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ANALYSIS OF GENDER DIFFERENCE IN ACADEMIC SELF-EFFICACY AND ACHIEVEMENTS AMONG SENIOR SECONDARY SCHOOL STUDENTS IN NIGER STATE, NIGERIA

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Abstract

This study examines gender difference in academic self-efficacy and achievements of public senior secondary school students in Niger state, Nigeria. The paper employed descriptive survey design, two research questions and hypotheses. A sample of 435 students for 2017/2018 academic session was selected through proportionate stratified random sampling technique (294 males, 141 females). The Academic Self-Efficacy Scale (ASES) and Academic Achievement Tests in English Language and Mathematics were used as instruments for data collection. The ASES instrument was validated through content and construct validity and the Cronbach's Alpha method was used to find reliability of the instruments which had a coefficient alpha of .829. The statistical techniques used for data analysis were mean, standard deviation, and t-test independent statistics. The findings of the study found that there was no significant difference in academic self-efficacy between male and female students. However, the mean value of female students indicated a higher level of academic self-efficacy (Mean =78.36) over the male students (Mean =78.16). The study also revealed a significant difference in achievements of male and female students. The mean difference showed that the male students performed better in academic achievements if compared with their female counterparts (Mean =105.42 for males and Mean =100.58 for females). The study recommended parental support and encouragement, provision of scholarship

and sponsorship for female students, free girl-child education, and employment opportunities for females, among others as strategies by governments at all levels and non-governmental organizations to boost self-efficacy of male students and bridge the gap that exist in achievements between male and female students in Niger state, Nigeria.

Keywords

Gender, Self-Efficacy, Academic Achievement, Senior Secondary School

1. Introduction

Gender is a personal variable that has been proved to have a considerable influence on students' academic self-efficacy and achievements (Ushie & Edinyang, 2018; Ebebuwa-Okoh, 2010; Froehlich, 2007). In this text, gender refers to the biological sex (either male or female). Academic self-efficacy, on the other hand, is the beliefs of students in their abilities, efforts, and competence to pursue and master academic subjects and performance during the course of teaching and learning. Academic achievements, therefore, refer to the scores of students' performance as a result of classroom teaching or training. Evidences have shown that differences exist in academic self-efficacy between male and female as a result of reasons such as: the type of subjects offered by male and female students (Mokhtar, 2015; Wang & Shan, 2017; Carroll, Houghton, Wood, Unsworth, & Hattie, 1999), family background (parenting styles, parents' level of education and socioeconomic status), psychological and/or biological factors (Lv, Zhou, Liu, Guo, Zhang, Liu, & Luo, 2018 & Mellandy, Martin, & O'Doherty, 2000), gender stereotyping and prejudice (Brandley, 1993). A study on gender difference in this study, therefore, relates to the analysis of the relationship between male and female students, and how quantitatively and qualitatively it affects their beliefs, efforts, capabilities, competence, confidence and perseverance during learning activities.

Studies on academic self-efficacy and achievements based on gender have mixed findings and therefore inconclusive (Verešová & Foglová, 2018; Buadi, 2000; Ebebuwa-Okoh, 2010 & Noble, 2011). Choi (2004) and Correll (2001) have found that there are gender differences in self-efficacy, delinquency and achievement among school children. Researchers such as (Mokhtar, 2015; Scherer & Siddiq, 2015; Meece & Jones, 1996; Carroll, Houghton, Wood, Unsworth, Hattie, Gordon & Bower, 2008) reported gender differences in self-efficacy favouring adolescent boys; others reported differences favouring girls (e.g., Britner & Pajares, 2001); and some (e.g., Smith, Sinclair & Chapman, 2002) found no differences. Besides, previous research studies have shown that Mathematics achievement of boys surpassed that of girls (Maccoby & Jacklin, 1974; Froehlich, 2007; Lloyd, Walsh, & Yailagh, 2005).

Thus, if achievement gap in students' beliefs, competency, attributions and level of self-efficacy is related to gender, then the rationale for this paper to investigate further among senior secondary students in Niger state is timely and vital.

Niger state is one of the states created by the General Murtala Muhammad Ramat administration in 1976. The state is bordered to the North by Zamfara, and to the North-West by Kebbi. At the Southern border is Kogi state, and South-West Kwara. Kaduna state is situated at the Northern-Eastern axis of the state, while the Federal Capital Territory is located at her Southern-Eastern part. The state has a total land area of 76,000 square kilometers and a population of 3,950,249 people according to the census figure of 2006 by the National Population Commission. The major tribes in the state are Nupe, Gwari/Gbagyi, and Kambari. Other tribes include: Hausa/Fulani, Kamuku, Koro, and many others. Niger state is blessed with abundant human and economic resources, as well as tourist potentials. The occupations of people of the state are farming, fishery, industries, and public service.

In terms of educational development, in 2005, Niger state was found low in girls' education along six other Northern states, namely; Bauchi, Borno, Jigawa, Katsina, and Sokoto respectively (Niger State Universal Basic Education Board, 2005). The situation report necessitated the state government under the leadership of former Governor of the state between 1999-2007, Engineer Abdulkadir Abdullahi Kure to re-launch the Universal Basic Education Programme as a reform strategy in order to reposition the education sector in the state to face the challenges of the International trends of Education For All (EFA) and the Millennium Development Goals (MDGs) (Niger State Universal Basic Education Board, 2005). Subsequently, another former Governor of Niger state (between 2007-2015) Dr. Mu'azu Babangida Aliyu launched free education programmes through payment of fees for the West African Examination Council (WAEC) and National Examinations Council (NECO) as well as provision of resource materials and infrastructure as a complementary policy for educational development in the state (Niger State Girls' Education Project 2, 2009).

An educational review by Adeniran (2006) found a sharp disparity in educational pursuits and academic achievements of male and female students in Niger state. Adeniran (2006, 2007) posited that among the underlying factors that attributed to these differences in the state were poor parental support and encouragement and cultural factors (preference to farming and early marriage) which translated into low enrolment, completion, retention and drop-out syndrome. Truancy, low level of confidence and perseverance to pursue education were also observed among public senior secondary school students in the state manifested in poor academic performance (Niger State GEP2, 2009). It is as a result of the researcher's overview of the forgoing, this study is undertaken to achieve the following objectives:

1. To find out the difference in academic self-efficacy of male and female senior secondary school students in Niger state.
2. To determine the difference in achievements of male and female senior secondary school students in Niger state.

The following null hypotheses were tested:

H₀₁: There is no significant difference in academic self-efficacy of male and female senior secondary school students in Niger state.

H₀₂: There is no significant difference in achievements of male and female senior secondary school students in Niger state.

2. Literature Review

Gender is both a developmental and cultural construct which characterizes the maturational, intellectual, and emotional behaviours of males and females (Schnell, Ringeisen, Raufelder, & Rohrman, 2015 & Udousoro, 2011). Umoh (2003) defined gender as a psychological term which describes the attributes of individuals on the basis of being born as either male or female. Studies such as (e.g., He & Freeman, 2019; Verešová & Foglová, 2018; Busch, 1995; Pajares, 1996; Lloyd, Walsh & Yailagh, 2005) found gender as a predictor of students' performances, selection of courses and career professions. Several findings indicated that female students had low self-efficacy in Mathematics, engineering, physical sciences and computer than males (Scherer & Siddiq, 2015; Goodwin, Ostrom & Scott, 2009, Lloyd et al., 2005). Similarly, Goodwin et al., (2009); Lloyd et al., (2005) and Pajares (2005) found a correlation between computer and Mathematics anxiety and self-efficacy based on gender. Cooper (2006) conducted a meta-analysis on the past 20 years of researches studying gender differences and the digital divide. The meta-analysis results revealed that many studies from the past two decades reported greater expression of anxiety and negative attitudes toward computers for girls and women than boys and men. In relation to his findings, Cooper argued that the gender disparity stems from computer anxiety and socialization patterns that present more boys than girls with computer from an early age, in addition to gender stereotyped and other social and developmental factors. The outcome of Cooper's study corroborates Maric (2018) on gender-based digital divide in favour of boys.

Although some research findings indicated that males have higher Mathematics ability than females (Feingold, 1988), other studies showed no significant differences (Froehlich, 2007). Thus, parental expectations toward girls' performances in Mathematics have been found to strongly influence girls' Mathematics choices (Choi, Chang & Choi, 2015; Froehlich, 2007 & Eccles, 1989). This is why

some females possess low Mathematics self-efficacy, and tend to attribute success of Mathematics achievement to external factors (e.g., luck and influence) rather than ability. In line with this reason, Sarouphim, and Chartouny (2017), Cabello, Sorrel, Fernández-Pinto, Extremera, & Fernández-Berrocal (2016), Broadley (2015) and Fennema (1990) discovered low Mathematics self-efficacy as a contributor to the lower number of female scientists and Mathematics-related fields.

Furthermore, researchers have reported differences of perceptions in Mathematics achievement between boys and girls. The perceptions which students held about themselves and their competences assist in determining what they do during the teaching learning process. This subsequently influences how they select learning activities, expend efforts, and persist in task accomplishments (Lloyd et al., 2005; Pajares & Valiante, 1999). Hackett and Betz (1989) in Lloyd et al., (2005) found strong positive correlations in self-efficacy and Mathematics related degree programmes among college students based on masculine sex-role orientation. The finding reveals that girls have relatively lower perception of Mathematics and low participation rates in Mathematics-related careers (Broadley 2015; Goodwin et al., 2009 & Pajares & Miller, 1994). Against this background, this study is premised based on the justification that no study has been undertaken particularly on gender as predictor of self-efficacy and achievement in Niger state, hence the need to fill the gap..

3. Methodology

A survey design was employed in this study because it was considered useful and appropriate for obtaining information that covers personal and social characteristics, beliefs, efforts and competencies of the research participants. Hence, the target population is all 165,034 public senior secondary school students (SS2) for 2017/2018 academic session in Niger state (Niger State Ministry of Education, 2017). The sample size is 435 students, drawn randomly from 20 senior secondary schools. A proportionate stratified random sampling technique was used to divide students into males and females (294 males, 141 females).

The instruments used in this study were Academic Self-Efficacy Scale (ASES) and English Language and Mathematics Achievement Tests). The ASES instrument had 20 items structured on 5-point Likert's scale which includes strongly agree, agree, not decided, disagree and strongly disagree and were scored 5,4,3,2 and 1 respectively. The English Language and Mathematics Achievement Tests were made of 20 multiple-choice items for each subject to measure students' performances in English Language as well as in Mathematics as general and compulsory subjects offered at the secondary education levels. The instruments were validated through content and construct validity and the method

of test reliability was Cronbach’s Alpha statistics which was analyzed using Statistical Package for Social Science (SPSS) 21.0 version and it had a correlation estimate of .829. The data collection was carried out by the researcher and four research assistants after permission to visit the selected schools by the state ministry of education. The instrument was administered to the students within a period of 15 minutes for ASES and 40 minutes for the achievement tests in English Language and Mathematics. The statistical analysis was performed using mean, standard deviation and t-test independent samples.

4. Analysis of Hypotheses

Hypothesis One

H₀₁: There is no significant difference in academic self-efficacy of male and female senior secondary school students

Table 1: *t-test Analysis of Mean Difference in Academic Self-Efficacy of Male and Female Senior Secondary School Students (N=435)*

	Gender	N	\bar{X}	df	t-value	Sig (2-tailed)	Std. Deviation
Self-efficacy	Male	294	78.1633	433	-.168	.867	12.29892
	Female	141	78.3617				9.78722

Not significant P > 0.05 levels

The analysis on Table 1 presents t-value of -.168, df 433, P=.867. This is represented in mean scores with 78.16 for males and 78.36 for females. In this case, the computed P-value is greater than 0.05, signifying that the null hypothesis is accepted.

Hypothesis Two

H₀₁: There is no significant difference in achievements of male and female senior secondary school students.

Table 2: *t-test Analysis of Mean Difference in Academic Achievements of Male and Female Senior Secondary School Students (N=435)*

	Gender	N	\bar{X}	df	t-value	Sig (2-tailed)	Std. Deviation
Achievements	Male	294	105.4184	433	2.007	.045	22.04677
	Female	141	100.5887				26.26542

Significant P < 0.05 levels

The t-test analysis on Table 2 is $t=2.007$, $df\ 433$, $P=.045$ which is expressed in mean values as 105.42 for males and 100.58 for females. Since the computed P-value is less than 0.05, this implies that the null hypothesis is rejected.

5. Discussions

The findings of this study agreed with studies of Asakereh and Yousofi (2018), Schnell, Ringeisen, Raufelder and Rohrmann (2015), Vuong et., (2010), Lloyd et al., (2005) and Busch (1995) which showed no significant difference in academic self-efficacy of male and female students. However, a significant difference in achievements was found between the genders. The analyses on academic self-efficacy revealed higher mean scores for female students (Mean = 78.36) over their male counterparts (Mean = 78.16). Busch (1995) in his study of gender differences in self-efficacy and attitudes towards computer among undergraduate students of Norwegian College found no statistically significant gender difference in computer self-efficacy regarding simple computer tasks and computer liking. Hence, the results of this study further agreed with the findings of Vuong et al., (2010) which investigated self-efficacy and academic success of First-Generation College Sophomore students and no significant difference for gender was found with MANOVA results $F = .85$ (3,1169), $P = .47$, Wilkis's Lambda = .998, Hotelling's Trace = .002.

A similar analysis by Lloyd et al., (2005) on sex differences in attributions, self-efficacy and achievements in Mathematics among British Columbian public school students showed that there was no significant difference in students' self-efficacy based on gender. However, the outcome of their study reported girls with under-confidence in their abilities when compared with the self-efficacy of boys. In line with findings of this study, related literature indicated that girls have lower Mathematics performance and participation rates in Mathematics-related courses (Kuzmina, 2016, Ng, Liu & Wang, 2016; Goodwin et al., 2009; Lloyd et al., 2005; Pajares, 1996). This assertion is apparently further justified by the investigation of Sarouphim and Chartouny (2017); Broadley (2015), Abesha (2012) and Malpass, O'Neil, and Hocevar (1999) which noted a significant positive direct and enhanced perceptions of Mathematics self-efficacy for males than females. The study of Froehlich (2007) consistently revealed that girls demonstrated lower Mathematics self-efficacy than boys among primary pupils from Suny New Paltz campus. Also, Reisberg, Bailey, Burger, Hamann, Raelin and Whitman (2010) examined gender and self-efficacy among 990 undergraduate engineering students in United States. The analysis found male students with higher academic self-efficacy beliefs than their female counterparts. In further support of the findings of this study, Nartgun, Kahraman and Coskun (2019) and

Vogt et al., (2007) reported similar results; revealing higher academic self-efficacy for male students against their female colleagues.

From the foregoing, it is worthy to point out that, previous research findings on gender and academic self-efficacy revealed mixed findings which thus are inconclusive. While some analyses reported findings in favour of girls (Kuzmina, 2016, Britner & Pajares, 2001 & Vuong et al., 2010), some showed no differences (Pajares, 1996; Pajares, 2003; Pajares & Kranzler cited in Abesha, 2012). On this account, the outcomes of this study provide further support and theoretical bases that female students in Niger state have higher academic self-efficacy. The reason may be as a result of their personal desire for education due to massive campaigns on importance of girls' education, encouragement from parents and concerted efforts of the state government and non-governmental organizations through provision of support services for girls' education in the state.

On the other hand, the findings on differences in achievements indicated that male students had greater values in means of the achievement scores than those of the female students. This obviously showed that male students performed better than their female counterparts. Several studies have proved this finding (e.g., Sarouphim & Chartouny, 2017; Abubakar & Oguguo, 2011; Abdul-Raheem, 2012; Christopher et al., 2008; & Froehlich, 2007). The finding also corroborates the report of Goodwin et al., (2009) which found no significant difference in cumulative credits GPA of males and females among undergraduates at a Western University in United States. Nevertheless, the results favoured men in the Mathematics sub-score means ($M_{male} = 20.4$ to $M_{female} = 19.7$, with a P-value = .005). Christopher et al., (2008) has equally found that male students had significantly higher American College Testing (ACT) scores than female students. In a similar research, Cabello, Sorrel, Fernández-Pinto, Extremera, Fernández-Berrocal (2016), Ng, Liu and Wang (2016) and Abubakar and Oguguo (2011) found no significant gender difference achievements of college mathematics and science students. However, the findings revealed mean scores of (mean=2.36) for male students and (mean=2.18) for female students. In addition, the findings of Abdu-Raheem (2012) on academic achievement and retention in social studies among JSS students in Ekiti state indicated no significant difference between male and female students for both the experimental and control groups.

Further findings on gender and academic performance recorded no significant difference (Ng, Liu, & Wang, 2016), Cholewa, & Ramaswami, 2015; Abubakar & Oguguo, 2011, Ugoji, 2008 & Ebenuwa-Okoh, 2010). This is supported by reports of several studies which found no significant difference in cognitive development and achievement in respect of sex (Adeyemo, 2007; Ajiboye & Tella, 2006; Adeosun, 2002 & Akinbote, 1999). In a related study, Froehlich (2007), found no

significant difference in performance of girls and boys on the implicit theory of intelligence questionnaire ($t = -1.57$, $df = 225$, $P = .118$). Nonetheless, the analysis showed that boys had higher mean value (mean = 4.16) than the girls (mean = 3.84). Also, Udousoro (2011) posited gender stereotype as indicator for choice of school subjects and occupations where males performed better in Chemistry Achievement Test with (mean = 13.50) than females (mean = 12.58) among secondary students in Uyo metropolis. This research outcome agreed with the findings of Lent, Miller, Smith, Watford, Lim, and Hui (2016) and Busch, (1995) which found males with higher levels of achievements in science and engineering related courses than females who perform better in language, arts and nutrition courses.

It is worthy to note that, several reasons are responsible for the discrepancies in reports concerning the academic self-efficacy of male and female students. As Pajares (1996) observed, females have an underestimation of Mathematics capability, and as such, they tend to avoid Mathematics courses and careers than males. Wang and Shan (2017) and Cooper (2006) argued that gender disparity in academic self-efficacy and achievements may stem from the socialization patterns which portray males than females with computer in an early stage, in addition with the influence of social and developmental factors. This signifies that the type of socialization offered on children, the social environment, and developmental characteristics of individuals all have effects on the development of academic self-efficacy and achievement (Wang & Shan, 2017; Luo & Zhang, 2015; Ibrahim, 2015 & Dramanu, 2012). Besides, parental expectations toward girls' performance in Mathematics are also evident for low Mathematics self-efficacy of females (Luo & Zhang, 2015 & Froehlich, 2007). Individual perceptions of Mathematics self-efficacy also suggest the dispositions about Mathematics related courses. This, as Goodwin et al., (2009) asserted, is one of the reason why male students are significantly more and interested in science courses than females.

In the light of the foregoing, findings from this study have provide justification that in Niger state, parents' encouragement and support in education favour both male and female students. The outcomes of this study have also proved it right that that difference in educational attainment between boys and girls is obvious in Niger state as maintained in the educational review of Adeniran (2007). Consequently, the study's findings therefore justify the effort and successes of the Girls' Education Project (GEP) by the Niger state government and Development partners (e.g., UNICEF& Department of International Development) which have translated into higher academic self-efficacy of female students in the state.

6. Conclusion

The findings of this study indicated no significant gender difference in academic self-efficacy but the mean scores showed higher academic self-efficacy for female students over their male counterparts. On the other hand, the outcome of the analysis found a significant difference in achievements favouring males over female students. However, it is important to point out that the scope of this study is limited to academic self-efficacy and achievements of public senior secondary school students only and it does not cover primary and junior levels of education and private secondary schools in the state. It is therefore suggested that further studies should be undertaken on other aspects of indicators such as cultural affiliations, age variations, family type and styles as well as religion to identify and determine the extent to which they might exert influence on self-efficacy and achievements of male and female for the other levels of education (primary, junior and tertiary levels) as well as private schools in Niger state.

7. Recommendations

In line with the findings of this study, the following recommendations are made:

1. Government at all levels, school managers, and voluntary organizations should mount strategies for improving parental support, encouragement and involvement in school activities and at homes to enhance students' academic self-efficacy especially for the boys.
2. Female students should be encouraged through provision of scholarship and sponsorship, free girl-child education, and employment opportunities. This will build their intrinsic and extrinsic motivation so as to enhance their academic performance.
3. Parents should set realistic goals and aspirations for female children to build their abilities, competence and confidence in school activities.
4. Government (federal, state and local government areas) should give more priority to girls' education by providing friendly school environment to facilitate teaching learning activities.

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