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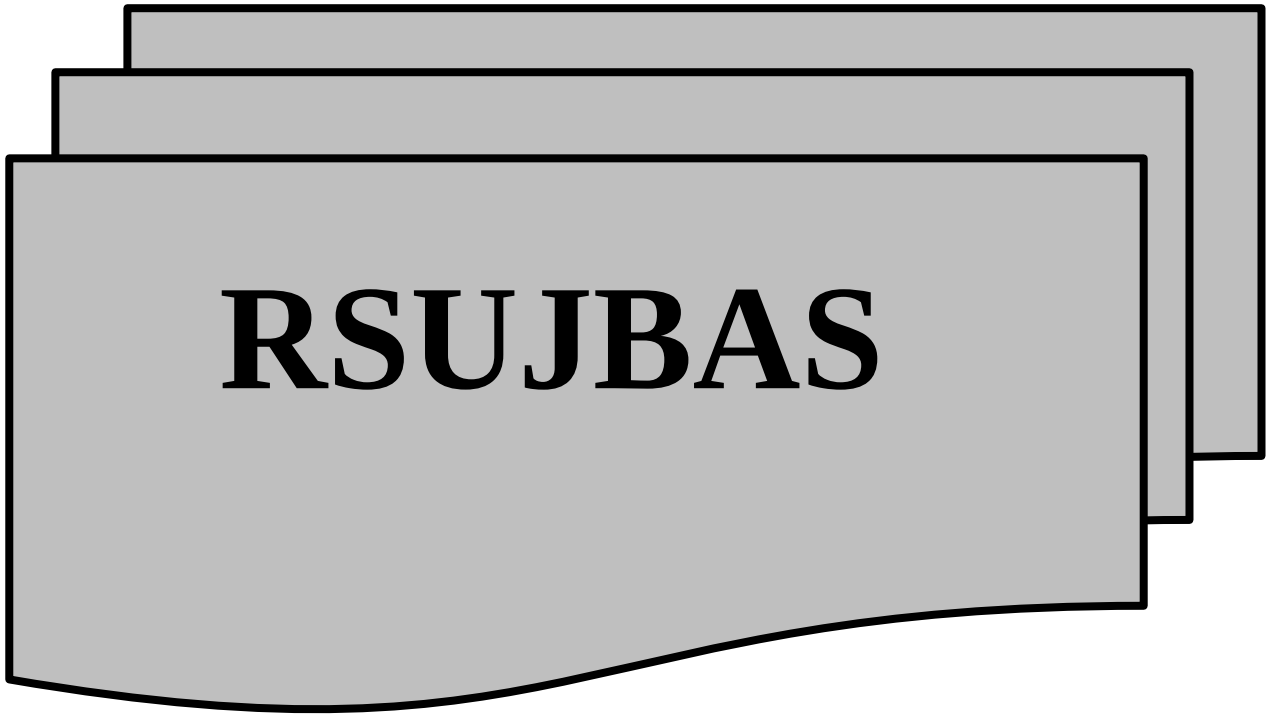

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COMPUTER BASED ACADEMIC PERFORMANCE FOR NIGERIAN UNIVERSITY STUDENTS

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ABSTRACT

Students' academic performance is dependent upon students prompt attendance to lectures and advice through their University management. These facts are very challenging in the contemporary Nigerian Academic Institutions today. The problems that motivate the researchers are poor academic performance of students due to inconsistency in lecture attendance, capturing attendance manually is not always accurate because students cheat by signing for a person who is absent and record their friends' attendance falsely, it is time consuming and lack of monitoring and control for students. It is essential to devise an automatic monitoring system that enhances regular attendance to lectures by students because the manual method of taking attendance is very cumbersome and ineffective. There are attempts to solve the problem of this manual approach using electronic cards and a clock-in system, which presents the problem of reading information connected to somebody without his or her permission. *In the light of these defaults, an automated system was successfully applied to address the problem facing students in their academic performance due to insufficient attendance to classes. The platform guides the University management in advising their students based on their academic performance. This is because the platform computes the student's result and compares students' lecture attendance with examination performance. The comparison will then guide the University management in comparing the performance of a particular student to that of his/her classmates. Object oriented analysis and design methodology were used to develop the computer based academic performance for Nigerian University students. The results showed that the web-based platform performed automatic real-time monitoring of students' and lecturers' attendance at lectures. The system was able to show a relationship between students' lecture attendance and examination performance. The result obtained guide the University in advising their students based on their academic performance and result because it is used to identify students who are struggling, excelling or underachieving.*

Keywords: Academic performance, Lecture attendance, Nigerian University Students

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1 INTRODUCTION

This study aims to determine the significant impact of students prompt attendance to lectures, students' academic performance and advice through their University management based on the students' performance. Attendance in most universities are recorded manually, some uses electronic cards and a clock-in system. The predominant manual method of taking attendance in the Nigerian Educational Institutions, either by calling students 'name or asking them to sign on paper waste person–hour, is ineffective, crude and uneconomical as it wastes ink and paper (Garcia *et al.*, 2008). All these methods presents the problem of reading information connected to somebody without his or her permission. In the light of these defaults, an automated system was successfully applied to address the problem facing students in their academic performance due to insufficient attendance at classes. In this paper, we compare students' academic performance in examinations with lecture attendance. We actually look at the context of the students' performance based on the number of times the student attend lectures. With the students' lecture attendance compared with examination performance, we determine the significant impact of lecture attendance on students' academic performance. Administrators in most Nigerian Universities are concerned about the irregular attendance of students at lectures. In their academic regulations, some institution maintain the 75 % attendance to lectures recommended by the Nigerian University Commission ((NUC, 2013)) for a student to be allowed to sit for an examination. In some other Institutions, attendance merely forms part of the continuous assessment. The latter case can only be implemented if the lecturer is candid enough always to maintain an accurate attendance list of students who attended the lectures each time. Bias on the examination result outcome is very obvious in this case.

Lecture attendance for students in the first place is an essential prerequisite for academic performance in any academic institution. This is because a lecturer must teach one well to guarantee good academic performance. Secondly, the regularity in attending lectures ensures a smooth flow of information and concepts being communicated between the students and lecturer. Aremu (2014) add that the overall academic performance of a student who is absent from lectures even for a day can be affected. Jain *et al*., (2015) also added that poor academic performance of students drags the reputation of the lecturer and that of the university in general down.

The result obtained from the platform guide the University management in advising the students based on their result. This is because; the platform computes the student's result and compares students' lecture attendance with examination performance. The comparison will then guide the University management in comparing the performance of a particular student to that of his/her classmates. It also helps him to identify students who are struggling, excelling or underachieving.

2. REVIEW OF RELATED LITERATURE

2.1 Attendance capture using radio frequency identification and biometric

In most of the colleges and universities, attendance is recorded manually and the process consumes lots of time. In attempts to solve the problem of this manual approach, the attendance system that uses Radio-frequency identification was introduced which is advanced wireless technology. Here only the authorized students are provided with the RFID tags. This tag consists of an inbuilt integrated circuit for storing and processing information. Radio-frequency identification (RFID) uses electromagnetic fields to automatically identify and track tags attached to objects. The tags contain electronically-stored information. RFID tags are used to record students' attendance. Each student is issued with his or her authorized tag which can be used for swiping in front of the RFID reader to record their attendance. The tag presents the problem of reading information connected to somebody without his or her permission. Angell and Kietzmann (2006) said that since RFID tags can be attached to money, garments and property or implanted in animals or persons, there will be risk of reading somebody's information without his or her knowledge. Biometric in the other hand is a technology that measures and analyzes human physical and behavioral characteristics for authentication, identification or screening purposes *(Woodward et al., 2003).* A biometric characteristic can be human physical characteristics which include but are not limited to

fingerprint, face recognition, palm print, hand geometry, iris recognition and retina. These biometrics features can also be used to capture students' attendance.

2.2 Lecturers' skills and competencies determines student academic performance

An understanding of the skills and competencies required for effective lectures is necessary to identify skill and competency gaps in the education sector. Several social and educational researchers have identified a list of lecture skills and core competencies that lecturers must have to function effectively at all levels of education. Olatunji (2013) said that the examined skills and competencies are necessary for successful lecture and learning in the classroom, particularly in Nigerian Universities and Africa in general. He came up with the concept of academic competence as a complete description of lecture skills and competencies, in which the lecturer is expected to have an intellectual approach towards the lecture duty, thereby adding to the development of knowledge of lecture and learning. Though academic competence includes lecture skills and the scholarship of lecture, it goes beyond them. According to (Oldsjo, 2010), the habitual vision of academic competence is primarily a question of practice in the classroom whereby a skilled lecturer, through knowledge, methods, actions and ability to exchange a few words, gets lecture conditions to a useful purpose and creates conditions for learning. He though noted that this view is lacking because it does not include a scientific attitude toward lectures and learning. He opined that the lecturers' ability lies primarily in a scientifically based subject competence and the practical lecture skills that he/she has acquired and continued to develop.

In agreement with Magin (2016), Olsson *et al* (2010) also established that academic competence is a broader concept than lecture skills. They opined that academic competence presupposes a good, broad and deep understanding of the subject of the lecture. An academically talented lecturer would demonstrate in different contexts the ability to use subject knowledge in research-related areas and practical, educational actions with student learning in focus.

Apelgren & Giertz (2010) defined *lecture competence* as the ability and determination to apply the approach regularly, the understanding and the skills that advance students' learning most excellently. This shall agree with the goals that apply and within the framework available and presupposes continuous development of the lecturer's own competence and instructional design. They highlighted many aspects in their definition that they consider significant for the lecturer's academic competence. These include attitude, knowledge, ability, adaptation, perseverance and

continuous development. Several international research studies emphasized three significant aspects of lecture skills and competencies. These include:

i. What do lecturers do, that is different kinds of abilities?
ii. Knowledge that lecturers need in order to be able to act in the best possible way.
iii. Attitudes and reinforcement values that the lecturer embraces and applies in the classroom.

Melrose, (2011) cited in his work that the competencies of instructors which affect students' academic performance are to identified instructional planning, strategies and techniques, communication with learners, learner-reinforcement involvement and adherence to professional standards on competencies of university lecturers in the Philippines in relation with these aspects of competencies.

Oldsjo (2010) cited in his work that Uppsala University published eleven most important criteria for determining the skills and competencies of university lecturers. According to the University, these criteria were based on research in higher education and were formulated in consultation with lecturers from different academic disciplines.

The criteria are summarized as follows: Attitude that furthers students' learning, Scientific Approach to lecture, Broad and appropriate subject knowledge, Knowledge about how students learn, Knowledge about the lecture, knowledge about educational goals and organization, A holistic view of lecture and learning, Application of lecture skills, Striving for continuous improvement, Excellent leadership and administrative skills and Cooperation with others and contacts with the surrounding society.

In Nigeria, the skills and competencies of university lecturers are traditionally evaluated in three domains of lecture, research and services. Most universities emphasize scholarly research publications as a major determinant of lecturers' academic competencies. Though lecture or academic competencies are required for elevation from one cadre to another, these are rarely scientifically evaluated. Competencies in the domain of services are evaluated in terms of lecturer's contributions to the institution's administrative functioning such as membership in committees, participation in students' mentoring and advisory services. Consequently, the three domains of lecture, research and services can be considered core competencies necessary for lecturers in Nigerian Universities.

From the foregoing literature review on lecture skills and competencies, six basic areas can be considered as core competencies or skills of lecturers necessary for effective lectures at all levels of education. These are subject matter, educational, communication, evaluation, ICT and counseling competencies. The six core competencies were investigated in this study to determine skills and competency gaps in the Nigerian education sector. Therefore, Nigerian Universities cannot perform well and produce qualified students without helping the lecturers acquire the basic academic skills and competency to enable them to fill in the gap.

2.3 Monitoring lecture activities and students attendance in Nigerian Universities

Daily, weekly and monthly reviews can all enhance the learning of new material and if they incorporate questioning and other learning probes, it can need concentration in the area where coaching is needed. A link between integrating monitoring methods into repeated classroom lectures has been established to enhance students' academic performance. The effectiveness of using review sessions to monitor student learning is clearly revealed in the work of Franklin *et al.*, (2008). Lecturers who are trained using methods for conducting intermittent classroom reviews produce students whose achievements were higher than it was before the lecturers had been trained and higher than the achievement of students of untrained lecturers.

Students' attendance at lectures should be monitored strictly because they usually resort to examination misconduct based on their poor lecture attendance. Measuring attendance is a vital apprehension for many institutions that can use the information to measure the efficiency of students' efforts and plan for their future efforts. Attendance should be compulsory in classroom settings. Poor attendance by a student in a lecture hall affects their academic performance or other evaluations. Poor attendance might also reproduce problems in a students' state of affairs and it is a pointer that students are not developing the knowledge and skills needed for their future success (Franklin *et al*., 2008). Students in primary school and secondary school may be mandated for unavoidable attendance, while students at higher institutions of learning may be penalized by professors or the institution for lack of attendance. The anticipation of assured attendance levels at a particular result is a major factor in determining the seating ability to be built and measuring of academic performances (McLean and Hurd, 2011). If there is a frequent occurrence, the plan should be to stretch attendance across less popular days or widen academic performances over a longer time (Appleton, 2012). Since some Lecturers attend lectures haphazardly, while some do

not attend lectures at all but end up giving photocopied materials, books, or notes to read, it used to affect the overall academic performance of the students. Therefore, this study will capture the number of lectures attendance and both the students will sit up to their responsibilities.

3. DISCUSSIONS

3.1 Student course registration

The design platform enables the students to login and register for their courses. Students registered their courses based on semesters or sessions and only those who register their courses can take and view their attendance. The University management can advise the students based on their results.

3.2 Lecture attendance

When the system is executing on the browser, the information is captured based on real-time response in the sense that the system captures information from users and gives appropriate feedback immediately. On registration, the administrator captures the students' details and stores their bio-data and other details in the database. During lectures, once the students' faces are directly facing the camera installed in the Lecture hall, the faces are captured as a frame and tested against any face stored in the image directory. Once it matches any face in the directory, it gets the filename, query the database for the user attendance record and then increment attendance by one and store it back per course. The system only requires the face of the student that registered for courses to increment the number of attendance in the classroom per course, per time allocated for the lecture.

3.3 Analysis of the variables used

The variables of our analysis are described as variable 1-attendance point and variable 2-examination points.

i. Variable 1- attendance point

This is the number of lectures attended by a student per course. The academic session is used to determine and measure the number of attendance for each student per course and it consists of 135 – 162 weeks divided into two semesters of 15 – 18 weeks each. A semester is made up of 15 weeks of lectures and two weeks of examinations (NUC, 2013). Each course is taught twice a week,

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making up 30 lecture periods per lecture. The NUC Bench Mark requires that a Lecturer attends lectures on a particular course at least 25 times per semester to justify setting an examination on the course. Grading is based on a point scale where attendance was 30 %. Three groups were used, and three students for each group for the analysis. Student 1 in group 1 attended CSC 201 lectures only two times in a semester, while Student 2 in group 2 attended lectures up to 5 times in a semester for the same course. Student 3 in group 3 attended CSC411 lectures up to 28 times in a semester. The registration number of Student 1 is UNI/BSC/1898; Student 2 has a registration number, UNI/BSC/1306 while Student 3 has registration number, UNI/BSC/1293. Students' courses and their attendance are in figure 1.

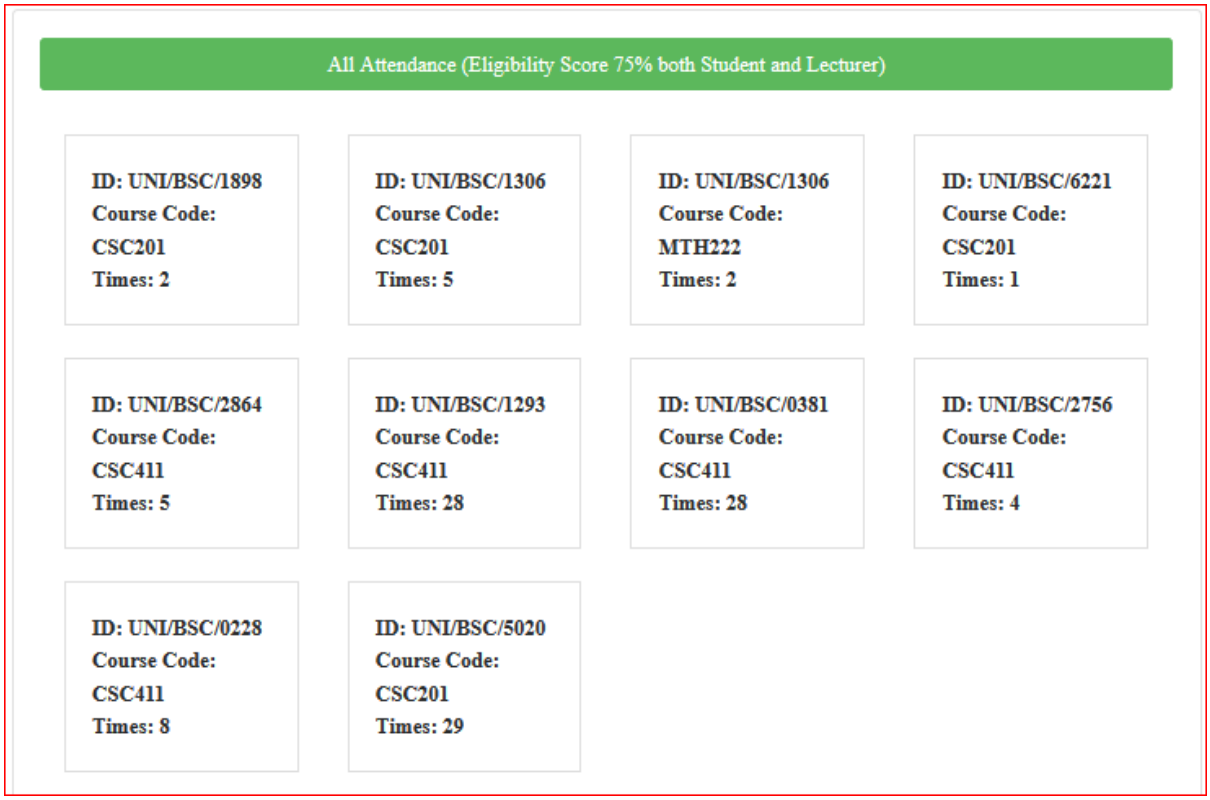

Figure 1: Students Courses and their Attendance

ii. Variable 2 – examination point

We got the data from the students' attendance and built the table 1 consisting of the examination point. This was used as an indicator of each student's examination performance. It is the number of points obtained by the students in the final examination. Grading is based on point scale where

the examination point was 70 %, not less than 45 % is required to pass the final examination. The variables used for the analysis are three groups of students in table 1. Group 1 has three students with their examination scores. Group 2 has four students with their examination scores. Group 3 has three students with their examination scores.

Table 1: Number of Examination Score Table

VARIABLES	Registration No	Course Code	Examination Scores
GROUP 1	UNI/BSC/1898	CSC 201	33
	UNI/BSC/1306	MTH 222	26
	UNI/BSC/6221	CSC 201	19
GROUP 2	UNI/BSC/1306	CSC 201	39
	UNI/BSC/2864	CSC 411	42
	UNI/BSC/2756	CSC 411	41
	UNI/BSC/0228	CSC 411	45
GROUP 3	UNI/BSC/1293	CSC 411	58
	UNI/BSC/0381	CSC 411	62
	UNI/BSC/5020	CSC 201	63

4. COMPARING STUDENTS' ACADEMIC PERFORMANCE

The findings are based on comparing students' academic performance in examinations with lecture attendance. In table 2, the researcher discussed the number of attendance and the examination score per student. Group 1 examination scores were matched with the students' attendance. Similarly Group 2 examination scores were also matched with the students' attendance. Finally Group 3 examination scores were also matched with the students' attendance. This serves as academic performance that is based on comparing students' lecture attendance with examination performance as shown in table 2.

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Table 2: Number of Attendance and Examination Score Table

VARIABLES	Registration No	Course Code	No of Attendance	Examination Scores	Total Score
GROUP 1	UNI/BSC/1898	CSC 201	2	33	35
	UNI/BSC/1306	MTH 222	2	26	28
	UNI/BSC/6221	CSC 201	1	19	20
GROUP 2	UNI/BSC/1306	CSC 201	5	39	44
	UNI/BSC/2864	CSC 411	5	42	47
	UNI/BSC/2756	CSC 411	4	41	45
	UNI/BSC/0228	CSC 411	8	45	53
GROUP 3	UNI/BSC/1293	CSC 411	28	58	86
	UNI/BSC/0381	CSC 411	28	62	90
	UNI/BSC/5020	CSC 201	29	63	92

Source: Field Work, 2022

5. COMPUTE THE RESULT

The students in table 3 were picking at random. The researcher provided a system that computed the students' results using their attendance and examination scores on this platform. The result computation was performed using Student 1 in group1 with registration number UNI/BSC/1898. Student 2 in group 2 with registration number UNI/BSC/1306 and Student 3 in group 3 with UNI/BSC/1293. The result computation performed with Student 1 in group 1 shows that she scores is 35%. Similarly, the result computation performed with Student 2 in group 2 shows that she scores is 44% and the result computation performed with Student 3 in group 3 shows that she scores is 86%.

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Table 3: Result Computation for Student 1, 2 and 3 Respectively

variables	Students	Reg No	Course Code	No of Attendance	Examination Scores	Total Score
GROUP 1	**Student 1**	UNI/BSC/1898	CSC201	2	33	35
GROUP 2	**Student 2**	UNI/BSC/1306	CSC201	5	39	44
GROUP 3	**Student 3**	UNI/BSC/1293	CSC411	28	58	86

5.1 OUTPUT FROM THE RESULT COMPUTATION TABLE

The language used to achieve this platform is Php scripting language and MySQL database. The design tool used to accomplish this is the localhost. So the result computation was performed on the localhost xamp server as in table 4. The Student 1 in group 1 had a failure, Student 2 in group 2 score D and Student 3 in group 3 had A.

Table 4: Result Computation Table

variables	students	regno	coursecode	attendance	examscore	total	grade
Group1	Student1	UNI/BSC/1898	csc201	2	33	35	F
Group2	Student 2	UNI/BSC/1306	csc201	5	39	44	D
Group 3	Student 3	UNI/BSC/1293	csc411	28	58	86	A

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ANALYZING THE STUDENTS' ACADEMIC PERFORMANCE

The design tools used to accomplish this work is the line chart and data analysis. Line chart analysis is used to analyze the students' performance based on their lecture attendance. Three groups are used for the analysis. First, we performed a line chart analysis to form a clear separation between the three groups. Line Chart Analysis is shown in figure 2.

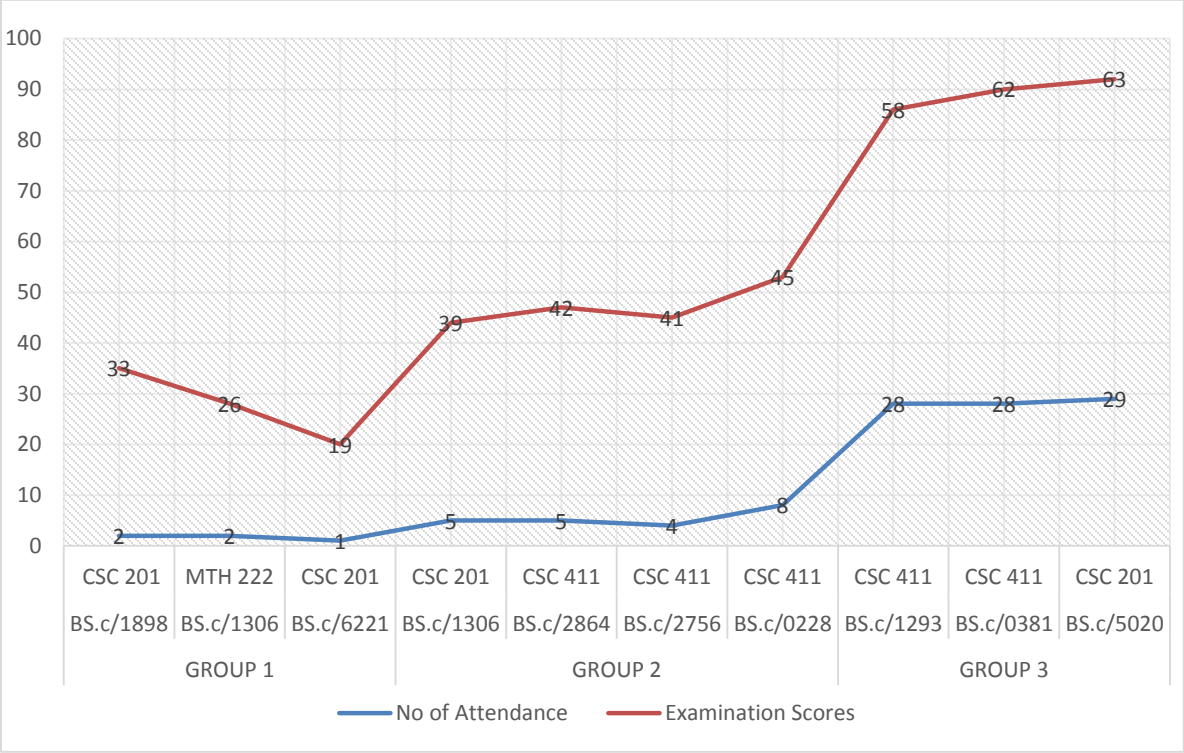

Figure 2: Line Chart Analysis (Ugwuja and Onu, 2018).

6.1 DATA ANALYSIS:

Student 1

Variable 2 – Examination point for student 1 with registration number UNI/BSC/1898. She scores in attendance (2%) and examination (33 %). Total result was 35 % and her final grade was "F" (Table 4). The result is a failure, probably because the student attended lectures only twice a semester.

Student 2

Variable 2 – Examination point for student 2 with registration number UNI/BSC/1306. His score in attendance (5%) and examination (39 %). Total result was 44 % and his final grade was "D" (Table 4). The result was not good because he attended lectures only five times.

Student 3

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Variable 2 – Examination point for student 3 with registration number UNI/BSC/1293. She scored in attendance (28%) and examination (58 %). Total result was 86 % and her final grade was "A" (Table 4). The result was excellent, most probably because he attended lectures up to 28 times a semester.

6.2 TOTAL ANALYSIS:

Group 1: Group1 are those who fail to attend lectures regularly, their attendance is only two times in a semester and they sat for the Examination. The number of student who failed is 3 and the number of student who passed is 0. This is because they are inconsistence in lecture attendance, the maximum score is 35, and the minimum score is 20.

Group 2: These are those who attend lectures up to 75 to 80% and sit for the examination. The number of students who failed is 0, the number of students who pass is 4 and the maximum score is 53 while the minimum score is 44.

Group 3: These are those who attended lectures up to 90 to 100% and sat for the examination. The number of student who failed is 0, the number of students who pass is 3 and the maximum score is 92 while the minimum score is 86.

From the findings, the total number of observations used in a class is ten (10) students. the students' academic performance based on the number of times they attended lectures shows that those who attended lectures up to 90 to 100% have the maximum score of 92 and the highest pass mark. Therefore, Nigerian universities highly recommend attendance as criteria that enables students to pass and not cheat in the examination hall. The information processed from the monitoring enables University management to advise the students and the university management at large.

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Table 5: The Total Analysis

GROUPS	Number of Failure	Number of Passed	Total number of observation	REM	MIN SCORE	MAX SCORE	MEAN - ATTENDANCE	MEAN-EXAMINATION
GROUP 1	3	0	10	FAIL	20	35	**10.77**	**17.43**
GROUP 2	0	4	10	PASS	44	53	**23.93**	**50.57**
GROUP 3	0	3	10	PASS	86	92	**27.9**	**73.77**

7. ACADEMIC PERFORMANCE AND RESULT

The study assessed the relationship between lecture attendance and examination performance. Here we compare students' lecture attendance with examination performance thus. When the lecture attendance of student 1 was compared with the examination performance, it shows that his academic performance was poor based on the fact that he attended lectures two times in a semester. When the lecture attendance of student 2 was compared with the examination performance, it shows that his academic performance was also poor because he did not attend lectures regularly. When the lecture attendance of student 3 was compared with examination performance, it shows that his academic performance was high based on the fact that he attended lectures regularly. These facts are automatically generated in the resulting system. The results showed that the web-based platform performed automatic real-time monitoring of students' attendance at lectures. The automated system was successfully applied to address the problem of attendance capturing and academic performance. The study was able to capture the number of lecture attendance and related the number of attendance to lectures and examination performance.

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8. CONCLUSION

Strict adherence and full implementation of the 75 % attendance by the NUC is highly recommended in the Nigerian Universities as criteria for students taking part in examinations. The result obtained will guide the University management in advising the students to be regular in attendance to classes to help boost their academic performance in their results. Therefore, there is a need to install digital cameras in Lecture Halls/Theaters. Compatible sensors should also be installed in the Offices of the Monitoring Units of the University to checkmate indolence, truancy and cheating on the system to promote productivity and excellence. Results generated from this system will showcase the true picture of the academic performance of Students involved in the system. With an electronic system that monitors the academic performance, both Students will sit up to their responsibilities squarely.

With the full implementation of the 75% NUC policy, the students will also sit up to their responsibilities.

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