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# Achieving Gender Equity in Nigerian Basic Science and Technology Classrooms with Metacognitive Skills Package

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**Abstract**
*The study investigated the possibility of achieving gender equity in Basic Science and Technology classrooms with Metacognitive Skills Package in Pankshin, Plateau State, Nigeria. The study adopted the non-randomized pre-test, post-test quasi-experimental control group design. The population comprised 1,873 Junior Secondary two students out of which 235 students constituted the sample. Two research questions and two hypotheses guided the study. The Basic Science and Technology Achievement Tests with reliability index of .85 established using the Cronbach alpha method was used to collect data from the sample. The data were analyzed using Statistical Package for Social Sciences (SPSS) version 25.0. Research questions were answered using mean and standard deviation while hypotheses were tested using Analysis of Covariance at .05 level of significance. The study revealed that students taught with metacognitive strategy achieved better in Basic Science and Technology when compared to those taught using the lecture method. It was also revealed that metacognitive skills package enhanced achievement of both male and female students thereby improving gender equity in Basic Science and Technology. Based on the findings of this study, it was recommended that Basic Science and Technology teachers should teach their students with metacognitive skills package to enhance students' achievement in the subject. Metacognitive skills package should also be used by teachers as a gender-friendly package to improve gender equity in Basic Science and Technology.*
**Keywords**: Achievement, Basic Science and Technology, Gender Equality, Metacognitive Skills

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## Introduction

Education can be seen as a process of imparting knowledge, skills and values to individuals for effective living and survival in the society. Bot (2017) defines education as a process of imparting knowledge that begins from birth and lasts till the moment of death. He also sees education as the transmission of culture from one generation to another in a meaningfully structured process to enable individuals develop necessary skills for effective living in the society. Education is provided at the basic, senior secondary and tertiary levels in Nigeria and in different specialized fields, including arts, humanities, science, mathematics and technology.

Science is a systematic investigation of nature with a view to understanding and harnessing it to serve human needs. It is an organized body of knowledge inform of concepts, laws, theories and generalizations (Ishaku, 2020). Science has permeated all facets of human endeavours and is a necessary tool for the socio- economic and technological development of nations of the world. Technology on its own is the practical application of scientific knowledge or inventions to solve everyday problems of humans and the society (Ozoji, 2020). The products of science and technology have contributed to the development of nations of the world. With the rapid pace of scientific and technological advancement coupled with the globalization of science learning and emphasis on scientific literacy of the citizenry for useful living in the society, basic science and technology in Nigeria is now a core curriculum in the national policy of education at the basic level of education. The application of scientific knowledge has led to

the invention of equipment and machines used in industries, homes and other facets of the economy. The fore-going statement, therefore, is not unconnected to the reason why Imo, Habila and Ozoji (2019) posited that any country that still suffers from underutilization of scientific and technological processes and products generally experiences underdevelopment. Therefore, for any country that aspires to address the problem of underdevelopment, science and technology has to be put at the fore front of every educational programme of that country (Bala, 2018). To Imo et al., teaching basic science and technology at the foundation level of education is a powerful way of inculcating scientific mindset in students. Hence, the need for teachers to use effective and innovative strategies, as well, as properly designed learning activities in science and technology classrooms for equipping students from the basic level of education with 21st century skills for the future.

The Nigerian government as a critical stakeholder in education has made other efforts to boost the teaching and learning of science and technology as a result of its relevance to national development. Such efforts include the emphasis on the use of activity-based strategies in teaching and learning of science and related courses (Federal Republic of Nigeria [FRN], 2014) and employing and training of basic science and technology teachers, provision of facilities, such as science kits, and equipment for the teaching and learning of basic science and technology in various junior secondary schools in the country, establishment of special science schools, the Science and Technology Education Post Basic (STEP-B) project, and reviewing of science and technology curricula in line with emerging trends in the area, societal needs, environmental issues and challenges in line with best practices across the globe (FRN, 2012). Some professional associations such as the Science Teachers' Association of Nigeria (STAN) and Nigerian Association of Teachers of Technology (NATT) have also provided useful guidelines and methods to enhance the teaching of Basic Science and Technology.

However, despite all these efforts by the government and other stakeholders to reposition science, technology and mathematics education, students still achieve poorly in basic science and technology (Adegoke, 2013; Ozoji, 2020). This may be why Adegoke posited that underachievement by students in basic science and technology had been a major concern to stakeholders, including teachers, students, parents and members of the society. According to the National Center for Education Statistics (NCES, 2012) poor achievement of students in science has put science education in the nation in a state of crisis. Underachievement is evident in the results of Basic Education Certificate Examinations (BECE) of students in Basic Science and Technology (BECE, 2015 -2019) in Pankshin Area Directorate, Plateau State of Nigeria, where in 2016 and 2017, about 60.00% of candidates who sat for Basic science and Technology examinations passed below credit level, each year (Education Resource Center, Jos [ERC], 2019).

If the issue of underachievement in science and technology in the country is not given sufficient attention, Nigeria as a nation would not be able to actualize her dream of becoming one of the world's biggest economies, or that of the Sustainable Development Goals 4 and 9 on quality education; industry, innovation and infrastructure, respectively. It would be equally difficult for the nation to produce a formidable work force in science and technology fields. Moreover, it would be impossible to achieve the objective of the National Policy on Science, Technology and Innovation (Federal Ministry of Science and Technology [FMST], 2011) which states that by 20-20 Nigeria has to build a strong science, technology and innovation capability and capacity needed to evolve a modern economy. There is therefore, an urgent need for a paradigm shift from the traditional methods of teaching science and technology subjects to more effective, modern, innovative and activity-based strategies, such as, hands-on and minds-on strategies, use of metacognitive skills package, concept mapping strategy, as well as, properly designed learning activities in science and technology classrooms for equipping students from the basic level of education for further studies in science and technology-oriented courses at the secondary and higher

levels of education. Other factors have been implicated in achievement of students in basic science and technology which include poor foundation (Atadoga & Lakpini, 2013), poor scientific background of students, lack of equipment and facilities for practical, incompetence of science teachers, poor mastery of science concepts by students, student-related variables, such as, attitudes, interest and motivation to the subject, as well as gender-related issues (Ugwuanyi &Nwagbo, 2013), such as gender-stereotyping and lack of gender equity in science classrooms and achievement.

Gender, according to Akpochafo (2009) relates to cultural attributes of males and females while Singh (2010) posited that gender is a socio-cultural construct that connotes the differentiated roles and responsibilities of men and women in a particular society. Gender equity may be seen as the state of equal ease of access to practices, resources and opportunities regardless of gender (Kanno & Onyeochu, 2019). In STM education, gender equity refers to males and females experiencing the same advantages or disadvantages, such as, school attendance, same teaching methods, gender-friendly curricula and academic orientation all, targeted at equal learning achievement and future careers.

In Nigeria, despite the efforts of the government to promote gender equity in science, technology and mathematics education at all levels of education (FMST, 2011), gender gaps still exist (Busola, 2011; Uzoechi, Nweke & Fataokun, 2017; Owoyemi, 2018; UNESCO, 2018). On the contrary, the study by Umaru (2010) indicated no significant difference between the mean achievement scores of male and female students exposed to an experimental treatment and those exposed to the conventional lecture method. This finding corroborates with that of Ugwu (2013) Uzoechi *et al.* which reported that male and female students do not differ in science achievement when exposed to the same instructional method. However, Umaru and Onuigbo in their separate studies indicated that interaction effect of instruction in metacognitive skills and gender on mathematics achievement was significant. Females are also under-represented in science, technology and mathematics fields and employment opportunities where according to Ogbu and Ezechi (2015) 11% of women are personnel in science, technology and engineering profession out of 50% of women population in Nigeria. The under-representation of women in science and technological manpower pool may likely be a reflection of under-achievement of girls in science and technology in school. In his study, Abdu (as cited in Iliya, 2020) observed that girls believed that science was too difficult and not important for their future, and that, teaching methods used by teachers in STM instruction did not assist girls to understand science.

The fore-going views are at variance with the objective of the national policy on education on gender equity, as well as that of the national gender policy. However, the issue of gender in science and technology education research still remains inconclusive and as such requires more investigation. Furthermore, an effective approach for increasing the number of women in science and technology has not yet been achieved (Adies, 2015; Ritz & Fan, 2015). Closing gender gap or inequality in science and technology is of vital importance in order not to lose human resources capable of contributing to national development. For instance, there are 69 million women and girls in Nigeria (UNESCO, 2018); excluding them from science and its application to daily living means a large waste of human resources, considering the critical role women play in agricultural activities, energy, health and sanitation needs of the society. Moreover, it is in the field of Science, Technology Mathematics and Engineering (STEM) education that 21$^{st}$ century skills, such as, critical thinking and problem-solving skills needed for individual and national development are learned. For STEM education to continue to be male-dominated means deepening the already existing gender disparity in the field.

To adequately address the issue of gender equity in achievement of students in basic science and technology, there is an urgent need for teachers to improve on their pedagogies by exploring the use of more effective, learner-centered, activity-oriented and gender-friendly teaching methods. Some of the innovative strategies include, Jigsaw puzzle, computer-simulation, mind mapping

mastery learning strategies and metacognitive skills strategy/package that would enable junior secondary students achieve well in the subject and provide a solid foundation to them for further studies in science and technology-related subjects at the senior secondary and higher levels of education in Nigeria and elsewhere.

Metacognition can be regarded as higher intellectual ability of an individual to plan, reflect upon, monitor, understand and control his/her learning. Metacognition refers to a higher order thinking which involves control over the cognitive processes engaged in learning, and, consists basically of metacognitive knowledge and metacognitive experiences, otherwise known as regulation (Antonio, & Prudent, 2022). These cognitive processes include thinking, knowing, remembering, judging, perception, imagining and planning. Metacognition is also a process involving an individual's awareness and regulation or control of his/her own learning so as to attain set goals (Iliya, 2020). Umaru (2010) in his study posited that metacognitive skills are an essential process for learning. According to him, they are skills that help the learner to construct meaning from information. Metacognitive skills engage one in monitoring one's understating of a given task. Kristani, Susilo, Rolman and Aloysius (2015) in their study reported that metacognitive skills played a significant role in students' achievement in science. Metacognitive skills include awareness skills, skills of planning and selecting strategies of learning, monitoring the process of learning by questioning, self-testing and providing one's own feedback, analyzing the effectiveness of learning strategies and reflection (Iliya, 2020).

Studies have emerged signifying the role of metacognition in science education (Zohar & Bazilai, 2013). For instance, Owo and Ikwut (2015), Bello and Zakariyya (2018), showed that metacognitive strategy enhanced achievement of students in chemistry. Findings by Gumbo (2017) also showed that students exposed to metacognitive strategies had significantly higher achievement and higher metacognitive self-regulation than those not exposed to the strategy. Audu and Amakor (2015) in their study with junior secondary students observed that metacognitive strategy enhanced students' achievement in mathematics. However, there is paucity of studies that investigated effectiveness of metacognitive instructional practices on in science learning in Nigeria, particularly at the basic level of education. Besides, there exists a gap between theory and practice as many teachers do not have sufficient pedagogic knowledge about metacognition (Wilson & Bai, 2010).

In terms of gender, studies indicated no significant interaction effect of metacognitive strategy and gender on achievement of students in science (Iliya, 2020) and in mathematics (Umaru, 2010) known as the language of science. Some other studies on influence of gender on science achievement of students revealed mixed results (Caiscai & Lavinia, 2011). This implies that the issue of gender in science and technology education research is still inconclusive. Hence, the need for employment of more innovative, activity-based and interactive strategies and empirical studies in that area. In view of the fore-going background, the present study investigated the possibility of achieving gender equity in achievement of junior secondary two students in Basic Science and Technology by using the metacognitive skills package in Pankshin, Plateau State of Nigeria.

**Purpose of the Study**

The purpose of the study was to investigate the possibility of achieving gender equity in Nigerian Basic Science and Technology classrooms with metacognitive skills package. Specifically, the objectives of the study were to:

1. Find out the difference in the mean achievement scores of Junior Secondary School two students taught Basic Science and Technology using metacognitive skills package and those taught using conventional method.
2. Find out the difference in the mean achievement scores of male and female Junior Secondary School two students taught Basic Science and Technology using metacognitive skills package.
3. Find out the difference in the mean achievement scores of male and female Junior Secondary School two students taught Basic Science and Technology using conventional method.

**Research Questions**

1. What is the difference in the mean achievement scores of Junior Secondary School two students taught Basic Science and Technology using metacognitive skills package and those exposed to conventional method?
2. What is the difference in the mean achievement scores of male and female Junior Secondary School two students taught Basic Science and Technology using metacognitive skills package?
3. What is the difference in the mean achievement scores of male and female Junior Secondary School two students taught Basic Science and Technology using conventional method?

**Hypotheses**

1. There is no significant difference in the mean achievement scores of Junior Secondary School two students taught Basic Science and Technology using metacognitive skills package and those taught using conventional method.
2. There is no significant difference in the mean achievement scores of male and female Junior Secondary School two students taught Basic Science and Technology using metacognitive skills package and those taught using conventional method.

**Methodology**

The non-randomized pre-test, post-test, quasi-experimental control group design was used in the study. This design was used because students were not randomly assigned to experimental and control groups. Rather, they were used in their intact class settings. The population of the study consisted of 1873 junior secondary two students in 24 public schools in Pankshin Local Government Area of Plateau State, Nigeria. The sample comprised 235 junior secondary two students from two randomly selected schools. In each of the two schools, two intact classes were used. One of the intact classes was randomly assigned, to the experimental group while the other was assigned randomly also to the control group by balloting. A three-stage sampling technique was used to select the schools from the following clusters: State, local government area and public schools in the study area.

The instrument used for collecting data from the sample was the Basic Science and Technology Achievement Test (BSTAT). The BSTAT comprised two sections, A and B. Section A solicited information on students' personal data, such as gender, name of school and class. Section B consisted of 40 multiple choice items on the concepts of energy, work and power with four options, A, B, C and D. The instrument was developed based on Benjamin Bloom's Taxonomy of objectives that covered the cognitive domains of knowledge, comprehension and application based on the cognitive levels of the (junior secondary school) students used in the study. Each item was assigned one mark bringing the total marks for the items to 40 marks. The total mark for each student was converted to percentage. The BSTAT was developed by the researchers using the Basic Science and Technology text book for junior secondary two and the national core curriculum for Basic Science and Technology. The BSTAT was content validated by first subjecting it to item analysis, then, giving the instrument with a table of specifications for scrutiny to two senior lecturers, one in Science Education Unit and the other in Research Measurement and Evaluation Unit, both in the Faculty of Education, University of Jos. The Metacognitive Skills Package was validated by the expert in Research Measurement and Evaluation unit too. The instruments were trial tested on a sample of 23 students that had similar characteristics with the sample for the main study. However, the sample for the trial-test did not participate in the main study. Reliability index for the BSTAT was established as 0.85 using the Cronbach alpha method.

The experimental group was taught Basic Science and Technology concepts (energy, work and power) using metacognitive skills package for six weeks while the control group was taught the same concepts for the same length of time with the lecture method. Metacognitive package comprised the metacognitive (developing) skills, namely, planning skills, monitoring and reflection skills, as well as the concepts and tasks on energy, work and power to be learnt through problem-solving activities, and the strategies for effective teaching and the learning of the concepts. The researchers trained two

research assistants in each of the schools used for the study who were Basic Science and Technology teachers on how to teach the identified concepts using the Metacognitive Skills Package. The metacognitive skills package in this study consisted of planning skills, such as, estimating the time for completing specific tasks, organizing learning materials, monitoring skills, evaluating skills which would aid students in learning basic science and technology concepts. The training lasted for one week. During the training session, as the research assistants took their turns to teach one another the concepts of energy, work and power, they engaged in planning, monitoring their learning and evaluating their skills and achievement outcomes on the concepts taught.

One research assistant taught the experimental group while the second research assistant taught the control group in each school. Students in the experimental group were engaged in planning, monitoring their learning and evaluating achievement outcomes on the concepts selected for the study. They were engaged in planning skills, such as, estimating the time for completing specific tasks, organizing learning materials; monitoring skills-encouraged students to critically reflect on what they know about the concepts and tasks presented to them, keep track of the things that worked for them and those that did not work for them in the course of their study and investigations/hands-on activities on the concepts under investigation using their worksheets, evaluating skills discuss among themselves, self-test /self-question themselves on the concepts of energy, work and power, pose questions to the teacher for clarification of grey areas/tasks not understood, and, to respond to the questions posed by the teacher. The contents of the lessons were the same for the experimental and control groups. However, the control group was not exposed to activities, experiences and examples in the metacognitive skills package. The teaching of the experimental and control groups lasted for six weeks.

The (BSTAT) was administered to both the experimental and control groups by the research assistants for one hour before their exposure to the Metacognitive Skills Package and the lecture method, respectively. The BSTAT items were reshuffled and administered, again, as post-test to the experimental and control groups after the six weeks teaching period. Students' scripts were collected, scored and the scores collated by the researchers in readiness for analysis. Means and standard deviation were used to answer the research questions while Analysis of Covariance (ANCOVA) was used in testing the hypotheses at 0.05 level of significance, to take care of any initial differences between the experimental and control groups since intact classes were used.

## Results

The results are presented based on the research questions raised and hypotheses formulated as follows:

### Research Question One

What is the difference in the mean achievement scores of Junior Secondary School two students taught Basic Science and Technology using metacognitive skills package and those exposed to conventional method?

**Table 1: Mean Achievement Scores of JS2 Students exposed to Metacognitive Skills Package and those exposed to conventional method?**

| Group | N | $\bar{x}_1$ | $SD_1$ | $\bar{x}_2$ | $SD_2$ | Mean Difference |
|---|---|---|---|---|---|---|
| Experimental | 118 | 27.84 | 8.17 | 67.68 | 13.71 | 12.75 |
| Control | 117 | 30.97 | 9.14 | 54.93 | 9.20 | |

Table 1 shows the Basic Science and Technology (BSTAT) pre-test and post-test mean achievement scores of students exposed to Metacognitive Skills Package and those not exposed. The experimental group had a pre-test mean score of 27.84 and SD 8.17; post-test mean score of 67.68 and SD 13.75. The control group had a pre-test mean score of 30.97 and SD 9.14; post-test mean score of 54.93 and SD 9.20. The post-test mean difference between the experimental and control groups is 12.75. This implies that

students in the experimental group had a higher post-test mean achievement score than those in the control group.

**Research Question Two**

What is the difference in the mean achievement scores of male and female Junior Secondary School two students taught Basic Science and Technology using metacognitive skills package?

**Table 2: Difference in Mean Achievement Scores of Male and Female Students Exposed to Metacognitive Skills Package**

| Group | Gender | N | $\bar{x}_1$ | $SD_1$ | $\bar{x}_2$ | $SD_2$ | Mean Difference |
|---|---|---|---|---|---|---|---|
| Experimental | Male | 52 | 42.67 | 7.26 | 68.69 | 13.89 | 2.01 |
| | Female | 66 | 40.03 | 6.33 | 66.68 | 13.63 | |

Table 2 shows the Basic Science and Technology (BSTAT) pre-test mean achievement score of male students exposed to metacognitive skills package as 42.67 with SD 7.26 while their post-test mean achievement score is 68.69 with SD 13.89. Then, the pre-test mean achievement score of female students exposed to metacognitive skills package is shown as 40.03 with SD 6.33 while their post-test mean achievement score is 66.68 with SD 13.89. The post-test mean difference between the post-test mean achievement score of male and female students in the experimental group is 2.01.

**Research Question Three**

What is the difference in the mean achievement scores of male and female Junior Secondary School two students taught Basic Science and Technology using conventional method?

**Table 3: Mean Achievement Scores Difference between Male and Female Students Exposed to Lecture Method**

| Group | Gender | N | $\bar{x}_1$ | $SD_1$ | $\bar{x}_2$ | $SD_2$ | Mean Difference |
|---|---|---|---|---|---|---|---|
| Control | Male | 47 | 33.97 | 5.83 | 49.96 | 10.79 | 1.05 |
| | Female | 70 | 37.94 | 6.16 | 48.91 | 7.91 | |

Table 3 shows the Basic Science and Technology (BSTAT) pre-test mean achievement score of male students exposed to lecture method as 33.97 with SD 5.83 while their post-test mean achievement score is 49.96 with SD 10.79. Then, the pre-test mean achievement score of females exposed to lecture method is shown as 37.94 with SD 6.16 while their post-test mean achievement score is 49.96 with SD 7.91. The post-test mean difference between the post-test mean achievement scores of male and female students in the control group is 1.05.

**Hypothesis One**

There is no significant difference in the mean achievement scores of Junior Secondary School two students taught Basic Science and Technology using metacognitive skills package and those taught using conventional method.

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**Table 4: Analysis of Covariance of Basic Science and Technology Mean Achievement Scores of JS II Students taught with Metacognitive Skills Package and Control Group**

| Source | Type III Sum of Squares | df | Mean Square | F | Sig. | Partial Eta Squared |
|---|---|---|---|---|---|---|
| Corrected Model | 77856.836[a] | 3 | 25952.279 | 225.128 | .000 | .592 |
| Intercept | 1141017.523 | 1 | 1141017.523 | 9897.994 | .000 | .955 |
| GROUPS | 5936.962 | 1 | 5936.962 | 51.501 | .000 | .100 |
| Test | 68047.957 | 1 | 68047.957 | 590.296 | .000 | .559 |
| GROUPS * test | 3734.936 | 1 | 3734.936 | 32.399 | .000 | .065 |
| Error | 53719.387 | 233 | 115.278 | | | |
| Total | 1273315.000 | 235 | | | | |
| Corrected Total | 131576.223 | 234 | | | | |

a. R Squared = .592 (Adjusted R Squared = .589)

Table 3 shows that the group result F (1, 235) = 51.501 is significant, p = 0.000 ≤ 0.05. This implies that there was a significant difference between Basic Science and Technology mean scores of junior secondary two students taught with Metacognitive Skills Package and those not taught. The estimate effect size shows that the treatment could explain 10.00% of the variation in students' achievement in Basic Science and Technology.

**Hypothesis Two**

There is no significant difference in the mean achievement scores of male and female Junior Secondary School two students taught Basic Science and Technology using metacognitive skills package and those taught using conventional method.

**Table 5: Analysis of Covariance of Basic Science & Technology mean Achievement scores of JS II Male and Female Students taught with Metacognitive Skills Package and Control Group**

| Source | Type III Sum of Squares | Df | I Mean Square | F | Sig. | Partial Eta Squared |
|---|---|---|---|---|---|---|
| Corrected Model | 47869.954[a] | 3 | 15956.651 | 180.288 | .000 | .779 |
| Intercept | 242894.141 | 1 | 242894.141 | 2744.359 | .000 | .947 |
| GENDER | 22.286 | 1 | 22.286 | .252 | .617 | .002 |
| TEST | 41651.594 | 1 | 41651.594 | 470.604 | .000 | .755 |
| GENDER * TEST | 122.915 | 1 | 122.915 | 1.389 | .240 | .009 |
| Error | 13541.523 | 116 | 88.507 | | | |
| Total | 290558.000 | 118 | | | | |
| Corrected Total | 61411.478 | 117 | | | | |

R Squared = .779 (Adjusted R Squared = .775)

Table 5 shows that the calculated F (1, 118) = 0.252 is not significant p = 0.617 ≥ 0.05. This implies that there was no significant difference between Basic Science and Technology mean scores of male and female junior secondary two students taught with Metacognitive Skills Package and those not taught. The effect size shows that 0.20% of the variation could explain the effect of treatment on achievement of male and female students in Basic Science and Technology concepts.

**Discussion**

The result of the study revealed that metacognitive skills package was more effective in enhancing students' achievement in Basic Science and Technology than the conventional lecture method. This finding is in line with the study conducted by Bello and

Zakariyya (2018) which reported that there was a significant difference in the achievement means score of students taught calculation using metacognitive teaching strategy than those taught with the lecture method. The finding is also in agreement with the study conducted by Owo and Ikwut (2015), Bello and Zakariyya (2018) which showed that metacognitive strategy enhanced achievement of students in chemistry. This finding also agrees with the finding of Kristani, Susilo, Rolman and Aloysoius (2015) which revealed that metacognitive skills play a significant role in students' academic achievement in science. The result further revealed that both male and female basic science and technology students benefited significantly from metacognitive skills package because there was no significant difference between the achievement mean scores of JS 2 male and female students who were exposed to metacognitive skills package. The finding corroborates that of Ugwu (2013) as cited by Uzoechi *et al.* (2017) which indicated that male and female students do not differ in achievement when exposed to the same instructional method.

The enhanced achievement in Basic Science and Technology test must have stemmed from the fact the use of the metacognitive skills package in teaching the experimental group engaged the students in critical, reflective and higher order thinking. This finding is supported by Eze and Onuigbo (2009) and Umaru (2010) who in their separate studies revealed that interaction effect of instruction in metacognitive skills and gender on mathematics achievement was significant. This indicates that the relative effect of instruction in metacognitive skills on achievement means scores of students was consistent across gender suggesting that both male and female students benefited significantly from the studies. The present study has shown that the era of gender disparity in science and technology achievement is gradually winding up. With the mean scores of male and female students not being significantly different in achievement, the commonly held view of science and technology-courses being for males will, all things being equal gradually become history.

## Conclusion

The following conclusions were reached in line with the findings of the study: Students taught with the metacognitive skills package achieved better than those taught with the lecture method. The use of metacognitive skills-package significantly enhanced the achievement of male and female students in Basic Science and Technology, hence, improving gender equity in the subject.

## Recommendations

Based on the findings of the study it was recommended that Basic Science and Technology teachers should teach their students with metacognitive skills package to enhance students' achievement in the subject. Metacognitive skills package should also be used by teachers as a gender-friendly package to improve gender equity in Basic Science and Technology.

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