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Gender differences in internet addiction and interest in mathematics among secondary school students in Obio-Akpor local government area of Rivers state

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Abstract
This study was conducted to ascertain gender differences in secondary school student's internet addiction, interest in mathematics and academic achievement in mathematics in Obio-Akpor Local Government Area (LGA) of Rivers State. Population of the study comprised all the senior secondary class two students (SSS 2) in the LGA. Sample for the study was made up of 180 students drawn through purposive and stratified random sampling technique. The sample composed 95 male and 85 female students. Two questionnaires were use for the study. They are Internet Addiction Test (IAT) developed by Young which contained 20 items. The other questionnaire used was the Mathematics Interest Inventory (MII) developed by the researchers. Academic achievement in mathematics was measured by SSS 2 mathematics scores. The reliability co-efficient for both the IAT and the MII were 0.78 and 0.71 respectively. Three research questions and three hypotheses were answered and tested using z test statistical analysis the results of the study were as follows: there was no significant difference between male and female students internet addiction among secondary school students in Obio-Akpor LGA of Rivers State. Also, there was no significant difference between male and female students interest in mathematics. There was also no significant difference between male and female students academic achievement in mathematics in Obio-Akpor LGA of Rivers State. Some recommendation were made among which was that teachers should adopt stepwise approach in teaching and evaluation of mathematics in schools.

Keywords: Internet addiction, interest in Mathematics, Gender differences, academic achievement

Introduction

In contemporary Nigeria, internet is becoming widely utilized for information dissemination, examinations and networking. Internet as a modern information and communication technology has succeeded in creating a global village by drawing people of the world closer to each other irrespective of the barrier crated by geographical location. Internet has therefore provided instant connectivity and global information services to all its users at a very low cost. (Eze, Okorafor and Obi 2013), Kahn and Cenf (1999) [7] stated that the internet is revolutionizing our society, economy and technological system. They stipulated that no one knows for certain how far or in what direction the internet will evolve.

According to Eze, Okorafor and Obi (2013) [4] internet is a global network of networks connecting millions of computers and computer users. Based on the afore stated definition internet involves connection of world computer networks with numerous computer users globally. Onukwufor and Amadioha (2019) [9] citing geole.com.saw internet as a global computer net work providing a variety of information and communication facilities, consisting of interconnected networks using standardized communication protocols. The definition highlights that internets are a global computer facilitated method of information dissemination among individuals organizations and government agencies.

Internet addiction refers to excessive indulgence in the use of internet facility for obtaining different types of information and information dissemination. According to Young (1998) [14], internet addiction consists of spending an in ordinate amount of time on the internet and inability to control online use. According to Kandelt as cited in Weiten, Lloyd, Dunn and Hammer (2009) [13]. People who exhibit excessive internet use syndrome tend to feel anxious, depressed or empty when they are not on line. The internet use of the addicts is so excessive that it interferes with their functioning at home, work or at school.

In a study conducted by Ha and Hwang (2014) [6] in Korea captioned Gender differences in internet addiction associated with psychological health indicators among adolescents using a national web survey it was found that internet addiction was higher among boys than girls. This means that boys spent significantly more time on the internet than did girls. Arbahisarjou Gorgich Barifroshan and Ghoreishinia (2016) in a study called the association of internet addiction with academic achievement, emotional intelligence and strategies to prevention of them from students perspective, there was a significant relationship between internet addiction and academic achievement with the gender of students.

Weiser (2000) found significant gender difference in internet usage. In another study on internet addiction, Dufour, Brunelle, Tremblay Lecterc, Cousineau and Khazaal (2016), found that boys spend significantly more time on internet than did girls. They further found that a greater number of the girls made intense use of social networks while a larger number of boys made greater use of massively multiplayer online role playing games, online games and adult sites. Akhter (2013) in his study also found gender difference in internet addiction. Male students had higher internet addiction than female ones.

Concerning interest in mathematics Mutai (2017) [8] found that boys had a strong affinity and interest towards mathematics than girls. According to Ganley and Lubienski (2016) [5] some gender differences, in Maths attitudes and skills during elementary school and ultimately boys are much more likely than girls to pursue careers in some key mathematics fields, such as engineering and computer science. In a study conducted by Samuelsson and Samuellsson (2016), they found significant difference between boys and girls in their ratings of individuals' interest in mathematics. Ganley and Lubienski (2016) [5] found that at both primary and secondary levels, boys and girls score similarly on many state tests. Ganley and Lubienski stated that in general gender differences in maths performance are small. This presupposes that the difference between male and female in mathematics is insignificant. In their own finding, Arhin and Offoe in (2015) [3] found that there was no bias among gender in mathematics performance, this also highlights similarity of difference between male and female students.

Statement of Problem

Internet addiction may have detrimental consequence on the addict. When a person devotes his time towards engagement in internet activities, it may seriously reduce the time such a person has for other activities such as academic engagement. A situation where a person does not devote time towards his academic endeavour, such a person may become an academic failure. Consequently such a person may become a school dropout. Gender differences in internet addiction enable us to realize the extent of male and female engagement in internet addiction. The knowledge helps to know the extent such unhealthy activity affect both genders in their various fields of endeavour, especially in mathematics.

Interest appears indispensable in any aspect of human learning. Unfortunately in a core subject like mathematics, many students do not show interest in it. Studies tend to suggest that lack of interest in mathematics tend to be more prevalent among girls than boys. This may explain why more boys than girls study courses that are mathematically oriented such as engineering, physics, and mathematics in all its ramifications. Since interest in a subject facilitates the learning of such a subject, it therefore presupposes that those who show interest in mathematics may perform better in it than those who would not like to pay attention to the teacher when he is teaching mathematics in the classroom. Some students may prefer to loiter about when the teacher is teaching. Lack of interest and attention may affect the academic achievement of such students in mathematic. The problem of this study therefore is to find out the gender differences in internet addiction, interest in mathematics and academic achievement among secondary school students in Obio-Akpor Local Government Area of Rivers State.

Research Questions

1. What is the difference between male and female secondary school students internet addiction in Obio-Akpor Local Government Area of Rivers State.
2. What is the difference between male and female secondary school students interest in mathematics in Obio-Akpor Local Government Area of Rivers State.
3. What is the difference between male and female secondary school students academic achievement in Mathematics in Obio-Akipor Local Government of Rivers State.

Hypotheses

1. There is no significant difference between male and female secondary school students internet addiction in Obio-Akpor Local Government Area of Rivers State.
2. There is no significant difference between male and female secondary school students interest in mathematics in Obio-Akpor Local Government Area of Rivers State.
3. There is no significant difference between male and female secondary school students academic achievement in mathematics in Obio-Akpor Local Government Area of Rivers State.

Methodology

The research design adopted for this study is descriptive survey. Population for the study comprised all the senior secondary school class two students (SSS 2) in Obio-Akpor Local Government Area (LGA) of Rivers State. Sample for the study was made up of 180 students drawn through purposive and stratified random sampling method from four secondary schools in the LGA. The sample comprised 95 male students and 85 female students. Two questionnaires were used for the study. They are; internet Addiction Test, IAT developed by Young (1998) [14], which has 20 items. The other instrument used was the mathematics Interest inventory (MII) developed by the researchers. The instrument comprised 12 items Academic achievement in mathematics was measured through the students SS 2 Mathematics scores which were standardized. The reliability co-efficient for both the IAT and the MII were 0.78 and 0.71 respectively. Three research questions were answered while three hypotheses were tested. In scoring the instruments, the internet addiction inventory was scored as follows. Not at all = 1, Rarely = 2, occasionally = 3, Often = 4 while Always = 5. Consequently the minimum score for the instrument was 20, while the maximum score was 100. The mathematics interest inventory was scored as follows: Strongly Agree = 4, Agree 3, Disagree = 2 and strongly disagree = 1.

Thus, the minimum score for MII was 12 where as the maximum score was 48 points.

z-statistical test was use to answer the research questions and to test the hypotheses.

Results

Research Question One

What is the difference between male and female secondary school students internet addiction in Obio-Akpor Local Government Area of Rivers State?

Hypothesis One

There is no significant difference between male and female secondary school students internet addiction in Obio-Akpor Local Government Area of Rivers State.

Table 1: Mean, standard deviation and z-test of male and female students on internet addiction

Respondents	N	$\bar{x}$	Sd	Df	z-cal	z-crit.	Remarks
Male	95	47.8842	13.67235	.178	.89	1.96	Null hypothesis is accepted
Female	85	45.8706	1636692				

Table 1: showed that male students have mean of 47.88 slightly above the female counterpart of 45.87. There fore male students have internet addiction slightly higher than their female counterparts. With a degree of freedom of 178, the calculated z-value of 0.89 is less than the critical table z-value of 1.96, therefore, the null hypothesis is accepted. By implication, there is no significant difference between male and female secondary school students internet addiction in Obio-Akpor Local Government Area of Rivers State.

Research Question Two

What is the difference between male and female secondary school students interest in mathematics in Obio-Akpor Local Government Area of Rivers State?

Hypothesis Two: There is no significant difference between male and female secondary school students interest in mathematics in Obio-Akpor Local Government area of Rivers State.

Table 2: Mean, standard deviation and z-test of male and female students on interest in mathematics

Respondents	N	$\bar{x}$	Sd	Df	z-cal	z-crit.	Remarks
Male	95	35.76	6.94	178	1.44	1.96	Null hypothesis is accepted
Female	85	34.13	8.19				

Table 2 showed that male students have mean of 35.78 slightly above the female counterparts of 34.13. There fore male students have interest in mathematics slightly above their female counterparts. With a degree of freedom of 178, the calculate z-value of 1.44 is less than the critical table z-value of 1.96, therefore, the null hypothesis is accepted. By implication, there is no significant difference between male and female secondary school students interest in mathematics in Obio-Akpor Local Government Area of Rivers State.

Research Question Three

What is the difference between male sand female secondary school students academic achievement in mathematics in Obio-Akpor Local Government Area of Rivers State?

Hypothesis Three

There is no significant difference between male and female secondary school students academic achievement in mathematics in Obio-Akpor Local Government Area of Rivers State.

Table 3: Mean, standard deviation and z-test of male and female students on academic achievement in mathematics

Respondents	N	$\bar{x}$	Sd	Df	z-cal	z-crit.	Remarks
Male	95	43.33	13.27	178	1.12	1.96	Null hypothesis is accepted
Female	85	41.19	12.35				

Table 3: showed that male students have mean of 43.33 slightly above the female counterparts of 41.19. There fore male students achieved in mathematics slightly above their female counterparts. With a degree of freedom of 178, the calculated z-value of 1.12 is less than the critical table z-value of 1.96, therefore, the null hypothesis is accepted. By implication, there is no significant difference between male and female secondary school student's academic achievement in mathematics in Obio-Akpor Local Government Area of Rivers State.

Summary of Results

1. There was no significant difference between male and female secondary school students' internet addiction in Obio-Akpor Local Government Area of Rivers State.
2. There was no significant difference between male and female secondary school students interest in mathematics in Obio-Akpor Local Government Area of Rivers State.
3. There as no significant difference between male and female secondary school students academic achievement in mathematics in Obio-Akpor Local Government Area of Rivers State.

Discussion

Difference between male and female students internet Addiction.

The findings for research question one and hypothesis one as contained in table 1 showed male internet addiction mean ($\bar{x}$) to be 47.8842, while female internet addiction mean was 45.8706. The male internet addiction mean is greater than the female addiction mean $\bar{x}$ by mean difference of 2.0136. However, when the mean difference was subjected to z statistical analysis at 178 Df and 1.96 level of significance, the z calculated of. 89 was less than the z critical value of 1.96. There fore there was no significant difference between male and female students internet addiction in Obio-Akpor LGA of Rivers State. Thus the mull hypothesis was accepted.

In terms of mean differences, the finding of this study was in consonance with the findings of Ha and Hwang (2014) [6] in Korea who found that internet addiction was higher among boys than girls.

In this present study the difference between male and, female students internet addiction was not statistically significant. The finding of this study does not agree with Weiser (2006) [12] who found significant gender difference in students internet addiction.

Gender differences in Students interest in mathematics

The findings for research question two and hypothesis two as contained in table 2 showed that male mean score on interest in maths was ($\bar{x}$) 35.76, while female students interest in mathematics mean score was ($\bar{x}$) = 34.13. Male students mean score interest in maths is higher than that of female students by mean difference of 1.63. When the mean difference was subjected to z statistical analysis at 178 Df and at 1.96 critical level. The z calculated was 1.44. The z calculated of 1.44 was found to be less than the z critical of 1.96. Thus the null hypothesis was accepted. Consequently, there is no significant difference between male and female

students interest in mathematics. However this finding appeared surprising to the researchers. The finding for this study is at variance with Mutai (2017) [8] who found that boys had a strong affinity and interest towards mathematic than girls. Also contrary to the present finding, Ganley and Lubienski (2016) [5] found gender differences in mathematics attitudes and skill during elementary school and ultimately boys are much more likely than girls to pursue carrier in some key mathematical fields such as engineering and computer science.

Gender differences in Mathematics Academic Achievement

The result for this research question three and hypothesis three as contained in table 3 showed male mathematics academic achievement score mean to be 43.33 while the female students' mathematics academic achievement mean score was 41.19. The male students' mathethmatics mean core is higher than that of female students. The mean difference is 2.14. When this difference was subjected to z-test statistical analysis at 178 Df and at critical level of 1.96; z calculated of 1.12 was less than z critical thus the null hypothesis was accepted. Consequently, there was no significant difference between male and females' students academic achievement in mathematics.

This result is in agreement with the findings of Ganley and Lubienski (2016) [5] who found that at both primary and secondary school levels boys and girls score similarly on many state tests. Ganley and Lubienski (2016) [5] further stated that in general, gender differences in mathematics performance are small. Still in consonance with the finding of this research, Arhin and Offoe (2015) [3] in their study found that there was no bias among male and female in mathematics performance this also highlight similarity of performance between male and female secondary school students in Mathematics. The absence of significant difference between male and female students performance in mathematics could be attributed to the encouragement being offered to the females that what ever male could do, female could as well do it". This encouragement tends to strengthen female students to confront mathematics as subject just like their male counter-parts without any fear of the subject as being difficult.

Conclusion

In this study, similarity in internet addiction between male and female students was found. This finding stems from gender parity in the awareness of internet usefulness in almost all aspects of human endeavour. The increased awareness of the importance of mathematics, in science and technological development has narrowed the difference between male and female students interest in mathematics. The tendency of many secondary school students to be scientifically inclined in consonant with the requirement of contemporary Nigeria has made male and female students to show almost equal interest in mathematics. This study did not find significant difference between male and female students academic achievement in mathematics. The academic achievement of male and female students was found to be almost the same. This close parity in performance between male and female students is attributable to the general encouragement females receive from the public that "What ever male can do, females could even do better" The females feels fortified by this statement to put in more effort.

Recommendations

Based on the findings of this research, the following recommendations were made:

1. Computer teachers should teach male and female students how to enhance their academic achievement through the use of internet especially mathematics.
2. Mathematics teachers should adopt stepwise approach in teaching and marking of mathematics so as to maximize academic achievement in mathematic.
3. Mathematics teachers should apply reinforcement when teaching mathematics in the classroom in order to elicit student's interest.
4. Mathematics teachers should constantly give mathematics homework to students and ensure that the assignments are marked.
5. Parents should ensure that they buy WASSCE recommended mathematics text book for their secondary school children.

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