



ANALYSIS OF TREND OF PERFORMANCE IN PHYSICS AND CHEMISTRY AMONG FINAL YEAR SECONDARY SCHOOL STUDENTS, IN ZARIA

Onudibia Moses E.¹, Okorie Charity E.², Ewgu, Chinwe E.³, Suleiman, Shaibu Asuku Iseah⁴, Amaitem John⁵
E-Mail Id: mosesmarke@gmail.com, mosesmarkfuw.edu.ng@gmail.com

^{1,4}Department of Pure and Applied Physics, federal University Wukari, Taraba, Nigeria

²Department of Mathematic and Statistics, federal University Wukari, Taraba, Nigeria

³Department of Science and Laboratory Technology, Nigerian Institute of leather and Science Technology, Zaria

⁵Samaru College of Agriculture, Division of Agricultural College Ahmadu Bello University, Zaria, Nigeria

Abstract-The main philosophy of this work is to determine the analysis of trend in performance of both Physics and Chemistry among final year senior secondary School students in Zaria local government area of Kaduna state, Nigeria. Four schools were selected among the schools in Zaria local government area. The trend of performance from 2000-2010 was analysed. The statistical tool used was Analysis of Variance (ANOVA). There is a significant relationship between the performance in both Physics and Chemistry students. There is decline percentage in their performance i. e. no steady percentage credit or pass in Physics and Chemistry. School A has an average performance of 89% in Physics and 83% in Chemistry, School B have an average performance of 44% in Physics and 39% in Chemistry, School C has an average 73% performance in Physics and 76% in Chemistry, while School D have an average performance of 43% in Physics and 36% in Chemistry. The increasing order of their performance is: A > C > B > D. The trends of their performance are sideway trend, which shows that there is no constant or steady trend in the performance of the students.

Keywords: Trend, Performance, Physics, Chemistry, Secondary School, Zaria Nigeria

1. INTRODUCTION

It is imperative that every parent, teachers and government wishes to know the performance of the students at the end of their secondary School programme.

We need education not only for our livelihood but also for our survival. It benefited both individual and society as a whole. Instead of our livelihood, it plays pragmatic role to understand our as well as world's diverse culture, socio-economic and political system, science & technology. Therefore, we need an effective and comprehensive education system for development of the nation (Priyanka Singh, 2017). Therefore, education is very important as an individual.

Chemistry and Physics are basic science subjects in secondary School levels. In fact, they are the basic (Core) subjects that students of Engineering, Medicine and pure-science students need for their enrolment in the university. Not only that, they are the prerequisite, foundation and feature subject (courses) for science, Engineering and technology, but the main subjects all science students need for them to be given admission in any higher institution. Hence, they filled with interesting phenomena, appealing experimental activities, and fruitful knowledge for understanding the natural manufactured worlds and full exploration.

The term academic performance has been described as the scholastic standing of a student at a given moment (Edokpayii and Suleiman, 2011). Academic performance refers to how an individual is able to demonstrate his or her intellectual abilities. This scholastic standing could be explained as the grades obtained in a course or groups of courses (subjects) taken (Asaolu, 2003). Thus, in predicting academic performance, Daniels and Schouten, 1970, emphasized the use of grades in examinations and reported that grades could serve as prediction measures and as criterion measures. They argued that a prediction of a future examination result could be made with reasonable success on the basis of the results of a previous examination. For the student to perform excellently, the teacher must play a very good role. (M. Thangarajan, 2018) said The teacher as such is expected to function not only as a purveyor of knowledge but also as a 'moulder' of child's total personality Hence the teacher should have keen sense of values, positive attitude and good aptitude for teaching, so that he can guide the whole generation. Information and communication technology (ICT) is a force that has changed many aspects of the way we live Babita, 2018.

According to (Rama Raju and Arora, 2006), Physics is defined as study of the properties of matter and energy. That means that physics is applied in almost everything around us: in our movement, our speech, in construction etc. Physics is a science subject that deals with the study of properties of everything on earth (matter) and energy.



Almost all aspect of life science, both living and non-living has something to do with physics, ranging from engineering to mathematics, biology, chemistry, (Abdullahi, 1990). The knowledge of Physics have actually touched' life and have led to so many developments in life. In today's technological breakthrough, the knowledge of physics has led to communication between people by radio, telephone, television and the development of road, water, air, motor vehicles, (Adenike, 2004). Physics is one of the subjects taught to student at the senior secondary level of the Nigeria educational system. Physics is very important because it is a major ingredient of science and technology. There are other impacts of physics but to mention a few.

Chemistry on the other hand is the scientific study of the structure of substance, how they interact when they come in contact with another and how they behave under different conditions.

Like Physics, Chemistry is important in scientific and technological development of any nation, which has been widely reported. Chemistry has been identified to be one of the major bedrock for transformation of our national economy, and hence must be accorded adequate attention. The students' performance in practical aspect of chemistry examination at the SSCE level contribute to high failure rate of students in chemistry which in turn affects students' performance at the tertiary level (Adomwonyi and Aava, 2011) and (Akinleye, 1987).

A deeper understanding of physics and physics processes could only be achieved through laboratory materials, which encourage active participation and serves to develop critical thinking equally; they provide concrete experiences to substantiate the theoretical aspect of physics (Adelodum, 2005). Physics and chemistry provides training for a vast range of careers, where it is either employed directly, or where the skills developed can be applied in innovative ways in other fields. Physicists and chemist are facing the world with confidence and know where to obtain the information they need to complete a task. Physicists and Chemists are thus employed in an extensive range of activities, both within and outside the discipline itself. Hence, it is imperative to study the analysis of performance of Physics and Chemistry students among the final year students. Physics and Chemistry are basic (important) subjects for all science students. They are core subjects for all science students at O' Levels. Just like Government and commerce are core subjects which students must credit before offering admission into any higher institutions in commercial or pure Arts.

Physics is father of other sciences, followed by Chemistry which is prerequisite for enrolment in field of Engineering, technology, pharmacy, medicine and other applied sciences.

Afolabi (2005), cemented: The performance of students in WESSCE, NECO and JAMB has generated so much concern that one begins to question whether there is any achievement being made by teachers and students in secondary schools. Hence there is need to carry out this research (Akanbi, 2008).

According to the Nigeria Institute of Physics (NIP), (2014), WASSCE result analysis, the average performance for Physics and Chemistry from 1999 to 2011 was 44 .71% and 42.33% respectively. Hence generally, the average performance of Physics and Chemistry are depreciating (Nigerian Institute of Physic, 2014).

Challenges of technology, globalization, climate change, inequalities, distress, conflicts etc make them more vulnerable at same time. (Arti Bhatnagar and Neha Madan,). This vulnerability is as a result of lack of general technology and infrastructure. This contributes to the poor performance of the students.

2. MATERIALS AND METHODS

2.1 Research Instrument

The West African Examination School Certificate Examination result from 2000 to 2012 formed the instrument used for data collection. This was collected for four secondary schools in Zaria Local Government area.

2.2 Population

The population of this study is made up of four (4) Schools for all Senior Secondary Schools three (SSS III) students who offered Physics and Chemistry from 2000 to 2010 for WSSCE and NECO. The results of all the students that offered the two basic science subjects (Physics and Chemistry) from each school sampled was used for the data analysis.

2.2 Data Collection

The four schools were selected by means of random sampling technique. In each of these four Schools, results of all students offered Physics and Chemistry were collected from the examination officers through the Principals of the four Schools and were sampled for all the students.

2.3 Method/Instrument

The statistical tool used is the ANOVA. This was followed up with summary and a multiple comparison test in order to identify the subject(s) where performances were significantly different from the others.

3. RESULTS AND DISCUSSION

The ANOVA table have been analysed from each of the tables bellow. The Histogram and the trend graphs have been used for the graphical analysis.

Table-3.1 Summary of One-Way Physics ANOVA

SOURCE	SS	Df	MS	F	LS
Between Groups	10549.029	3	3516.343	6.306	0.003
Within Groups	13382.208	24	557.592		
Total	23931.238	27			

Table-3.2 Multiple Comparisons Of One Way Physics ANOVA

(I) Schools	(J) Schools	MD (I-J)	SDE	LS	95% Confidence Interval	
					LB	UB
School "A"	School "B"	44.87000*	12.62189	.002	18.8197	70.9203
	School "C"	15.75429	12.62189	.224	-10.2960	41.8046
	School "D"	45.25714*	12.62189	.001	19.2069	71.3074
School ""B	School "A"	-44.87000*	12.62189	.002	-70.9203	-18.8197
	School "C"	-29.11571*	12.62189	.030	-55.1660	-3.0654
	School "D"	.38714	12.62189	.976	-25.6631	26.4374
School "C"	School "A"	-15.75429	12.62189	.224	-41.8046	10.2960
	School "B"	29.11571*	12.62189	.030	3.0654	55.1660
	School "D"	29.50286*	12.62189	.028	3.4526	55.5531
School "D"	School "A"	-45.25714*	12.62189	.001	-71.3074	-19.2069
	School "B"	-.38714	12.62189	.976	-26.4374	25.6631z/z
	School C	-29.50286*	12.62189	.028	-55.5531	-3.4526

*. The mean difference is significant at the 0.05 level.

Table-3.3 Summary of One-Way Chemistry ANOVA

SOURCE	SS	Df	MS	F	LS
Between Groups	13648.265	3	4549.422	9.730	0.000
Within Groups	11221.034	24	467.543		
Total	24869.299	27			

Table-3.4 Multiple Comparisons of One Way Chemistry ANOVA

(I) Schools	(J) Schools	MD (I-J)	SDE	LS	95% Confidence Interval	
					LB	UB
School "A"	School ""B	43.94714*	11.55784	.001	20.0929	67.8014
	School "C"	6.98286	11.55784	.551	-16.8714	30.8371
	School "D"	50.32857*	11.55784	.000	26.4744	74.1828
School ""B	School "A"	-43.94714*	11.55784	.001	-67.8014	-20.0929
	School "C"	-36.96429*	11.55784	.004	-60.8185	-13.1101
	School "D"	6.38143	11.55784	.586	-17.4728	30.2356
School "C"	School "A"	-6.98286	11.55784	.551	-30.8371	16.8714
	School ""B	36.96429*	11.55784	.004	13.1101	60.8185
	School "D"	43.34571*	11.55784	.001	19.4915	67.1999
School "D"	School "A"	-50.32857*	11.55784	.000	-74.1828	-26.4744
	School ""B	-6.38143	11.55784	.586	-30.2356	17.4728
	School "C"	-43.34571*	11.55784	.001	-67.1999	-19.4915

*. The mean difference is significant at the 0.05 level.

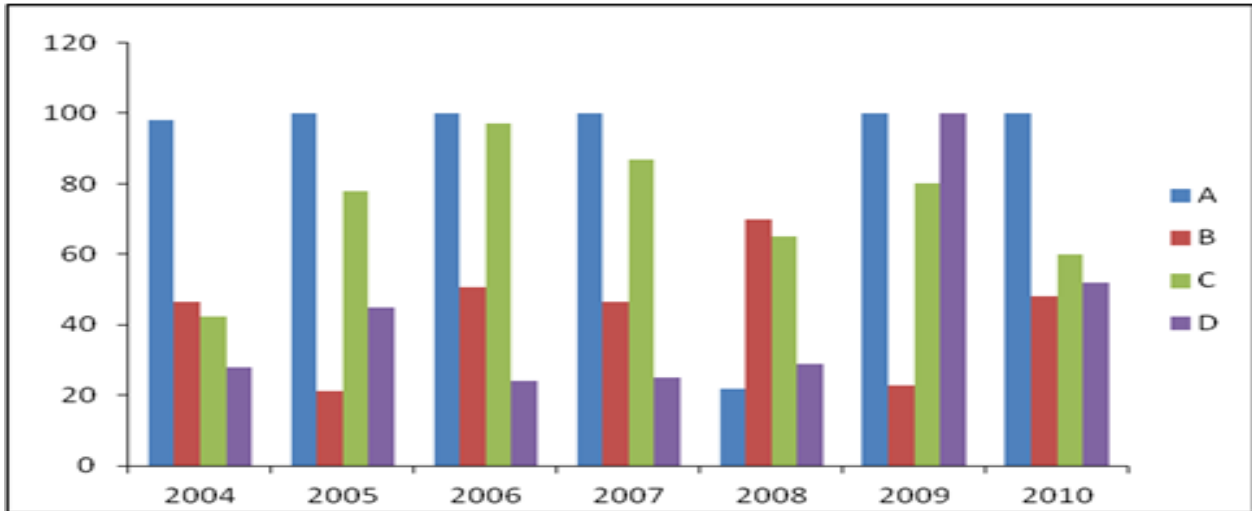


Fig. 3.1 Bar Chart for Physics

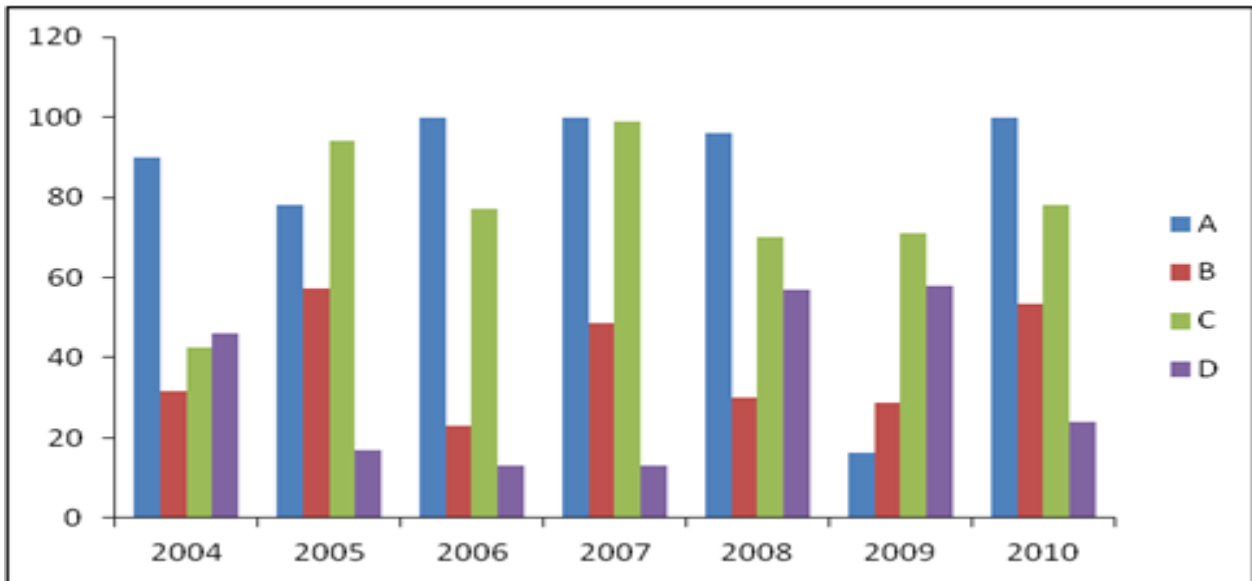


Fig. 3.2 Bar Chart for Chemistry

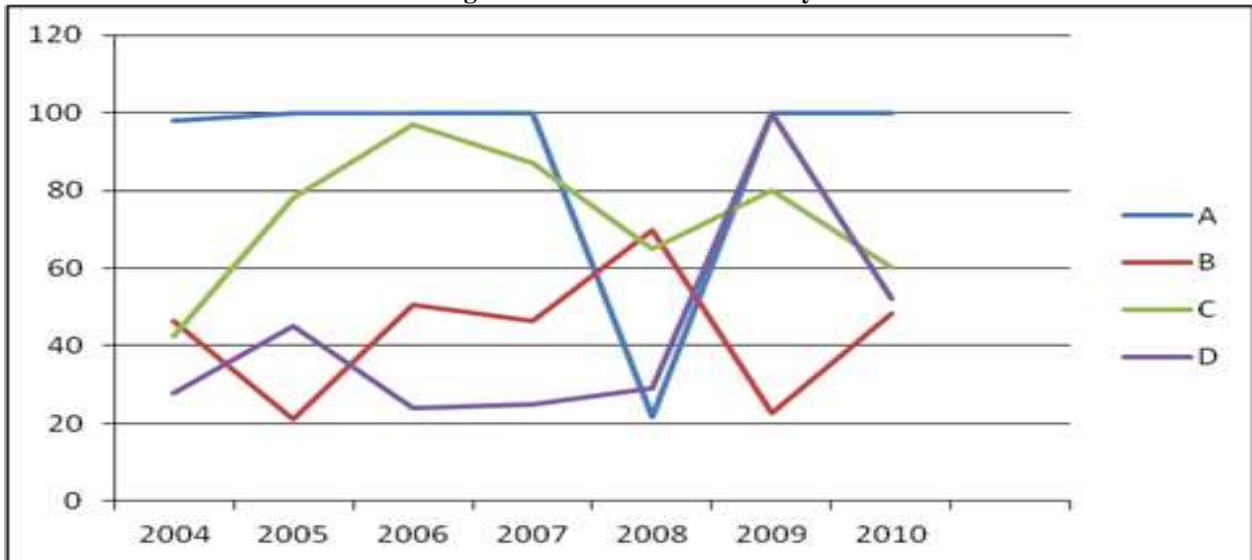


Fig. 3.3 Trend for Physics

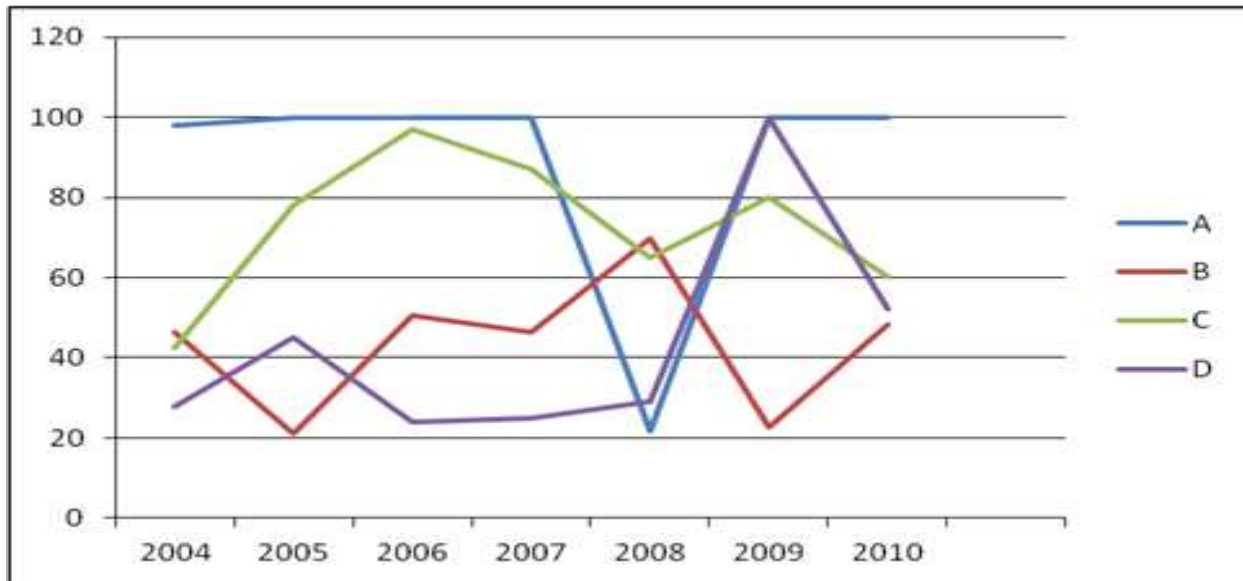


Fig. 3.4 Trend for Chemistry

3.1 For Physics

There is no significant relationship between the performance of the students in both Chemistry and Physics. From table 1a, the calculated value (6.306) is greater than the table value (3.01) at 0.05 level of significance. Therefore, the null hypothesis is rejected. Hence, there is a significant relationship between the performance in both Physics and Chemistry students. The average performance of Physics for the four schools was about 62%.

3.2 For Chemistry

From table 3.2, the calculated value (9.735) is greater than the table value (3.01) at 0.05 level of significant. Therefore, the null hypothesis is rejected. Hence, there is a significant relationship between the performance in both Physics and Chemistry students. The average performance of Chemistry for the four schools is about 58%.

3.3 School A

School A is a private burden School. The students' performance was very high. Their average performance in Physics was 89% and chemistry was 83%. From the first row of table 3.1 and 3.2 the mean difference of both Physics and Chemistry for B, C and D from school A are positive and not negative. Hence, from fig. 1B and 2B, School A performed best more than other schools.

3.4 School B

It is a private public day School. Their average performance in Physics was 44% and that of Chemistry was 39%. From the second row of table 3.1 and 3.2 the mean difference of both Physics and Chemistry for A; C and D from School B are negatives except school D that is positive. Hence school B did not performed well.

3.5 School C

It is a private day school, but not a burden school. Their average performance in Physics was 73% in and 76% in Chemistry. From the third row of table 3.1 and 3.2 the mean difference of Physics and Chemistry for A; B and D from school C are positives except school A. Their performance was better than School B and D. Hence, from fig 2B and 2B, School C performed better than B and D.

3.6 School D

It is a private day school student. Their average performance in Physics was 43% and Chemistry was 36%. From the fourth row of table 3.1 and 3.2 the mean difference of both Physics and Chemistry for A; B and C from school D are all negatives. Hence, from Fig. 3.1 and 3.2, school D performs worse than other Schools. Their average performance is low especially in Chemistry.

From the trend graph Fig. 3.3 and Fig. 3.4 and Fig. 3.1 and Fig. 3.2 there is decline in the performance of both Chemistry and physics. Hence, the performance of both Physics and Chemistry is decreasing, and not steady (not constant).

Fig. 3.3 and fig. 3.4 shows the trend of performance of the Students for both Physics and Chemistry. The trend is sideways trend. That is, the student's performance falls within a narrow range, it neither increasing nor decreasing.



The shows that there is no trend in the performance of the students. Hence, the trend is not uniform. Also from the Bar Charts fig. 3.1 and Fig. 3.2 it is clear that there is no constant trend in the performance of the students.

CONCLUSION

The increasing other of their performance is: $A > C > B > D$. That is School A performs best followed by C and B while School D performs worst. The result of the analysis shows that there is no constant increase or trend in the performance of the students. The performance of the students in Physic and chemistry are declining. This is in accordance with the Nigeria Institute of Physics (NIP), (2014), WASSCE result analysis.

School A is a private burden School. The students' performance was very high. Their average performance in Physics was 89% and chemistry was 83%. SCHOOL B It is a private public day School. Their average performance in Physics was 44% and that of Chemistry was 39%. SCHOOL C It is a private day school, but not a burden school. Their average performance in Physics was 73% in and 76% in Chemistry. SCHOOL D

It is a private day school student. Their average performance in Physics was 43% and Chemistry was 36%.

School B and D are the oldest among the schools while school A and C youngest, their performance in both Physics and Chemistry is better than that of B and D. Hence, the Year the School started has no effect on predicting the performance of the students.

RECOMENDATIONS

Based on the findings, the following recommendations have been stated for the government, teachers, ministry of education and owner of school of the etc.

- Teachers' salary should be reviewed for both private and Government schools, so that teachers will not be moving about looking for better jobs.
- School proprietors and ministry of education should ensure that the school laboratories are well equipped.
- Teacher should not be changed for a particular year group.
- The government/ ministry of education should make a law that all teachers teaching in secondary schools should engage in coordination and making external examinations: such as (NECO, WASSCE, NABTEB, IJMB etc.).
- Physics teachers should function as facilitator to assist the students to develop positive attitude towards the subject [19].

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