

Students' high Failure Rate in Science Education in Nigeria Colleges of Education

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Abstract: Science is a piece of applied knowledge. It is a subject that has an impact on our daily activities. It can be seen as a tool that is important to both individuals and the nation as a whole to survive and to meet the global economic requirements. Despite the indispensable importance of science in our society, it is sad to note that the performance of students in science courses in higher institutions these days are generally poor, most especially in Colleges of Education in Nigeria. This study therefore seeks to determine the factors responsible for students' failure in tertiary institutions in Nigeria. The sequential Exploratory Mixed method was used for the study. The sample for the qualitative phase was attained by a theoretical saturation of 10 participants. The population consists of lecturers, non-academic staff and students in Colleges of Education in Nigeria. The sample consisted of 25 lecturers, 20 non-academics and 60 students which recorded a 95% confidence level in Rasch Measurement Model. The thematic analysis and the Rasch Model analysis was used for data analysis. Findings revealed that 4 major variables as the major causes of failure by science students. A reduced workload among others was recommended for effective teaching of science subjects by lecturers. The study was recommended for other disciplines.

Keywords: Students, Failure, Science, Education

I. INTRODUCTION

The high failure rate is a serious concern to lecturers and College management of the College of Education, Ikere Ekiti. To address this issue of high failure rate, it is important to have a clear understanding of the factors that may affect the academic performance of students. Ayalew et al., (2018), opined that poor performance of students could be attributed to many factors such as environment, culture, teaching methodology, and course structure, type of assessment, instructor, students and external factors. Danili & Reid, (2006) affirmed that student's performance can be determined by the content and presentation of the subject in question and stressed further that cognitive styles have an impact on pupils'

performance and achievement. Therefore, the concern of educators should be to understand the possible styles that suit the students so that teachers can adapt their teaching style to suit the pupils' preferred styles and help them to overcome their difficulties and display their abilities. Science is defined as applied knowledge. It is a subject that has an impact on our daily activities. It is also defined as a tool that is important to both individuals and the nation as a whole to survive and to meet the global economic requirements (Astha Jain, 2020). This implies that science subjects continue to be of the most important subjects, as the world is currently at a stage where its wealth and economic development is highly dependent to the science workforce (Muzah, Education, & Education, 2011). Despite the indispensable importance of science in our society, it is sad to note that the performance of students in science subjects in College of Education in Nigeria has been very poor. This incessant poor performance of students in the School of Science of the Colleges of Education has continued to give Management a lot of worries. This observation calls for an investigation into factors that cause poor performance to make efforts to improve the science pass-rates in the College, and by extension other cadres of education in the country. This then calls for stakeholders in Education in the country to shape its science educational policies by emulating the education systems of the best achievers using international comparison strategies (Meier & Lemmer, 2015). Many factors determine the academic performance of students and the time they graduate from school. Researches have shown that school-based factors (the availability and use of teaching/learning facilities), socio-economic factors (the education of the parents and their economic status), student factors (motivation and attitude), school type and the teachers' characteristics are some of the factors that contribute to the learners' poor performance in the science subjects (Astha Jain, 2020). There are also unforeseen factors that determine how long a student stays in school before graduation. For example, students' stay in school may be prolonged as a result of his or her poor health condition, accidents, disruptions in the academic occasion by students' unrest or industrial actions by staff, sudden break down of diseases, etc. The academic performance of students will lead to an increase in employment. If the students perform well in their examinations, the tendency is that they will graduate on time and consequently have enough time to further their study for the next stage. That is why students should strive to perform well in their studies.

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By delaying or extending their stay in school as a result of poor academic performance, students may get tired and become frustrated to study because they will feel that their study periods are becoming too long and consequently, unbearable. It could be concluded that a student who studies well or shows interest in his/her study and makes it on time will have more time to find a job since the rate of unemployment in Nigeria increases on daily basis.

Students should work towards finishing their studies on time instead of delaying or extending it. This is because if they graduate on time, they feel satisfied with their achievements and this will spur them to face the next challenge of their life. The academic performance of students will be adversely affected if they develop a poor attitude towards their study. Findings indicate that researches into the causes of poor performance in science have mostly been covered both within and outside the country. The findings suggest that even if the above-mentioned factors were addressed they were not addressed correctly, as we are still facing the challenges of poor performance in science subjects, or that the causes have not yet been discovered, apart from those mentioned above, that affect the students. This indicates that more research still has to be done to see if those factors mentioned above are the ones causing the learners' poor performance in science subjects, or if there are yet to be identified factors.

This study was therefore designed to research factors leading to the learner's poor performance in science courses in Colleges of Education in Nigeria to improve the learners' performance.

A. The research question

What are the factors responsible for the poor academic performances of students in science subjects in Colleges of Education?

B. Objective of the Research

The general objective of the study is to investigate the factors influencing the poor performance of students in science subjects in Colleges of Education, with particular reference to the College of Education Ikere – Ekiti, Nigeria.

C. Methodology

The population for the study is made up of Academics staff, students and Non-academic staff of the school of Science, College of Education Ikere Ekiti. The purposive sampling technique was used for the qualitative with a theoretical saturation of 10 participants which includes 3 academic staff, 6 students and 1 non- academic staff. The thematic analysis was used for the qualitative phase of the study. Since the current study is seeking to establish the validity of the factors responsible for students' high failure rate in science courses in higher institutions, the Partial Credit Model (PCM) in Rasch Measurement Model version 3.74.0 was used to obtain the consensus of the experts.

D. Analysis and Findings

Table 1: How does management contribute to student failure?

Responses	Respon dents	Codes	Themes
Disruption in school academic calendar. They will change the date of the Exam. They are not consistent.	A1, S1, S2,	Academic calendar	Inconsistency
Inadequate accommodation for students. Most students live in town. Many come late to lectures	S3, S4, A2, S1,	Accommodation issues	Lateness
Too many courses in the NCE curriculum. We are doing many courses. We are too overloaded	A3, S4, S5	The curriculum needs to be amended	Overloaded curriculum
Lack of staff quarters: Staff lives in far places	A1, S5,	Staff welfare	Irregularity at work
Books of reading are not made available to students on time, the lecturer will not give us what to read on time.	S6, S4, S3,	Availability of book series	Laziness

No time lag for registration. Un care attitudes of management to registration. We can submit our registration form at will.	S1, S4, S5, A2	Bad planning	Registrati on.
Delay in student results. They don't allow us to see our results on time	S2, S3, S4, S6	College lapses	Discourag ement

Table 1.2: Summary of interview findings for Management factors.

Construct	Academic			Student					
	A 1	A 2	A 3	S 1	S 2	S 3	S 4	S 5	S 6
Inconsistency	/			/	/				
Lateness		/		/		/	/		
Crowded curriculum		/		/	/				
Irregularity at work	/							/	
Laziness						/	/	/	/
Registration		/		/		/	/	/	/
Discouragement				/	/	/	/	/	/

Table 1.3: lecturer effect on students' performance

Responses	Respondents	Codes	Themes
Short time allocated for lectures. Most lecturers spend little time at lectures. Tunacy...	A1, A2, S2, S3,	Overcrowded time table	Ineffectiveness
Inadequate manpower in some departments, lecturers are not enough for teaching	A3, A1, S6, S2	Inadequate Manpower	Excess workload
The rigidity of some lecturers, lecturers' difficulty to approach. No regard for students	A1, A2, S2, S1	Lecturers attitude	Rigidity
Too many programme at the same time, Teaching practice and	S2, S3, A1, A2, A3,	Unstandardized program	No focus

SIWES supervision, OAU, Nsuka all at the same time.			
Inability to change with technological changes, adamant to old methods of teaching, lack of internet facilities	S1,S4, S5,S6, .A1,A3	Technologi cal changes	Teaching method

Table 1.4: Summary of interview findings for lecturers' factors

Construct	Academic			Students					
	A 1	A 2	A 3	S 1	S 2	S 3	S 4	S 5	S 6
Ineffectiveness	/	/			/	/			
Workloads	/		/		/				/
Rigid	/	/		/	/				
No Focus	/	/	/	/		/			
Teaching method	/		/	/			/	/	/

Table1.5: Shows Analysis for Students factors: Late resumption

Responses	Respondents	Codes	Themes
Our school fees are high, parents poverty level, lectures will not start lectures on time.	S1,S2,S3,S4	Late resumption	Absenteeism
Socialism rather than academics. Students charting instead of reading, Many students going to clubs rather than going to prep.	A1, A2, S3, S5	Socialism	Un seriousness

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The most student doesn't know what to pay..., students will not be allowed to seat for exams without school fees, Parents' backgrounds.	S1,S3,S6, S4.	School fees	Tuition	Schedule of payment not generated on time, Result will not release on time for students.	NA1, S1, S3, S4	Registration	Results delay.
Lack of learning aids, No enough practical class, Teaching is theoretical, Teaching is done abstractly	A1, S1, S2, S3, S4	Abstract teaching	Incompetence				
No reading culture, Most students highly visit the library, Most students cannot programme themselves.	S1, S3, S5, A1	Reading culture	Laziness				

Table 1.8: Summary of interview findings for Non-academic factors

Construct	Academic			Students							Non-Academics	
	A1	A2	A3	S1	S2	S3	S4	S5	S6	S7		
				/	/	/	/	/	/	/	/	NA1
Time Wastage				/	/	/	/	/	/	/	/	/
Discouragement				/	/	/	/	/	/	/	/	/
Results delay				/	/	/	/	/	/	/	/	/

Table 1.6: Summary of interview findings for students' factors

Construct	Academic			Students					
	A1	A2	A3	S1	S2	S3	S4	S5	S6
Absenteeism				/	/	/	/	/	/
Un seriousness	/	/				/	/	/	
Tuition				/	/	/	/	/	
Incompetence	/			/	/	/	/	/	
Laziness	/			/	/	/	/	/	

Table 1.7: Findings for Non-Academic Staff factors

Responses	Respondents	Codes	Themes
Long queue in the bank for payment, Lost of funds during payment.	S1, S2, S4 NA1	Bank issue	Time wastage
The staff doesn't recognize students. Staff maltreats students. Most staff are too bossy, Non-challant attitude of Non-academic Staff.	NA1, S1, S2, S4, S5	Bad Attitude	Discouragement

TABLE 3.1 Desktop spss.sav ZOU952WS.TXT Sep 2 12:12 2020
INPUT: 30 PERSON 39 ITEM REPORTED: 28 PERSON 24 ITEM 4 CATS WINSTEPS 3.74.0

SUMMARY OF 28 MEASURED PERSON

	TOTAL	COUNT	MEASURE	MODEL	INFIT		OUTFIT	
	SCORE				ERROR	MNSQ	ZSTD	MNSQ
MEAN	71.8	24.0	.94	.29	1.01	.0	1.01	.0
S.D.	5.8	.0	.55	.03	.27	1.0	.27	1.0
MAX.	88.0	24.0	2.62	.40	1.45	1.6	1.48	1.7
MIN.	61.0	24.0	.07	.27	.63	-1.5	.64	-1.5
REAL RMSE	.31	TRUE SD	.46	SEPARATION	1.46	PERSON RELIABILITY	.68	
MODEL RMSE	.29	TRUE SD	.47	SEPARATION	1.59	PERSON RELIABILITY	.72	
S.E. OF PERSON MEAN = .11								

DELETED: 2 PERSON
PERSON RAW SCORE-TO-MEASURE CORRELATION = .99
CRONBACH ALPHA (KR-20) PERSON RAW SCORE "TEST" RELIABILITY = .63

SUMMARY OF 24 MEASURED ITEM

	TOTAL	COUNT	MEASURE	MODEL	INFIT		OUTFIT	
	SCORE				ERROR	MNSQ	ZSTD	MNSQ
MEAN	83.8	28.0	.00	.27	1.00	.0	1.01	.0
S.D.	8.9	.0	.62	.02	.22	.9	.22	.9
MAX.	97.0	28.0	1.51	.31	1.42	1.6	1.44	1.7
MIN.	61.0	28.0	-1.01	.25	.63	-1.7	.63	-1.7
REAL RMSE	.28	TRUE SD	.55	SEPARATION	1.95	ITEM RELIABILITY	.79	
MODEL RMSE	.27	TRUE SD	.55	SEPARATION	2.05	ITEM RELIABILITY	.81	
S.E. OF ITEM MEAN = .13								

DELETED: 15 ITEM
UMEAN=.0000 USCALE=1.0000
ITEM RAW SCORE-TO-MEASURE CORRELATION = -1.00
672 DATA POINTS. LOG-LIKELIHOOD CHI-SQUARE: 1387.47 with
619 d.f. p=.0000
Global Root-Mean-Square Residual (excluding extreme
scores): .7048

0 +MEWL3 LOS2 NEG3
T| EWL2
| BKP1 CDC1
| CDC3 INC2 LAT2 NCA2
|
|S LAT3 PTL2 PTL3
|
| LAZ3
-1 + CDC2
<less>|<frequent>

MEASURE PERSON - MAP - ITEM

<more>|<rare>
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XXXXX |
1 XX M+ EWL1
XXXX | RIG3
XX | ICON1
XXXXXX |S NCA3
XX |
XX S| LOS3
| ICON2 LAZ1 RIG2
X |

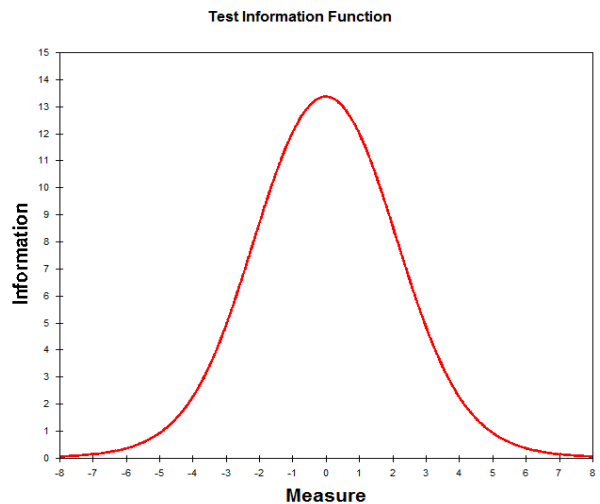


Figure 1.1: Test Information Function of Findings



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S/NO	Item	Value
1	INC2	-0.13
2	LAZ1	-0.12
3	LAZ3	-0.1
4	LOS2	-0.5
5	LOS3	-0.1
6	EWL1	0.32
7	EWL2	-0.42
8	EWL3	0.06
9	RIG2	0.21
10	RIG3	0.28
11	NEG2	0.16
12	NEG3	-0.01
13	BKP1	0.06
14	NCA2	-0.2
15	NCA3	0.14
16	PTL2	0.43
17	PTL3	0.02
18	ICON1	-0.6
19	ICON2	-0.64
20	CDC1	-0.01
21	CDC2	0.05
22	CDC3	0.25
23	LAT2	-0.32
24	LAT3	-0.02

II. RESULT AND DISCUSSION

The Figure 1.1 shows the general outlook of the results of the interview protocol with the ten participants. Since the views expressed by them could be subjective (Linacre, 2002;

Saidfudin et al., 2010); the Rach Analysis Model was used to evaluate and determine both the person and item separation, and their reliability. With a Person separation of 1.46 and reliability of 0.68, it shows that the sample size was too small to distinguish between the low and high performer. Similarly, the item separation of 1.95 and the reliability of 0.79 shows that sample is large enough to confirm the item difficulty hierarchy of the instrument. However, the raw variance explained variance of 14%, the 1st Unexplained Variance of < 15 and the Eigenvalue of 5.2 indicate that each of the variables; Student Factor, Management Factor, Lecturer Factor and the Non-Academic Factor cannot be treated together. Thus, each must be treated and analyzed based on their merits. The analysis of the partial credit model shows that the initial thematic result for the qualitative data is subjective to some extent. The PCM result shows that only (13) thirteen items; Inconsistency, Laziness, lack of Skills or Technological skills, Excess workloads, Negligence, Non-challan attitude, Overcrowded Curriculum, Incompetence, poor reading culture, lack of determination, too many activities at the same time, irregularities in wages and Lateness, out of the whole 24 items has the consensus agreement of the experts as the factors responsible for student failure in science education in Nigeria Colleges of Education. These items have their mean below zero and therefore, form the major factors responsible for students' failure in Science Education in Higher Institution in Nigeria. This does not mean that the other 11 item are unimportant, but they are the least important (Abas, 2018; Adams & August 2010; Al-Far, Qusef, & Almajali, 2019). The factors are shown in Figure 1.2.

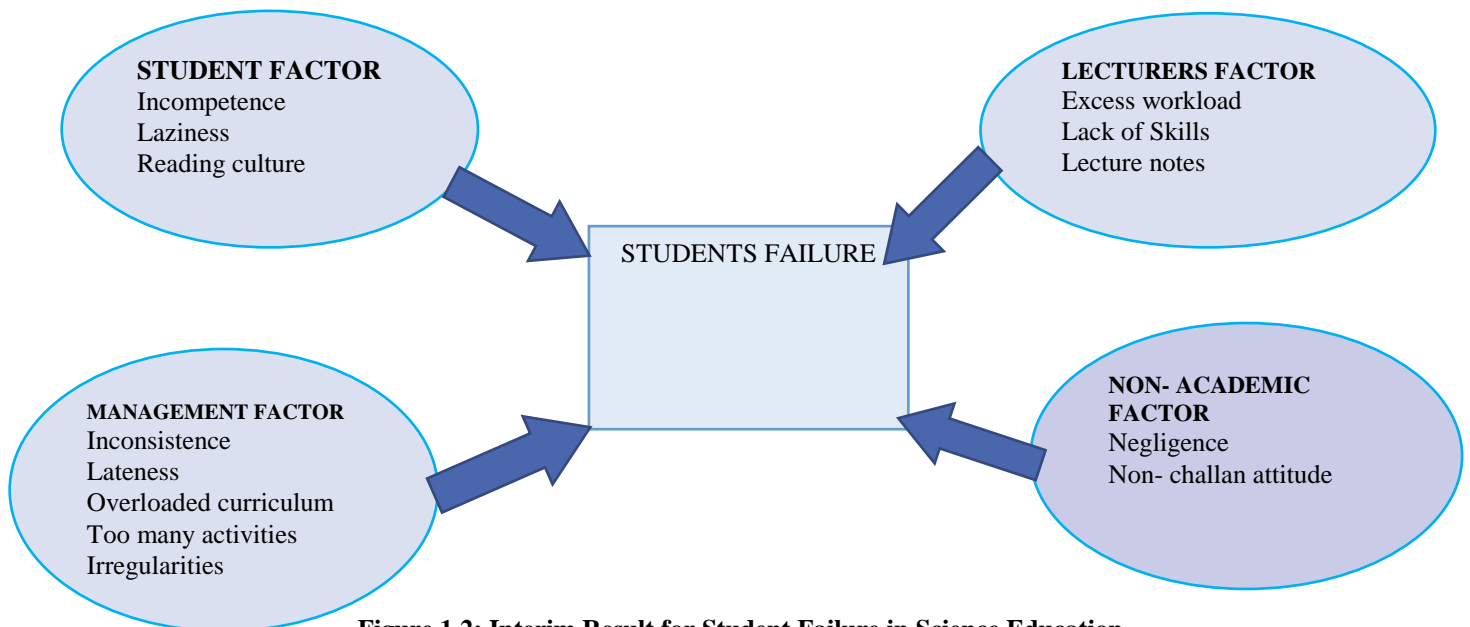


Figure 1.2: Interim Result for Student Failure in Science Education

III. CONCLUSION

To ensure that students produced are competent, lecturers should make concerted efforts to make their teachings practical and interesting. This would be achieved by using appropriate teaching aids during each lecture and also creating enough periods for practical classes. Similarly, the students must shun laziness and embrace hard work, they should be encouraged to work harder by making them aware of people who have made it in society through education. Besides, the reading environment should be made conducive. Also, the lecture timetable should be planned such that social and academic activities do not interfere with each other. The excess workload of lecturers hampers effective teaching. Management of tertiary institutions should employ more hands who are professionals in their various fields. Lecture timetables should also be planned to avoid clashes. course allocation should always be done with the mindset that lecturers would not handle more than a course at a level. To ensure that staff (both academic and non – academic) carry out their work diligently and consciously, seminars/workshops on the ethics of their professions should always be organized for them on regular basis. As a way of ensuring that curricular are not unduly overcrowded, stakeholders (i.e. regulatory agencies, lecturers, students and parents) should meet to streamline the existing curricular. Management of institutions should always ensure that vital instructions are carried out with dispatch. All bureaucratic procedures in the release of vital documents must be eliminated.

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