

Chi-Square Analysis of the Relationship between Number of Hours of Study and Grades Attained

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Abstract

Grading and students' performance in Institutions is always affected by many seen and unseen factors. This study investigated the relationship of the number of hours of study in relation to the grades attained by students. It was a descriptive study and it adopted a survey research design by using the total number of NDII Statistics students. Data for the study was obtained by administering questionnaires to the respondents. The findings showed that the factors like hours of study, course interest and class difficulty were not a determining factor for students' academic performance. On the effect of study hour towards grades attained by the students the chi square value obtained was 14.111 at 8 degrees of freedom with a p value of 0.079 and the null hypothesis (H_0) is not rejected. The implication of this is that study hour has no significance relationship on the grade attained by the ND2 statistics full time student based on the evidence from the data collected. Finally student should spend quality time on studying with a clear objective, and should be mentored on how to study to help enhance academic performance.

Key words: Chi-Square Analysis, Hours of Study, Grades, Performance

Introduction

In some countries of the world, all grades from all the courses in current classes are averaged to create a grade point average for the marking period in consideration. The GPA is calculated by taking the number of grade points a student attained in a given period of time of middle school through high school. Grade point averages are also calculated for undergraduate and postgraduate students in most universities across the globe. This can be used by potential employers or educational institutions to assess and compare applicants from various institutions. A cumulative grade point average is the average of all total earned points of student divided by the possible amount of points scored. Grade point averages can be unweighted meaning where all classes with the same number of credits have equal influence on the GPA or could be weighted meaning where some classes are given more influence than others. The quantity of time put in to studying is a key component of time management, however, it doesn't equate to quality of studying; and so correlating the number of hours studying to academic performance has depicted mixed results. Despite a large number of researches investigating the ways in which humans can easily retain information, it appears that only a hand full of students use study skills that are beneficial to their cognitive learning or that aid their long-term recall of knowledge acquired. The report of the analysis carried out on study time and academic performance by Dickinson and O'Connell in 2003 shows only a weak correlation between total study time and academic performance but a strong correlation between time spent on gathering information and grades.

Their study supported the theory that it may not be how long student study that matters, but the way and manner in which such student study the given subject. If students are taught how to study it may be more advantageous to them rather than just telling them to study for longer hours (Williams, 2002). Perlmann and McCann (2002) stated in their study that beyond study time that may influence academic performance, there are several other extraneous factors that may influence student performance which may include; quiet studying environment, quality of lecture notes, stressful life events, motivation towards school, etc. Many lecturers, tutors, educators would probably be in support that the more a student or pupil spend time in preparation for an aptitude test or exam will amount for an equivalent or commensurate pass grade for the student. Conflicting outcomes and results have however been shown in past



studies regarding the relationship between academic performance and study time. The study done by Eikeland and Manger (2004) for the first semester academic performance of Norwegian University students showed that increasing study time did not have any improvements on students' performance. Okpala et. al. (2000) made use of production–function statistical model to predict the outcome of course grades in a Macroeconomics course and discover that study time did not significantly affect the academic performance. Majority of students in schools and colleges nowadays don't have time to study hard to boost their academic performance. However, this desire has not been met by some students. Consequently, the study situation of some student has remained unstable due to the management of time and other factors affecting them. The main objective of this study is to examine the relationship between number of hours of study and grades attained and to determine the relationship between student level of study and grade attained. In addition, to determine what extent does class difficulty affect student grade and to determine how course interest affect the grade attained. A research question in this study refers to set of statements put forward in order to generate a response and provide answer to a perceived knowledge gaps within a particular subject area or field of study (Asika, 2004). For the purpose of providing answer to the gaps identify in this study, the following questions are raised: How does study hour influence student grade? How does class difficulties affect student grade? Does course interest affect the grade attained? This research study will focus on the relationship between number of hours of study and grades attained. For the purpose of data collection, the students of ND 2 statistics, Yaba College of Technology, Lagos, Nigeria were the respondent for the study. Specifically, the survey was conducted at the premises of the college in the department and question raised are to provide answer and facts addressing issues which this research study seeks to provide answers to.

Background Study

Attitude could be defined as the erudite propensity of a person to act in response positively or negatively to an object, situation, a notion, or a person. It is also regarded as a belief held by either individuals or different people that reflects their own personal opinions and feelings and could be manifested in their behaviour (Joseph, 2013). Giordon(2008) wrote about learning as an individual deliberate action which confronts the learners with the risk of going to an unknown place in the end. For several instructors or teachers, a serious and good student is the one who is eager to learn, study and has great and positive attitudes towards leaning. It is believed that having learning expectation or determination at a low level will definitely reduce the motivation and commensurately the success. In a study done by Burke and Williams (2008), it was discovered that the students who were much better encouraged and inspired for learning, both get more successful and be liable towards the critical thinking skills (Burke and Williams, 2008). It is also known that a positive belief of most students towards obtaining deep knowledge becomes their backbone of efforts to develop interest on the subject or course of study (Kara, 2010). Positive attitude towards learning is paramount for a successful approach to course difficulties.

Effect of Social media on Grade

Nowadays, it is critical to determine the impact of social media on the student grade performance. Technology development in recent years has continuously evolved rapidly from year to year all over the world, and the younger generations are the ones caught in this hasty and drastic change. Junco al et. (2010) stated in their study that the growing aspect of the use of any social media among the youth of nowadays cannot be over emphasized. Over the years, social networking among university students has become famous. It provides a way to make connection not only on campus, but with friends and loved ones outside of school. Jocabesen and Forste (2011), in their study of first year university students in United States, found a negative relationship between the use of various media and reported GPA.

Parental factors affecting academic performance

According to Khanet. al. (2015) parents with higher level of education show much interest in the academic performance of their children. They observed that there is a positive significant relationship between the level of parents' education and students' academic performance. Parents with higher level of education serve as a motivation for their children to work hard in order to achieve their academic goals. For example, parents can influence children's high academic expectations of student by providing resources that facilitate their mental health. (Fan and Williams, 2010). Parental participation and support can promote motivational resources and enable children to cope with academic failure (Raftery et. al. 2015).

Methodology

Design of the study

The design of the study used is the cross-sectional design. The population for this study comprises of students of ND 2 Statistics, School of Science, Yaba College of Technology, Lagos, Nigeria. The estimated population of the class is 84 students. A sample size is defined as a set of data collected or obtained from a given population by a already defined procedure. For this study, a total sample of 84 students of ND 2 statistics, Yaba College of Technology was selected using complete enumeration method. For the purpose of this study, questionnaire was adopted. The reason for employing questionnaire relate to its simplicity to use and appropriateness for this present study. The data was individually coded and entered into the computer using IBM SPSS (statistical package for social science). The data was analyzed using chi-square analysis.

Chi-square (χ^2) Test of Association

There is a measure of discrepancy existing between the observed and the expected values of variables. Chi-square is majorly used for two purposes. First, it treats the null hypothesis that the data result from a specific random variable or distribution is known as the test of goodness of fit. Secondly, it test for independence of two variables or factors at different levels as categorized in the contingency table. Here, it estimates the degree to which the null hypothesis of independence is reflected in the distribution of data into categories to contingency table based on the two variables. Chi-square will be used for test of association between variables.

$$\chi^2 = \sum_{i=1}^n \frac{(O_i - E_i)^2}{E_i}$$

Where: O_i Are the observed values, E_i Are the expected values, $E = \text{Row Total} * \text{Column Total}$

Data Analysis and Presentation

Descriptive statistics

Table 1: Demographic characteristics

Characteristics	Category	Frequency	Percentage (%)
Gender	Male	54	64.3
	Female	30	35.7
	Total	84	100
Age(in years)	<20	14	16.7
	20 – 24	44	52.4
	25 – 29	5	6.0
	30 – 34	20	23.8
	35 Above	1	1.2
	Total	84	100
Relationship status	Single	66	78.6
	Engaged	13	15.5
	Married	5	6.0
	Total	84	100
Religion	Christianity	54	64.3
	Islam	25	29.8
	Traditional	5	6.0
	Total	84	100
Current CGPA	<2.00	7	8.3
	2.00 – 2.49	24	28.6
	2.50 – 2.99	3	3.6
	3.00 – 3.49	45	53.6
	3.50 – 4.00	5	6.0

	Total	84	100
Place of residence	School Hostel	25	28.8
	Quarters	11	13.1
	Off- campus	22	26.2
	Home	20	23.8
	Others	6	7.1
	Total	84	100
Secondary school attended	Private	51	60.7
	Public	33	39.3
	Total	84	100.0

Table 1 shows that there are 64.3% male respondents and 35.7% female respondents from the data obtained. The table also shows that 16.7% are less than 20 years, 52.4% of the respondents are 20 – 24 years, 6.0% of the respondents are 25 – 29 years, 23.8% of the respondents are 30 – 34 years and 1.2% of the respondents are 35 years above. The table also shows that 78.6 % of the respondents are single, 15.5% of the respondents are engaged and 6.0% of the respondents are married. The table also illustrates that 64.3% are of the respondents are Christians, 29.8% of the respondents are Muslim and 6.0% are traditional worshippers. This table also shows that 8.3% of the respondents has CGPA of less than 2.00, 28.6% of the respondent has 2.00 – 2.49, 3.6% of the respondent has 2.50 – 2.99, 53.6% of the respondents has 3.00 – 3.49 and 6.0% of the respondents has 3.50 – 4.00. The table shows that 28.8% of the respondents reside at school hostel, 13.1% of the respondents reside at School quarters, 26.2% of the respondents resides off-campus. 23.8% of the respondents reside at home and 7.1% of the respondents reside at other places. Finally 60.7% of the respondent attended private school while 39.3% of the respondent attended public school

Table 2: Student activities, difficulties and performance

Student responses on	Category	Frequency (84)	Percent (%)
Performance in previous secondary	Excellent	28	33.3
	Very Good	25	29.8
	Good	24	28.6
	Fair	6	7.1
	Poor	1	1.2
Choice of Department	Self-choice	40	47.6
	Parent recommendation	9	10.7
	University selection	12	14.3
	Peer Pressure	9	10.7
	Change of course	14	16.7
Absence from school	Never	42	50.0
	Once a week	25	29.8
	More than twice a week	12	14.3
	Twice a week	5	6.0
Time to study at place of residence	I don't find time	16	19.0
	About an hour	34	40.5
	About two hours	18	21.4
	About three hours	16	19.0
Health issues in a semester	Never	16	19.0
	Rarely	38	45.2
	Often	17	20.2
	Always	13	15.5
Average hours of Study in	1 – 3 Hours	59	70.2

a week	4 – 6 Hours	19	22.6
	More than 9 Hours	6	7.1

Table 2 shows that 33.3% of the respondents are excellent in their performance in previous school, 29.8% of the respondents are very good, 28.6% of the respondents are good, 7.1% of the respondents are fair and 1.2% of the respondents are poor in performance. The table also shows that 47.6% choice of department were self-chosen, 10.7% of the respondents were parents recommendation, 14.3% of the respondents are based on university selection, 10.7% of the respondents are influence of peer pressure and 16.7% of the respondents changed their courses . This table also shows that 50.0% of the respondent were never absent from school, 29.8% of respondents were absent once a week, 14.3% of the respondent were absent more than twice a week and 6.0% of the respondents were absent twice a week. The table also shows that 19.0% of the respondents do not have time to study at the place of residence, 40.5% of the respondents spend about an hour, 21.4% spend about two hours and 19.0% spend about three hours to study at place of residence. This table also shows that 19.0% of the respondents never had health issues in a semester, 45.2% of the respondents rarely had health issues in a semester, 20.2% of the respondent often had health issues and 15.5% of the respondents always had health issues. The table shows that 70.2% of the respondents study an average of 1 – 3 hours in a week, 22.6% of the respondent study 4 -6 hours and 7.1% of the respondents study more than 9 Hours averagely in a week. The table shows that 26.2% of the respondents were never late for lectures, 44.0% of the respondents were late once a week, 20.2% of the respondents were late about twice in a week and 9.5% were late almost every day. The table also shows that 26.2% of the respondents were extremely interested in course of study, 22.6% were very interested, 23.8% were somewhat interested, 21.4% were not so interested and 6.0 % of the respondents were not interested in the course of study. Finally the table illustrates that 46.4% of the respondents spend 1 – 3 hours on social networking, 40.5% of the respondents spend 4 – 6 hours and 13.1% of the respondents spend more hours on social networking

Table 3 Students' academic challenges

Proposition	Strongly Disagree (%)	Disagree (%)	Undecided	Agree (%)	Strongly Disagree (%)
I know how to properly manage my time to produce good results	9 (10.7)	11(13.1)	13(15.5)	38(45.2)	13(15.5)
Moving with people that influence academic performance	5(6.0)	9(10.7)	14(16.7)	41 (48.8)	15(17.9)
Hard work for good grade	9 (10.7)	17(20.2)	3(3.6)	35(41.7)	20(23.8)
Does class difficulty affect your grade?	11(13.1)	21(25.0)	9 (10.7)	20 (23.8)	23 (27.4)

Table 3 shows that 10.7 % of the respondents strongly agree that they manage their time to produce good results, 13.1% of the respondents disagree, 15.5% are not certain, 45.2% of the respondents agree and 15.5% of the respondents disagree. The table also shows that 6.0% of the respondents agree they move with people that influence their academic performance, 10.7% of the respondents disagrees, 16.7% of the respondents are uncertain, 48.8% of the respondents agree and 15.5 % of the respondent strongly disagree that they move with people that influence their academic performance.

Hypothesis Testing

H₀: There is no significant relationship between study hours and grade attained.

H₁: H₁: There is a significant relationship between study hour and student grade

Table 4: Cross tabulation of study hours and grade attained

		Current CGPA				
		<2.00	2.00 - 2.49	2.50-2.99	3.00 -3.49	3.50-4.00
Average Hours of study in a week	1- 3 Hours	3(42.9%)	21 (87.5%)	3(100.0%)	28(62.2%)	4(80.0%)
	4- 6 Hours	4(57.1%)	3(12.5%)	0(0.0%)	12(26.7%)	0(0.0%)
	More than 9 Hours	0(0.0%)	0(0.0%)	0(0.0%)	5(11.1%)	1(20.0%)
Total		7(100.0%)	24(100.0%)	3(100.0%)	45(100.0%)	5(100.0%)
$X^2 = 14.111, df = 8, P = .079$						

On the effect of study hour towards grades attained by the student the chi square value of obtained was 14.111 at 8 degrees of freedom with a p value of 0.079. The null hypothesis (H_0) is therefore not rejected. The implication of this is that study hour has no significance relationship on the grade attained by the ND2 statistics student full time based on the evidence from the data collected

Hypothesis Two

H_0 : there is no significant extent to how class difficulty affect student grade

H_1 : there a significant extent to how class difficulty affect student grade

Table 5: Cross tabulation of Class difficulty and grade attained

		Current CGPA				
		<2.00	2.00-2.49	2.50-2.99	3.00-3.49	3.50-4.00
Does class difficulty affect your grade?	Strongly Disagree	1(14.3%)	0(0.0%)	1(33.3%)	9(20.0%)	0(0.0%)
	Disagree	0(0.0%)	5(20.8%)	1(33.3%)	13(28.9%)	2(40.0%)
	Undecided	0(0.0%)	2(8.3%)	0(0.0%)	5(11.1%)	2(40.0%)
	Agree	1(14.3%)	7(29.2%)	0(0.0%)	11(24.4%)	1(20.0%)
	Strongly Agree	5(71.4%)	10(41.7%)	1(33.3%)	7(15.6%)	0(0.0%)
Total		7(100.0%)	24(100.0%)	3(100.0%)	45(100.0%)	5(100.0%)
$X^2 = 26.075, df = 16 P = .053$						

On the effect of class difficulty towards grades attained by the student (Table 5) the chi square value of obtained was 26.075 at 16 degrees of freedom with a p value of 0.053. The null hypothesis (H_0) is therefore not rejected. The

implication of this is that there is no significance relationship on class difficulty and grades obtained by the ND2 statistics student full time based on the evidence from the data collected.

Conclusion

Based on the data analysis above, it was observed that there are more male students than female students. It was also observed that 40.5% of the respondents attest that they spend about an hour studying at their place of residence. From the analysis, it was observed that 70.2% spend 1 to 3 hours averagely in a week.

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