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EFFECT OF EFFECTIVE READING ON STUDENTS' ACADEMIC PERFORMANCE IN TERTIARY INSTITUTION: A CASE STUDY OF COMPUTER SCIENCE DEPARTMENT FEDERAL POLYTECHNIC, EKOWE BAYELSA STATE, NIGERIA

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ABSTRACT: *Academic performance is the measurement of students' achievement across various academic subjects. Teachers and perhaps educationists measure academic achievements using classroom performance, graduation grades and results from standardized tests. In this paper, we carried out some statistical analysis to determine if the Grade Point Average (GPA) of students' academic performance in Computer Science department 2020/2021 National Diploma (ND) one academic session, do depend on the number of hours students spend over the weekends reading their books using simple linear regression analysis and correlation analysis at 5 percent level of significance. The findings of the study shows that there is a linear relationship between the two variables y(GPA) and the number of x(hours) the students spent reading for their examinations, and it also indicates a strong significant difference on the effect of effective reading of students' academic performance in tertiary institutions.*

KEYWORDS: Academic performance, Correlation, Effective reading, Grade Point Average, Simple linear regression.

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INTRODUCTION

Academic reading should not be seen as a passive activity but an active process that leads to the development of learning. Reading for learning requires a conscious effort to make links, understand opinions, research and apply what you learn to your studies (Liu, 2005; Ghulam, 2013). Reading is an essential process that helps the conception of ideas and knowledge in one's field of specialization (Chand, 2013; Ahmad et al., 2014; Egong, 2014). One of the goals of effective reading is to gain factual information for practical use (Palani, 2012). When we read while studying an academic course, our principal goal will be to gather information in order to answer an assignment question or gain further information on a subject for an examination or other type of assessment (Deavers, 2000; Issa et al., 2012; Chettri and Rout, 2013).

Reading is not just an important professional skill; it is also a way to enjoy informative, creative and inspiring works of literature that enrich our life experiences (Liu, 2005). Reading requires a lot of concentration, and success in a tertiary institution depends on one's reading ability; that is why reading represents the students' studying time and it is therefore expected of all students to improve on their reading capacity or ability to ensure a better academic performance (Ogbodo, 2010).

The purpose of this paper is to carry out some statistical analysis to determine if the Grade Point Average (GPA) of students' academic performance in the 2020/2021 National Diploma (ND) One academic session of the Computer Science Department do depend on the number of hours students spend over the weekends reading their books using simple linear regression analysis and correlation analysis at five percent level of significance. The rest of this paper is organized as follows: section 2 is centered on the review of related literature; section 3 discusses the materials and methods of the study, section 4 deals with data presentation and analysis, and section 5 concludes the paper.

RELATED WORK

Sweet et al. (1998) carried out a research on a sample of 68 teachers from randomly selected elementary schools that were representatives of county characteristics rated 374 students on 6 aspects of motivation for reading, including individual topical, activity-based, autonomy-supported, socially-supported, and writing-related aspects. Quantitative and qualitative results showed that teachers perceived higher achievers to be relatively higher in intrinsic reading motivation (individual and topical) than in extrinsic reading motivation (activity-based and autonomy-supported). In contrast, teachers perceived lower achievers to be relatively more motivated by extrinsic contextual factors than by intrinsic factors. Teachers appear to possess implicit theories that are in accord with the self-determination perspective on the development of motivation and reading achievement.

Saumell et al. (1999) worked on the study that examined a broad spectrum of college students' understanding of reading to determine whether a distinct difference exists in the understanding between "underprepared" or "at-risk" students and other college students. The 102 college students fell into three categories: students enrolled in a community college skills-based reading course, students enrolled in a university strategy-based reading class, and successful

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upper division university students. Students responded in writing to two questions about reading, and their responses were analyzed using a qualitative approach. Students of lower ability characterized good readers as those who read quickly and often, and they characterized the reading process as a passive activity.

Scales and Rhee (2001) presented an analysis of 115 adult responses to a questionnaire about their reading habits and patterns. Specifically, it was hypothesized that when grouped with demographic variables, participants' responses about their reading habits and patterns would not differ. The t-test and chi-square analyses were used to test significance of differences between them. Differences were found between the groups for reading habits and for reading patterns. Pearson r values were calculated to determine relationships between participants' reading habits and patterns, both positive and negative relationships were found. Additionally, through multiple regression analysis, it was determined that gender race and education were predictors for participants' education and race were predictors for reading patterns.

Smith's (2010) study explained that 84 adults were employed in a wide variety of occupations and participating in a study of reading skills development, completed questionnaires concerning their reading attitudes, reading habits, and perceptions about reading. Both adults with more education and adults employed in higher status occupations were found to have more positive attitudes toward reading and to spend more time reading. Adults with more education employ more sophisticated models of reading in considering how good and poor readers differ.

Tveit (2012) investigated the study of reading and library habits among teenagers in Oslo, Norway using qualitative interviews with four girls demonstrating individual variations in their library tastes and in the roles of reading they take on. The survey gives an overview of teenagers' library use and their literature preferences, and detects that girls and boys differ in preferences of reading media. The survey showed different patterns in reading frequency and reading materials in the sense that students from the schools with the closest connection to the public library read more, as well as in a broader range of reading materials than students from schools with no such connection.

Huang et al. (2014) employed a study with a convergent mixed method research design which investigates the reading habits of American college students. A total of 1,265 (466 male and 799 female) college students voluntarily participated in the study by completing a self-reported survey. Twelve students participated in the semi-structured interviews and classroom observations. Descriptive analysis indicated that the hours students spent weekly on academic reading, extracurricular reading, and the internet were 7.72 hours, 4.24 hours, and 8.95 hours respectively. Multiple linear regression and a zero-order correlation statistical analysis indicated the internet and socializing with others were significant factors that college students devoted to conventional academic and extracurricular reading.

Sodipo et al. (2015) carried out a study of students' academic performance at the University of Ibadan. It was discovered that a certain number of students who were admitted into the university, for the attainment of first degree, were unable to meet the requirements to be able to graduate at recorded time. A situation where some students have to study longer than the required four-years is undesirable and should be checked. It was observed from the findings of the tests carried out that not all the factors have significant effects on the academic performance of the students of the university.

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Baba and Affendi (2020) carried out a study of reading habits and attitudes of students in the Faculty of Education in Universiti Teknologi Mara and collected relevant data; a questionnaire investigated the students' reading habit preferences, and attitudes towards reading. The research findings through quantitative analysis revealed that the students had an overall positive attitude towards academic and leisure reading as they read academically and leisurely daily or at least once a week. Apart from that, digital materials are considered better compared to printed texts when it comes to the students' preference and its availability. Based on the findings, several recommendations were made to help improve students' reading habits and attitude.

Duncan and Freeman (2020) presented the results of a national survey into whether, what, how, and why adults across Britain may read aloud rather than in silence. Analyzing data from 529 questionnaire responses, the article examines the frequency with which different text types are read aloud, the formations in which this is done-alone, with one other person or in a group and the purpose of reading aloud and being read to, with attention to different purposes across contexts and life domains, and that it has a significant relationship with aspects of the life course and with identity formation and performance.

Kaur et al. (2022) researched on a study which its goal was to determine the perceived influence of reading attitude, perceived behavioral control, and subjective well-being among youths aged 15 to 24 in East and West Malaysia and the findings revealed that reading attitude and subjective norms positively and significantly influenced reading habits, although perceived behavioral control has a detrimental effect.

MATERIALS AND METHODS

The following basic materials or analytical tools used for this research which enables us achieve the purpose of our research are:

Research Design and Sample Population

The source of data for this study is the primary data collected through the use of questionnaires administered on the students of the Computer Science department, Federal Polytechnic, Ekowe Bayelsa State, Nigeria. In this study, 120 respondents were randomly selected amongst national diploma students of the Computer Science department 2020/2021 academic session.

Methods of Data Analysis

The methods of data analysis used for this study are the simple linear regression analysis and correlation analysis using Minitab software 16.0 version.

Simple Linear Regression Analysis

Simple linear regression analysis is a model that describes the relationship between a single dependent variable y and one independent variable x using a straight line. In simple linear regression, the model describing the relationship between x and y can be expressed as

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$$y_i = \beta_0 + \beta_1 x_i + \varepsilon_i \quad (3.1)$$

For $i = 1,2,\ldots,n$ where there are n observations on both x_i and y_i, $\epsilon_i$is an independently and normally distributed random error term with mean 0 and constant variance σ^2, β_0 and β_1 are the two parameters.

Correlation Analysis

Correlation analysis is a statistical method used to measure the strength of the linear relationship between two variables and compute their associations. A high correlation points to the fact that there is a strong relationship between the two variables, while a low correlation means that the variables are weakly related. There is a positive correlation between two variables when an increase in one variable leads to the increase in the other variable. On the other hand, a negative correlation signifies that when one variable increases, the other decreases and vice-versa.

Research Hypotheses

In order to achieve the goal of this study, the following hypotheses are to be tested:

H_0: There is no significant difference on the effect of effective reading on students' academic performance in tertiary institutions.

H_1: There is a significant difference in the effect of effective reading on students' academic performance in tertiary institutions.

DATA PRESENTATION AND ANALYSIS

The data presented below is a sample of results generated via questionnaire from Computer Science students of the Federal Polytechnic, Ekowe Bayelsa State, Nigeria and its data analysis using simple linear regression and correlation analysis.

Data Presentation

Table 4.1: Sample results of 2020/2021 ND 1 Computer Science department students GPA and the number of hours they spent reading their books over the weekends.

S/No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
X(HRS)	22	20	30	16	32	36	15	20	25	28	17	21	30	26	29
Y(GPA)	3.20	3.15	3.25	2.25	3.60	3.85	2.40	2.95	3.00	3.10	2.75	2.60	3.15	3.12	3.72
S/No.	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
X(HRS)	21	19	24	32	23	20	22	25	18	31	17	14	21	23	31
Y(GPA)	2.86	2.46	3.05	3.54	3.23	2.87	3.05	3.35	3.10	3.55	2.43	2.47	2.68	3.16	3.36

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Data Analysis

Considering the data in Table 4.1, we will carry out a data analysis beginning with simple linear regression and correlation analysis using Minitab Statistical software 16.0 version.

Simple Linear Regression Analysis

Regression Analysis: y(GPA) versus x(hours)

The regression equation is

y(GPA) = 1.66 + 0.0588 x(hours)

Predictor	Coef	SE Coef	T	P
Constant	1.6634	0.1534	10.84	0.000
x(hours)	0.058827	0.006320	9.31	0.000

S = 0.197158 R-Sq = 75.6% R-Sq(adj) = 74.7%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	1	3.3678	3.3678	86.64	0.000
Residual Error	28	1.0884	0.0389		
Total	29	4.4562			

Using the above Minitab output, the simple linear regression model or equation is $y(GPA) = 1.66 + 0.588x(hours)$ where $y(GPA)$ is an estimate of the mean value of the response variable for any value of the predictor variable. The first parameter $\beta_0 = 1.66$ in the above model is the y-intercept which predicts value for the response y when $x = 0$, while the second parameter $\beta_1 = 0.588$ is the slope which describes the change in y for each one unit change in x, x(hours) is the predictor variable.

From the analysis of variance table, the regression degree of freedom is $k = 1$, residual degree of freedom is $n - k - 1 = 30 - 1 - 1 = 28$, while the total degree of freedom is $n - 1 = 29$. The sum of squares regression $(SSR) = 3.3678$ is the variability explained by the regression line. The sum of squares error $(SSE) = 1.0884$ is the variability which cannot be explained by the regression line, while the sum of squares total $(SST) = 4.4562$ is the squared differences between the observed dependent variable and its mean.

The mean square due to regression (MSR) is computed by dividing SSR by its degree of freedom, i.e. $MSR = \frac{SSR}{K} = \frac{3.3678}{1} = 3.3678$, while the mean squared error (MSE) tells us how close a regression line is to a set of points, it is computed by dividing $\frac{SSE}{n-k-1} = \frac{1.0884}{28} = 0.0389$, and the lower the MSE, the better the forecast. Apparently, the mean squared error is used in finding the average of a set of errors.

The F-Ratio is the ratio of two variances, or two mean squares namely $\frac{MSR}{MSE} = \frac{3.3678}{0.0389} = 86.64$

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Decision rule:

Reject H_0 if F_{cal} or test statistic value $>$ F_{tab} or critical value, where $F_{tab} = F_{1-\alpha};\ k,\ n-k-1 = F_{1-0.05\ ;1,28} = F_{0.95\ ;1,28} = 4.20,\quad F_{cal} = 86.64$

Since the test statistic value $= 86.64 >$ critical value$= 4.20;$ we reject H_0 and conclude that there is a significant difference in the effect of effective reading on students' academic performance in tertiary institutions.

Correlations: x(hours), y(GPA)

Pearson correlation of x(hours) and y(GPA) = 0.869

P-Value = 0.000

The output indicates that R^2 the coefficient of determination $= \frac{SSR}{SST} = \frac{SST-SSE}{SST} = 1 - \frac{SSE}{SST} = 0.756 = 75.6\%$ ranges from 0 to 1, i.e. $0 \leq R^2 \leq 1$. Since R^2 is closer to one is an indication that our model has more explanatory power. The linear correlation coefficient and the coefficient of determination are related mathematically as $r^2 = R^2$ which implies that $r = \pm\sqrt{R^2} = +\sqrt{0.756} = 0.869$ which is a measure of the strength and direction of a linear relationship between the two variables $y(GPA)$ and the number of $x(hours)$ the students spent reading for their examinations. r always assumes the same values as β_1, its range is $-1 \leq r \leq 1$.

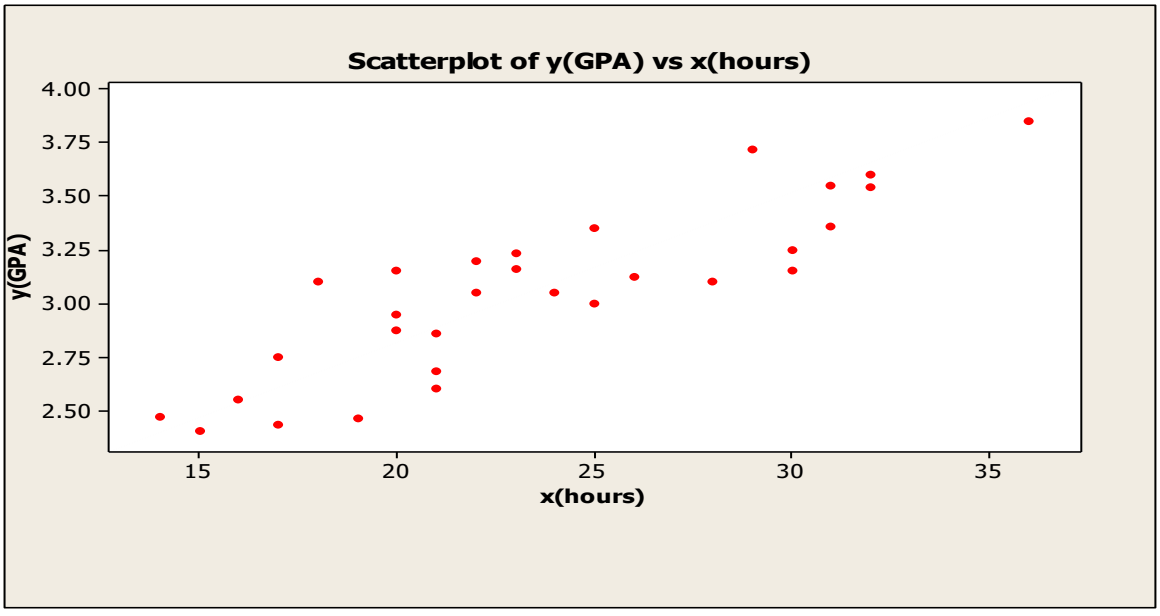

Figure 1: Scatterplot of $y(GPA)$ versus $x(hours)$.

The above scatter plot diagram shows that there is a strong linear relationship between $y(GPA)$ of students and the time they spent reading for their examination as $r = 0.869$.

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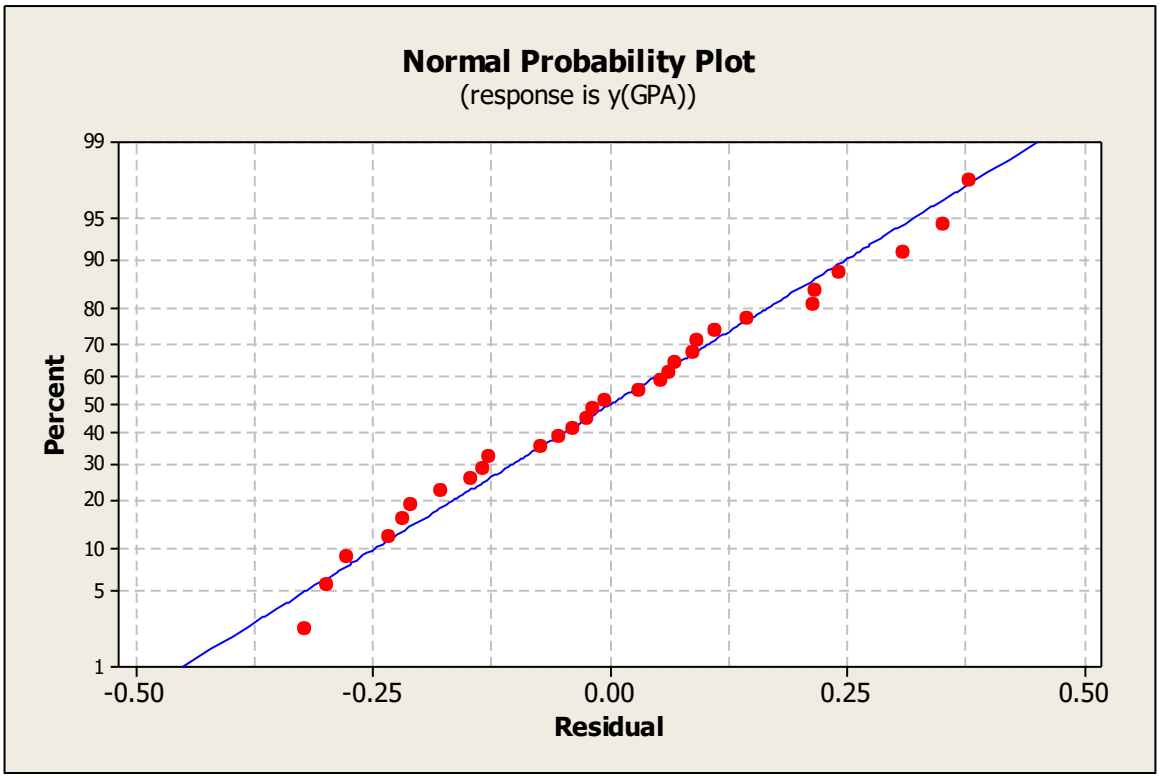

Figure 2: A normal probability plot.

The above normal probability plot allows us to see that the errors are normally distributed indicating that the residuals follow a straight-line pattern, sloping upwards.

CONCLUSION

The findings of the study show that there is a strong linear relationship between the two variables y (GPA) and the number of x (hours) the students spent reading for their examinations as the measure of strength and direction r is 0.869 as its range is $-1 \leq r \leq 1$. It is also observed that there is a significant difference on the effect of effective reading on students' academic performance in tertiary institutions, pointing out that the number of hours the students spent reading for their examinations has an effective effect on their respective GPA in that academic session.

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REFERENCES

Ahmad, H. I., Malik, K. and Azeem, M. (2014). A study of habit and computer technology effect on students in Pakistan. Journal of Education and Literature, 1(1), 9-19.

Baba, J. and Affendi, F. R. (2020). Reading habit and students' attitudes towards reading: A study of students in the faculty of Education Universiti Techno;ogi Mara, Puncak Alam. Asian Journal of University of Education, 16(1): DOI:10.24191/ajue.v16:1.8988

Chand, S. (2013). Study habits of secondary school students in relation to type of schools and type of family. International Journal of Social Science and Interdisciplinary Research, 2(7), 90-96.

Chettri, M. K. and Rout, S. K. (2013). Reading habits-an overview. International Organization of Scientific Research Journal of Humanity and Social Science, 14(6), 13-17.

Deavers, R. (2000). The effect of instruction on early non-word reading strategies. Journal of Research in Reading, 23(1), 267-286.

Duncan, S. and Freeman, M. (2020). Adults reading aloud: A survey of contemporary practices in Britain. British Journal of Educational Studies, 68(1), 97-123.

Egong, A. I. (2014). Reading culture and academic achievement among secondary school students. Journal of Education and Practice, 5(3), 132-136.

Ghulam, M. (2013). Study behavior, study habits, achievements, and motivations of university students and study advisory services. Literacy Information and Computer Education Journal, 4(1), 908-915.

Huang, H., Capps, M., Blacklock, J. and Garza, M. (2014). Reading habits of college students in the United States. Reading Psychology, 35(5), 437-467. https://doi.org/10.1080/02702711.2012.739593

Issa, A. O., Aliyu, M. B., Akangbe, R. B. and Adedeji, A. F. (2012). Reading interest and habits of the Federal polytechnic students. International Journal of Learning and Development, 2(1), 471-482.

Kaur, H., Rasiah, R., Baharom, A. H., Habibullah, M. S., Turner, J. J. and Awang-Marikan, D. A. (2022). The impact of reading habits and their antecedents on the subjective well- being of Malaysian youths. Eurasian Journal of Educational Research, 97, 344-361. DOI:10.14689/ejer.2022.97.19

Liu, Z. (2005). Reading behavior in the digital environment: Changes in reading behavior over the past 10 years. Journal of Documentation, 61(6), 700-712.

Ogbodo, R. O. (2010). Effective study habits in educational sector: Counseling implications. Edo Journal of Counseling, 3(2), 1-11.

Polani, K. K. (2012). Promising reading habits and creating literate social. International Reference Research Journal, 3(2), 91-101.

Saumell, L., Hughes, M. T. and Lopate, K. (1999). Underprepared college students' perceptions of reading: Are their perceptions different than other students? Journal of College Reading and Learning, 29(2), 123-135. https://doi.org/10.1080/10790195.1999.10850074

Scales, A. M. and Rhee, O. (2001). Adult reading habits and patterns. Reading Psychology, 22(3), 175-203. https://doi.org/10.1080/027027101753170610

Smith, M. C. (2010). Reading habits and attitudes of adults at different levels of education and occupation. Reading Research and Institution, 30(1), 50-58. https://doi.org/10.1080/19388079009558033

Article DOI: 10.52589/AJMSS-DIVSEGS5
DOI URL: https://doi.org/10.52589/AJMSS-DIVSEGS5

Sodipo, E. O., Sodipo, A. A. and Adepoju, K. A. (2015). Statistical analysis of students' academic performance in Nigeria Universities: A case study of the University of Ibadan, Nigeria. International Journal of Recent Advances in Multidisciplinary Research, 2(2): 187-192.

Sweet, A. P., Guthrie, J. T. and Ng, M. M. (1998). Teacher perceptions and student reading motivation. Journal of Educational Psychology, 90(2), 210-223. https://doi.org/10.1037/0022-0663.90.2.210

Tveit, A. K. (2012). Reading habits and library use among young adults. New Review of Children Literature and Librarianship, 18(2), 85-104.

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APPENDIX

Questionnaire on the effect of effective reading on students' academic performance in tertiary institution; answer the following questions below as sincere as you can to enable appropriate statistical analysis by filling necessary blank spaces or by ticking where necessary.

Note: Any information given will be treated as confidential.

SECTION A: Personal Data

1. Name ……. (optional)
2. Sex: (a) Male [ ] (b) Female [ ]
3. Marital Status: (a) Single [ ] (b) married [ ] (c) divorced [ ]
4. Department or course of study ……..
5. Age (Optional) ……

SECTION B: Effect of Effective Reading on Students' Academic Performance in Tertiary Institution.

6. How many days do you go for lectures in a week? (a) Once [ ] (b) Twice [ ] (c) Thrice [ ] (d) More [ ]
7. How many hours on the average do you read over the weekend? (a) Two [ ] (b) Three [ ] (c) Four [ ] (d) More [ ]
8. How many lectures do you attend in a day? (a) Two [ ] (b) Three [ ] (c) Four [ ] (d) More [ ]
9. How many of the following grades did you have in the average last semester? (a) A's [ ] (b) AB's [ ] (c) B's [ ] (d) BC's [ ] (e) C's and below [ ]
10. How many courses did you offer in ND 1 first semester? (a) Six [ ] (b) Seven [ ] (c) Eight [ ] (d) Nine and above [ ]
11. How often do you study? (a) regularly [ ] (b) occasionally [ ]
12. Can you attribute your academic performance to the effect of your effective reading? (a)Yes [ ] (b) No [ ]
13. How has your effective reading contributed to your G.P.A? (a) Increasing [ ] (b) decreasing [ ] (c) On the average [ ]
14. What was your grade point average in your ND 1 first semester? (a) less than 2.00 [ ] (b) 2.00 - 2.49 [ ] (c) 2.50 - 2.99 [ ] (d) 3.00 - 3.49 [ ] (e) 3.50 - 4.00 [ ]

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