictive value suggests that performance in SSCE Physics provides a reliable foundation for success at the university level, as it reflects students' prior knowledge, problem-solving ability, and readiness for advanced Physics coursework. The significant prediction further confirms that SSCE Physics scores are not due to chance but have a real and measurable influence on graduates' academic outcomes in Physics education programmes.

A plausible reason for this finding is that the SSCE Physics examination assesses core conceptual understanding, mathematical reasoning, and practical skills that are essential for studying Physics at the tertiary level. Students who perform well in SSCE Physics are therefore more likely to cope effectively with the cognitive demands of university Physics courses. However, the predictive value being moderate rather than high suggests that other factors such as quality of university instruction, learning resources, study habits, motivation, and assessment methods also contribute substantially to graduates' degree performance. These findings align with that of Farayola (2019), who found a positive relationship between SSCE grades and university achievement in Mathematics, though the current study demonstrates a stronger predictive relationship specifically for Physics education. Similarly, Oyeyemi, Womboh, Oyeyemi and Jasper (2016) observed that SSCE was strongly associated with FCGPA of Physiotherapy graduates.

This finding contradicts the result of Ezimadu, Odola, Okwa and Ezimadu (2024) which showed that a students' performance in WAEC examination does not significantly affect university graduation outcome. In contrast, Oyeyemi, Womboh, Oyeyemi and Jasper (2016) reported that WAEC/NECO was very poor, but significantly predicted graduates' FCGPA. This difference may be attributed to the subject-specific nature of the current study and the specialized skills required for Physics education. The practical significance of this finding supports the continued use of SSCE scores in university admissions for Physics education programmes, while also highlighting the need for complementary assessment measures and support systems for students with lower entry qualifications.

The finding of this study further revealed that both male and female students' external examination results in Physics have a moderate predictive value for graduates' degree results in Physics education programmes in Universities in the South-East, with male having a higher predictive value than their female counterparts. The corresponding hypothesis revealed that external examination in Physics significantly predicted graduates' degree results in Physics education programmes. The finding indicates that external examination results in Physics are meaningful predictors of graduates' degree results for both male and female students in Physics education programmes in Universities in the South-East. The moderate predictive value for both groups suggests that performance in SSCE Physics provides a solid academic foundation for success at the university level. The higher predictive value observed among male students implies that their SSCE Physics performance is more closely aligned with their subsequent degree outcomes compared to their female counterparts. The significant result of the corresponding hypothesis further confirms that the predictive influence of external examination results on graduates' degree performance is statistically reliable and not due to chance.

A possible reason for this finding is that male students may have had greater exposure to Physics-related activities, practical experiences, or sustained engagement with problem-solving tasks during their secondary education, which could strengthen the continuity between SSCE performance and university-level achievement. Additionally, socio-cultural factors, teaching



practices, and confidence levels in Physics may differentially influence how male and female students translate prior examination performance into degree outcomes. Nevertheless, the moderate predictive value for both groups also suggests that factors beyond SSCE results such as learning environment, instructional quality, motivation, and support systems at the university level play important roles in shaping graduates' academic performance. This finding contradicts the study of George *et al.* (2021), whose study noted no significant gender differences in overall academic performance. This finding is not supported by the finding of Fehintola (2017), who revealed that gender was not a significant predictor of academic performance of undergraduate students. The stronger predictive relationship for male students may be attributed to several factors, including traditional gender socialization patterns that encourage male engagement with Physics, consistent study approaches between secondary and tertiary levels, and potential differences in confidence and self-efficacy in Physics-related tasks.

### **Conclusion**

The study investigated external examination results as predictors of degree performance among Physics Education students in universities in South-East Nigeria. Based on the findings of this study, it can be concluded that Physics graduates' external examination results are important predictors of graduates' degree results in Physics education programmes in Universities in the South-East, Nigeria. The results revealed a moderate but statistically significant predictive relationship between SSCE Physics scores and graduates' degree performance, indicating that students' prior achievement in Physics at the secondary school level provides a meaningful foundation for success at the university level. This underscores the relevance of external examination results as a useful indicator of students' academic readiness for Physics education programmes. Furthermore, the study established that both male and female students' external examination results significantly predicted graduates' degree outcomes, although the predictive value was slightly higher for male students than for female students. This suggests that while gender differences exist in the strength of prediction, external examination performance remains a consistent and reliable predictor of academic achievement across gender groups. Overall, the findings imply that admission decisions, academic counseling, and early academic support in Physics education programmes should give due consideration to students' external examination performance, while also recognizing that other academic and contextual factors contribute to graduates' degree success.

### **Recommendations**

Based on the findings of the study, the following recommendations were made:

1. Universities offering Physics education programmes in the South-East should continue to give considerable weight to SSCE Physics results during admission and student placement, as these results have been shown to be significant predictors of graduates' degree performance. This will help ensure that students admitted into Physics education programmes possess the necessary foundational knowledge for successful academic progression.
2. Given that the predictive value of SSCE Physics results is moderate, universities should implement remedial and support programmes such as bridging courses, tutorials, and



mentoring for students with weaker external examination backgrounds. This will help address learning gaps and enhance students' chances of achieving better degree outcomes regardless of prior performance.

3. Since the predictive value of external examination results was slightly higher for male students than for female students, Physics educators should adopt teaching approaches that encourage active participation and confidence-building among female students. Providing inclusive learning environments, hands-on practical activities, and supportive academic guidance may help reduce gender-related disparities and improve overall performance in Physics education programmes.

### REFERENCES

- Ajaja O.P. (2018), Three years of UTME screening influence on Science Education, Bachelors of Education Degree in Universities in Ondo and Ekiti State, Nigeria-ISSN: 2166-4951 2013
- Akanbi, A. O., and Kolawole, C. O. (2015). *Senior secondary school performance as a predictor of success in university Physics courses in Nigeria*. Nigerian Journal of Science and Educational Research, 11(2), 78–89.
- Akumah, E. U. (2018). Gender differences in students' achievement and interest in STEM subjects in Nigerian secondary schools. *Journal of Education and Learning*, 7(4), 115-124.
- Ayeni, M. F. (2021). Science education and sustainable development in Nigeria: An analytic approach. *Journal of Education and Practice*, 12(11), 1–6.
- Azubuikwe, O. C. (2016). Influence of parenting styles on academic achievement of senior secondary school students in Abia State. *International Journal of Advanced Academic Research*, 2(7), 49-59.
- Ezeano, C. A. (2017). Influence of gender on students' achievement in chemistry in secondary schools in Anambra State. *International Journal of Advanced Research in Education and Technology*, 4(3), 65-71.
- Ezimadu, S. O., Odola, P. A., Okwa, F. O., and Ezimadu, P. E. (2024). Predicting graduation performance through transformed admission data and first year grades using multiple regression and ANOVA: A case study of Delta State University. *Scientia Africana*, 23(4), 187-202.
- Farayola, P. I. (2019). SSCE, UTME and Post-UTME Results as Correlates of Students' Academic Performance in Undergraduate Mathematics. *ABACUS-Journal of the National Mathematical Association of Nigeria (MAN)*, 39(1), 210–218.
- Farinde, E., Dada, S., and Ehimetalor, U. (2015). *Fundamentals of Physics*. Lagos: HEBN Publishers.
- Fehintola, J. O. (2017). Evaluation of university freshmen scholastic achievement based on SSCE, UTME, gender and age in South West Nigeria. *European Journal of Open Education and E-learning Studies*.
- George, T. O., Ajayi, M. P., Olonade, O. Y., Olanipekun, T., and Adebayo, M. E. (2021). Gender differences in academic performance and industry relevance: a study of a Nigerian private university graduates. *WSEAS Trans. Bus. Econ*, 18, 485-493.



- Horvath, M. M. (2016). Predicting student achievement in higher education: A multivariate approach. *International Journal of Educational Research*, 80, 152-164.
- Igbaji, C. N., Bello, G., and Sanus, S. A. (2017). Science education and Nigeria national development effort: The missing link. *International Journal of Education and Evaluation*, 3(5), 46–56.
- Izugbe, B. O. (2020). Science education for national development and scientific creativity among secondary school students in Nigeria. *UNIZIK Journal of STM Education*, 5(1), 92–100.
- Johnson, R. T., Williams, M. K., Thompson, A. J., García-López, S. P., and Chen, H. (2019). Predicting university Physics achievement: The relationship between high school Physics course selection and undergraduate performance. *Journal of College Science Teaching*, 48(5), 56-64.
- Mberekpe, A. N. (2018). Assessment practices and academic achievement of secondary school students in Nigeria. *African Journal of Educational Studies*, 6(2), 83-97.
- Orefor, C. O. (2016). Effect of gender on students' academic achievement in secondary school social studies. *Journal of Education and Practice*, 7(10), 38-42.
- Oyeyemi, A. Y., Womboh, I., Oyeyemi, A. L., and Jasper, U. S. (2016). Relationship Between Admission Qualification and Final Grade Point Average of Graduates of a Physiotherapy Programme in a Nigerian University. *Bayero Journal of Evidence-Based Physiotherapy*, 2(2), 183-197.
- Sani, M., and Ikpe, I. (2019). Science education and sustainable development in Nigeria: An analytic approach. *Journal of Education and Practice*, 10(11), 1–6.
- Topping, K. J. (2017). Peer assessment: Learning by judging and discussing the work of other learners. *Interdisciplinary Education and Psychology*, 1(1), 1-17.
- Williams, L., and Brown, T. (2020). *Diminishing predictive value of high school Physics grades on long-term academic success*. *International Journal of Higher Education Studies*, 15(2), 102–117.