ISSN:2384-6801

KWARA STATE UNIVERSITY
KWASU
Skills & Integrity

The University for Community Development



KWASU INTERNATIONAL JOURNAL OF EDUCATION (KIJE)

Published by the ► Faculty of Education, Kwara State University, Malete.

GENDER DIFFERENCES: ATTITUDE AND STUDENTS'ACADEMIC ACHIEVEMENT TOWARDS SCIENCE IN ILORIN METROPOLIS

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Abstract

This study focuses on the differences between male and female students' attitudes and academic performance in public secondary schools in the Ilorin Metropolis. Correlation research was used in this work. All Junior Secondary Schools made up the study's sample population. To conduct the study, 125 students were chosen at random. For this study, academic achievement data were gathered from the records of the classroom teachers. The researcher created an attitude questionnaire to gauge the respondents' views on science. The questionnaire was on a 4 point likert scale instrument ranging from strongly agree, agree, disagree and strongly disagree. The instrument was validated by four educational management experts and reliably tested at r=0.91 The research questions were analyzed using descriptive statistics like mean and percentage, and the hypotheses one and two was examined using an inferential statistics of t-test, while hypothesis three was tested using pearson product moment correlation. The results showed that there is significant difference on the performance of male and female students in science, there is significant difference on the attitude of male and female students towards science and there is significant relationship between the attitude and performance of students in science subjects. In conclusion, the sex of the students is an important factor that needs to be taken into account when science is taught and learned. The advancement of science and technology in society requires both male and female developmental involvement. In order to address the gender gap in secondary schools' students' attitudes and performance, the researcher advised using a gender-sensitive approach.

Keywords: Gender, Academic Performance, Attitude, science, Public secondary school

Introduction

To complete the process of science successfully, one must have a certain level of dedication, curiosity, and love for what scientists do. Science, Technology, Engineering and Mathematics (STEM) has contributed in no small measure to the development and comforts of the modern world.

According to one school of thinking, men are less anxious when it comes to problem-solving tasks including: problem-solving, fact-gathering, developing hypotheses, experimentation, observation and interpretation, generalization, and application. An essential component of the psyche of someone who aspires to success in the scientific sector is a scientific mindset. It necessitates reasoning, curiosity, and the desire for creativity and flexibility.

Regarding the gender accomplishment gap in science, national trends in Nigeria yielded conflicting findings (Amelink 2019). Furthermore, the study discovered that while women perform equally to their male peers in different subjects, there are differences between male and female students that first appear in primary school education and persist through high school in assessments, meant to gauge content mastery, such as the National Assessment of Educational Progress (Dalton, Ingels, Downing & Bozick, 2017). These researchers claim that fewer females pursuing degrees in science, technology, engineering, and mathematics (STEM) professions is partly responsible for inequalities in scientific achievement at the primary school level (Hazari, Tai, & Saddler, 2017).

Wijesundera and Ramakrishna (2016) claim that the topic of gender variations in school scientific accomplishment is far from being resolved and that there is no conclusive evidence from research done yet

to support any modifications in teaching and learning. Women do worse on standardized tests than men in many scientific, technology, engineering, and math areas, which jeopardizes their ability to succeed in courses and occupations that focus on these fields. Studies conducted in developed nations found that New Zealand women struggled to advance despite having excellent curriculum vitae. Until 1981, women in Britain were not allowed to enroll in any science courses at the University of Durham College Of Science in New Castle (Rendel 2018).

The secondary school level is the focus of this investigation. Primary and secondary education are fundamental, particularly when it comes to learning about scientific and technological subjects. Secondary school is that which provides children with part or all of their secondary education. Children between the ages of 11–14 are often enrolled in Nigeria's Primary Education program and ages 16–18 while the age range has decreased with the introduction of the Pre-School system ages 8–9 to 14–15. It consists of six years with three terms per school year, following which students can opt to continue their education at a higher institution such a university or vocational school. (Free online encyclopedia Wikipedia). Additionally, a variety of private elementary and secondary schools as well as non-profit organizations were founded to fill in some gaps and pursue a variety of goals, from religious to commercial. The history of contemporary education in Nigeria can be attributed to private organizations, particularly Christian missions. Ehigiamusoe (2012).

Gender differences is a process to find out whether male and female enjoy the same opportunities for realizing their human rights and rights to contribute to all spheres of national development and benefits from such development (Okoli, 2012). One of the cardinal points in the Nigeria's philosophy of education is need for equality of educational opportunities to all Nigerian children irrespective of male and female, each according to his/her ability (FRN, 2003). Gender became an important issue in science and technology in 1993 through the activities of the United Nations Commission on Science and Technology for Development. The gender dimension of science and technology came as a result of series of reports on International Conferences such as World Conference on International Women's year (2007), World Conference of the United Nations Decade for Women Equality, Development and Peace (2012), and Concerns expressed by Science, Technology, Engineering and Mathematics experts (2016) about the situation of women and the field of natural science, education, health, food and security. These reports all pointed to the fact that there are gender gaps in the field of Science, Technology, Engineering and Mathematics (STEM) Education (Dawal, 2021).

Teaching and learning in educational institutions from the nursery school to the University are assessed. Whatever is the system of education, the learning outcome is determined by assessing performance. The essence of certification in our daily life is not only of its usage to enter labour market but also for vertical and horizontal mobility. However, the most important fact tied to examination process is the need for study techniques which act as a tool for examination success. Assessment of the learning outcome is done for determining what has been learned and for decision-making with respect to selection of candidates for higher studies or job placement. It is a great joy to achieve what one aims at. If we define achievement as having good results in anything, we put in more efforts so that we can be happy and receive commendation, then it became necessary to learn how to succeed, putting in place various ways from those who have used similar ways successfully.

Gender issue has become the talk of today's forum. Although the literacy rate is more among the boys than girls, it is quite interesting to observe that girls are securing better ranks than boys in almost all competitive examinations. From the last ten years, it is very fascinating to note that the girls figure is more often in top ten, ranks in tenth's class annual examination (Goni, Wali, Ali & Bularafa, 2015).

Statement of the problem

Women scientists and engineers are noticeably underrepresented, and one starts to ask what caused their even lower numbers at higher levels in scientific and technological institutes. The widespread belief that some academic disciplines are solely for men and others are only appropriate for women served as the inspiration for this study. This can have an impact on how students feel about their course materials, particularly in secondary education. Males are strongly encouraged in both families and schools to pursue

professions in science, while females are discouraged from doing so. The researcher is interested in learning if these will translate into variations in respondents' attitudes and performance.

Literature Review

There are numerous quantitative studies on the performance of boys and girls in different subjects. The performance compared in studies contains academic achievement, learning attitudes, and emotions, such as learning interests, habits, and creativity, which are all considered as important factors of academic performance nowadays. Different subjects as well as different item forms are also investigated in different researches. The gender gaps over time also attract researchers' interest. In academic achievement, many studies investigated the academic gender gaps, most found that boys outperform girl in science, and the gaps are larger in mathematics. Learning attitude and emotion are also considered as important outcomes of academic performance, and positive relationship between emotional outcomes and academic achievement has already been proved (Yu, 2017; Fisher, Dobbs-Oates, Doctoroff, 2012).

In science, creativity also plays a crucial role. It is essential for the development and progress of human civilization (Chang, Wang and Lee 2016) and feeding creative activities when children are young will provide society with imaginative thinkers and leaders of scientific entrepreneurial discovery (Yates & Twigg, 2017). Recently, creativity has roused increased interest, and developing creativity is viewed as an educational imperative worldwide. Education drives the creative potential of students and expands comprehensive and balanced attitudes to transcend their lifestyles (Piguave, 2014). However, Castillo-Vergara, Barrios Galleguillos, Jofré Cuello, AlvarezMarin and Acuña-Opazo (2018), found females exhibited higher results than males in creativity's three dimension, fluency, flexibility, and originality. The results of creativity also vary in different studies. There are several research studies that have explored the gender gaps in different item forms which found that boys were good at multiple-choice (MC) items while girls were good at construct response (CR) items (Reardon, Kalogrides, Fahle, Podolsky & Zárate 2018). The gender gaps over time have also attracted researchers' interest.

Gender differences in the attitude and achievement of student often reported in science subjects. Nwaiwu and Audu (2015) reported that gender difference exists in the attitude and achievement of students towards biology, physics, chemistry and mathematics but that is reducing over the years Analysis of WAEC result of 2016, Kola (2016) reported that 7.32% and 6.42% of male and female students respectively obtained credit pass.

Most conversation in our country today are cantered on science and technology. Nigeria's need for Scientists and Technologists is broadcast over radio, television, read on magazines and newspapers and also seminars and workshops are organized on these issues the point now is how can these Scientist and technologist be produced without favourable attitude being developed towards student's achievement in science subjects? This means that students in secondary schools with many fears of Schooling from primary school to senior secondary schools are most likely to develop and exhibit attitude towards the study of STEM irrespective of their gender. In the present dispensation, this assertion needs to be investigated among students with close to fourteen years of schooling from the nursery school to their senior secondary school level

Research Hypotheses

Ho1: There is no significant difference in the performance of male and female students in science subjects

Ho2: There is no significant difference in the attitude of male and female students towards the study of science subjects

Ho3: There is no significant relationship between the attitude and performance of students in science subjects, based on gender.

Methodology

An analysis of correlation research was used in this work. All Junior Secondary Schools made up the study's sample population. Select public secondary schools in Ilorin Metropolis were sampled systematically. To conduct the study, 125 students were chosen at random. For this study, academic achievement data were gathered from the records of the classroom teachers. The researcher created an attitude questionnaire to gauge the respondents' views on science subjects. The questionnaire was a 4 point

Likert scale instrument ranging from strongly agree, agree, disagree to strongly disagree. The instrument was validated by four educational management experts and reliably tested at r=0.91 The research questions were analyzed using descriptive statistics like mean and percentage, and hypotheses one and two were tested using inferential statistics of t-test, while hypothesis three was tested using Pearson Product Moment Correlation.

Results

Research Hypothesis

Ho1: There is no significant difference in the performance of male and female students in science subjects

Table 1: Summary of T-test result showing significant difference on the performance of male and female students in science subjects

	Gender	N	Mean	Standard Deviation	T	F	df	Sig	Decision
Performance of pupils in science	Male	74	48.29	4.66	2.73	6.71	154	0.01	Sig
	Female		40.91	6.22					

Table 1 showed summary of t-test result showing significant difference on the performance of male and female students in science. It was revealed that male respondents had mean score 48.29 with standard deviation 4.66 while female respondents had mean score 40.91 with standard deviation 6.22, the T_{al} was 2.73, degree of freedom 154, F was 0.01 and significant level of 0.01 ($P<0.05$). This implies that there is significant difference in the performance of male and female students in science. Therefore, the null hypothesis that states that there is no significant difference on the performance of male and female students in science was rejected.

Ho2: There is no significant difference in the attitude of male and female students towards the study of science subjects

Table 2: Summary of T-test result showing significant difference in the attitude of male and female students towards science subjects

	Gender	N	Mean	Standard Deviation	T	F	Df	Sig	Decision
Performance of pupils in science	Male	74	48.29	4.66	2.73	6.71	154	0.01	Sig
	Female		40.91	6.22					

Table 2 showed summary of t-test result showing significant difference in the attitude of male and female students towards science. It was revealed that male respondents had mean score 48.29 with standard deviation 4.66 while female respondents had mean score 40.91 with standard deviation 6.22, the T_{cal} was 2.73, degree of freedom 154, F was 0.01 and significant level of 0.01 ($P<0.05$). This implies that there is significant difference in the attitude of male and female students towards science. Therefore, the null hypothesis that states that there is no significant difference on the attitude of male and female students towards science was rejected.

Ho3: There is no significant relationship between the attitude and performance of students in science subjects, based on gender

Table 3: Summary of Pearson Product Moment Correlation showing relationship between the attitude and performance of students in science.

Variables	**Mean**	**Std.D**	**N**	**R**	**Sig**	**Decision**
Attitude in science	1.781	0.060	125	-0.84	0.00	Significant
Performance in science	31.294	7.500				

Table 3 shows that there is significant relationship between the attitude and performance of students in science. Therefore, the null hypothesis that stated that there is no significant relationship between the attitude and performance of students in science is rejected.

Discussion of findings

The findings of this study revealed that, there is significant difference in the performance of male and female students in science. This finding means that male and female performance in science is different, as gender can either positively or negatively influence performance in science. Likewise, the attitude of the students based on their gender, in science is low indicating that most of the students believed that they are not confident about their performance in science subjects. The result of this study does not corroborate with Fatoba and Aladejana (2014), who looked at the influence of gender on students' attitudes about physics in senior secondary schools in Oyo State, Nigeria. In that study, it was discovered that gender had no bearing on students' attitudes, but there was a tiny bias among them in favor of women. Therefore, when developing and implementing curricula, stakeholders should take into account the variations between male and female performance.

Another finding of this study showed that there is significant difference in the attitude of male and female students towards science. This implies that gender difference plays a significant role in the attitude of students towards science. This indicates that the opportunities for Nigerian male and female students who may choose science subjects as their future career are the same. This finding support the study of Hassan (2016) who revealed that male and female students in Kakau local government Area, Kaduna State attitude towards science is significantly different. This finding is not in tandem with Kolawole (2017) who revealed that there is no significant difference in the attitude of students toward science in public secondary schools on the basis of gender.

Lastly, the investigation showed that, the mean score for the attitude towards science subjects is 1.781 with a standard deviation of 0.060 while the mean score of that of performance in science is 31.294 and a standard deviation of 7.500. Based on the studies conducted, the overall correlation between attitude toward science and performance in science was significant but has low association. The study revealed that there is significant relationship between the attitude and performance of students in science but very low. This finding supports that of Olatunji (2021), who showed that there is a correlation between the rate of learning, attitude toward learning science, and achievement in science. Although this finding does not agree with the study of Joshua (2019) who affirmed that, there is no significant relationship between attitude of students in science and performance of student science.

Conclusion

The findings showed that most female gender had negative attitudes and consequently performed lower compared to male gender. The study generally revealed that positive attitude contributes to positive results. Attitudes are learnt and can be changed through persuasion using a variety of techniques. Attitudes, once established, help to shape the experiences the individual has with teachers. Male student exhibited positive attitude towards science subjects than their female counterparts. The study also found that male students performed higher than the female students in science subjects. Hence, there is gender differences in the attitude and performance of students towards science subjects.

Therefore, it was based on the findings that the study concluded that, the gender of the students is an important component that needs to be taken into account when science is taught and learned. The advancement of science and technology in society requires the developmental contributions of both men and women.

Recommendation

Based on the findings of the study, it can be recommended that:

1. To close the gender gap in secondary school students' attitudes and performance in public schools, a gender-sensitive approach must be used in teaching students.
2. Male and female students should be encouraged to have a positive attitude towards science so that their performance can be improved.

3. Students' attitudes should be very central to educators, because gender is a powerful predictor of students' performance.

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