RELATIONSHIP AMONG METACOGNITION, STUDY HABIT AND ACHIEVEMENT OF SENIOR SECONDARY SCHOOL CHEMISTRY STUDENTS IN MINNA, NIGER STATE

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Abstract

The study investigated the relationship among Chemistry students' metacognition, study habits and achievement in secondary schools in Bosso Local GovernmentArea Niger state, Nigeria. The study adopted correlational research design.Four research question were raised, four null hypotheses were formulated and tested at 0.05 level of significance. Asimple random sampling technique was used to select ten schools and a total of 170students participated in the study. Two research instruments Metacognitive Inventory, (MI) adapted from Schraw & Dennison (1994)] and Chemistry Students' Study Habits Inventory(CSSHI) developed by the researchers were used for data collection. The two research instrument were subjected to face and content validity and a reliability coefficient of 0.63 and 0.70 respectively was obtained using the Cronbach alpha. Data collected were analyzed usingPearson moment correlation and t-test. Findings from the study revealed that there is a significant relationship among metacognition, study habit studentsachievement. However, no significant relationship was found among students' gender and metacognition or study habits. It was however recommended that students should take charge of their learning and teachers should equip the student with metacognitive skill and encourage them to imbibe good study habits to enhance their achievement in Chemistry.

Keywords: Metacognition, Study habit, Achievement, Secondary School Chemistry

Introduction

The importance of Chemistry agrees with the goal of secondary education in Nigeria which emphasizes useful living within the society Federal Republic of Nigeria(FRN 2014). Generally, having a good knowledge and understanding of Chemistry is necessary for working in almost all other sciences such as medical sciences, environmental sciences, material sciences and engineering in tertiary institutions.

In spite the recognition given to Chemistry in the study of many science courses in tertiary institutions the achievement of students in Chemistry is still low and unimpressive over the years(Owo 2015, Chinda 2009,Njoku 2007). Some factors identified to be responsible for this poor achievement have been attributed to poor teaching method poor learning environment, poor metacognition, lack of study habit, gender among others However,

Boekaerts&Corno (2005), observed that for any student to learn and achieve academic success the student must not only be actively involved in the learning process but should also be able to plan, observe, regulate and control his/her cognitive processes. By this it implies that the learner is the greatest determining factor of any learning activity since it is the learner that truly participates in the learning process especially when he/she is metacognitively and emotionally ready to learn. Therefore, learners of Chemistry need to possess high metacognition ability and the right study habit to be able to engage actively in learning and achieve success.

Metacognition could influence achievement of students in Chemistry. Metacognition comes from the root word "meta" meaning "beyond or at a higher level" and "cognition" meaning "the process of knowing, understanding and learning something'' (Pearson Education Limited, 2003). According to Owo&Ikwut (2015) Metacognition literally means "thinking about thinking" or cognition about cognition,metacognition therefore is the advanced intellectual ability of an individual to plan, reflect upon, monitor, understand and control his/her learning. This implies that metacognition influence student achievement especially in chemistry.

According to Lai (2011) Metacognition consists of two components: knowledge and regulation. Metacognitive knowledge includes knowledge about oneself as a learner and the factors that might impact performance, knowledge about strategies, knowledge about when and why to use strategies. Metacognitive regulation is the monitoring of one's cognition and includes planning activities, awareness of comprehension and task performance, and evaluation of the efficacy of monitoring processes and strategies

Some researchers observed that metacognition has significant relationship with students' academic achievementsince students who possess metacognitive knowledge exhibit a wide range of metacognitive skills and tend to be more successful as they can self-regulate their learning, keep information longer and perform better.t(Nonghodu&Bhutia 2017, Laistner&Nancy 2016, Owo&Ikwut 2015, (Bogdanović, Obadović, Cvjetićanin, Segedinac&Budić, 2015; Narang& Saini, 2013) (Nbina, 2012; Nzewi&Ibeneme, 2011)On the other hand some researchers found negative or no relationship between metacognition and academic achievement

(Cetin 2017, Sarwar, Yousuf, Hussain & Noreen 2009) since other factors apart from metacognition plays a very important role on students achievement . Studies on metacognition and academic achievement is inconclusive while some researchers found significant positive relationship, others found negative or no relationship between metacognition and students' academic achievement.

Apart from metacognition some researchers have found study habit study habit to be a factor that affects the achievement of students in Chemistry. Study Habits are mainly external factors that facilitate the study process such as sound study routines that include how often a student engage in studying sessions, review the material, self-evaluate, rehears explaining the material, and studying in a conducive environment (Credé, 2008).

Study habits are important components of learning process because they contribute significantly in the development of knowledge and student's perception. There is a need, to guide the students about meaningful learning so that they are able to memorize things in a better way. Students improve their achievement because they can learn most of the concepts better through proper study habits. Studies on study habits and students' achievement shown that there exists no significant relationship between study habit and student academic achievement Arul (2014). Most often, students perform poorly in school simply because they lack good study habits. Students who succeed especially well usually follow a study habit that has been worked out by them and is vital to their achievement of good study results(Siahi&Maiyo 2015, Ehtesham Anwar 2013)..Gender could also be a factor that affects the achievement of student in Chemistry. Gender refers to the socially culturally built characteristics and roles which are attributed to males and females in any society Okeke(2008).
Some researchers opined that there exist differences between metacognition of male and female students (Veloo, Rani &Hariharan 2014, Ciascai, Liliana &Lavinia2011) While other observed that there exists no significant difference between metacognition of male and female students Sarwar et al (2009). Some researchers are of the opinion that there's a significant difference between study habit of male and female Chemistry students Mahaboobuvali& Reddy (2014). While others argue that there exist no significant difference study habits of male and femaleRajendran (2009). This study seeks to find out if metacognition and study habit of males and female student differs.

Statement of the problem

The importance of Chemistry to nation development cannot be ignored as Chemistry is a prerequisite for professional courses like medicine, pharmacy, biochemistry etc. It is therefore disheartening to discover that the Nigerian secondary students' achievement in Chemistry has been poor and unimpressive over the years (Njoku 2007; Chinda, 2009). This poor achievement can however be attributed to poor metacognition (Nonghodu&Bhutia 2017, Laistner& Nancy 2016, Owo&Ikwut 2015) and poor study habits(Siahi&Maiyo 2015, Ehtesham Anwar 2013) of students towards chemistry. Some researchers opined that there exists a significant relationship between metacognition, study habit and achievement of student in Chemistry while others found that the exist negative or no relationship between metacognition, study habit and student achievement in senior secondary school Chemistry. Hence this study intends to ascertain if there exist any relationship between metacognition, study habit and the achievement of Chemistry student and the extent to which it affects their achievement.

Objectives of the study

The study examined the relationship between metacognition, study habit, gender and achievement of Chemistry students in secondary schools

Research questions

The following research questions were answered in this study

- Is there any relationship between Metacognition and achievement of students in Chemistry?
- Is there any difference between the metacognition of male and female Chemistry students?
- Is there any relationship between Study habit and achievement of students in Chemistry?
- Is there any difference between the study habit of male and female Chemistry students?

Research Hypotheses

The following null hypothesis were tested at 0.05 level of significance

Ho_1 There is no significant relationship between Metacognition and student achievement in Chemistry.
Ho_2 There is no significant difference between Metacognition of male and female Chemistry students.
Ho_3 There is no significant relationship between Study habit and student achievement in Chemistry.
Ho_4 There is no significant difference between Study habits of males and female' Chemistry students.

Methodology

The study adopted correlational design. A simple random sampling technique was used to select four schools from Bosso Local Government Area and a sample size of 170 students in their intact classes from four randomly selected coeducational senior secondary schools participated in the study. Two research instruments [Metacognitive awareness Inventory, MAIand Chemistry Students' Study Habits Inventory, CSSHI were used for the study MAI . was adapted from Schraw & Dennison (1994)]which was aimed at finding the student metacognitions which includes planning, evaluation, monitoring, information management strategies, debugging strategies, declarative knowledge, procedural knowledge and conditional knowledge.

The Chemistry Students' Study Habits Inventory, CSSHI developed by the researcher were used to ascertain the student's study habits this was centered on the component of study habits which include the environment and planning of study, concentration while studying, preparations for test and exams, note taking in class and to their diets, rest and exercise. End of term Chemistry examination result of SSII was used as their achievement, Items in the instruments were subjected to face and content validity and a reliability coefficient of 0.63 and 0.70 respectively was obtained using the Cronbach alpha. Data collected wereanalyzedusing Mean, standard deviation, Pearson moment correlation and t-test.

Results

HO_1: There is no significant relationship between Students Metacognition and Academic Achievement in Chemistry.

Table 1: Pearson Moment Correlation of Students' Metacognition and Achievement in Chemistry.

Variables	N	r	P
Metacognition	170	0.251*	0.01
Academic Achievement	170		

*- Significant at p<0.05

The result in Table 1 shows (r=(0.251) at P<0.05, hence the null Hypothesis is rejected. This means that there is significant relationship between metacognition and Academic Achievement in Chemistry. The correlation coefficient (r) shows that the relationship is weak and Positive.

HO_2: There is no significant difference in the metacognition of male and female students.

Table 2: t-test comparison of metacognition of male and female students.

Variable	N	df	Mean	SD	Mean/ SD	t-value	Sig
Male	70	150	68.03	9.73	6.992	-0.219	0.413
Female	100		68.37	9.88	6.920		

*- Significant at P≥ 0.05

Table 2 shows that(t(150)= -0.219 at P>0.05) level of significance. This means that there is no significant difference in the metacognition of male and female students; P> 0.05 level of significance therefore hypothesis 3 was accepted. There is no difference between the metacognition of male and female students.

HO_3: There is no significant relationship between Students Study Habit and Academic Achievement in Chemistry.

Table 3: Pearson Moment Correlation of Students Study Habit and Academic Achievement in Chemistry.

Variables	N	r	P
Students study Habit	170	0.210*	0.006
Academic Achievement	170		

*- Significant at p<0.05

Table 3 shows that (r0.210; P<0.05,) hence the null hypothesis is rejected. This means that there is significant relationship between students' study habit and Academic Achievement in Chemistry. The correlation coefficient (r) shows that the relationship is a weak and Positive.

HO_4: There is no significant difference in the Study habit of male and female Chemistry students.

Table 4: t-test comparison of Study Habit of male and female students.

Variable	N	df	Mean	SD	Mean/ SD	t-Value	Sig.
Male	70	164	86.5	6.69	12.929	-0.69	0.24
Female	100		87.3	8.28	10.543		

*- Significant at P≥ 0.05level

Table 4 shows that (t(164) = -0.69 at P>0.05) level of significance. This means that there is no significant difference in the Study Habit of male and female students; P>0.05 level of significance therefore hypothesis 4 was accepted.

Discussion of results

Findings from this study revealed that there is a significant relationship between metacognition and the achievement of secondary school Chemistry students. The findings reveal that students with high metacognition are more strategic, and are able to engage in self-regulated learning as well as using problem solving strategies effectively, and therefore achieve significant higher academic score than those with low metacognition. This finding therefore suggests that students having good metacognition are likely to achieve academic success. Finding of this study is in agreement with that of (Nonghodu&Bhutia 2017, Laistner& Nancy 2016, Owo&Ikwut 2015, (Bogdanović, Obadović, Cvjetićanin, Segedinac&Budić, 2015;Narang& Saini 2013) that reported positive correlation between metacognition and academic achievement.

Also findings from hypotheses 2 revealed that there is no significant difference between the metacognition of male and female secondary school Chemistry students. This shows that both male and female student have equal opportunity to use metacognition to improve their achievement. Findings of this study is in agreement with Sarwar,et al (2009).

Findings from hypotheses 3 also revealed that there is a significant relationship between Study habit and the achievement of secondary school Chemistry students, successful achievement in any form of academic activity is based upon good study habits, students who succeed especially well usually follow a study habit that has been worked out by them and is vital to their achievement of good study results. Result on relationship between study habit and academic achievement uphold results of previous studies (Siabi&Maiyo 2015, Ehtesham Anwar (2013) that reported positive correlation exist between students' study habit in their school subject influence students' academic achievement.

Findings from research hypotheses 4 revealed that there is no differences between the study habit of male and female secondary school Chemistry students. This shows that both male and female student have equal opportunity to use good study habit to improve their achievement. Findings of this study is in agreement withRajendran (2009).

Conclusion

In the present study, metacognition and study habits has being established to be good predictors of students' academic achievement as they significantly correlate with Chemistry achievement score. This shows that students have an active role to play in learning and to ensure they are higher achievers in their academic work and beyond. The should ensures to plan, monitor and evaluate their comprehension, apply strategy that has worked for them in their area of difficulty and also imbibe good study habits. Both metacognition and study habit is gender friendly, therefore parents, teachers, curriculum designers and school heads should consider these factors as important correlates of academic success, and so strive to develop them in students.

Recommendations

Based on the findings of this study, the following recommendations are made:

1. Chemistry student should be encouraged to take charge of their own learning by planning, monitoring and evaluating their own learning process to achieve success.

2. Chemistry teachers, students should determine strategies that has worked out in the past and apply them to their area of difficulty.
3. Parents should encourage the development of good study habit like daily review of notes, following a schedule of reading their books and remain focused.
4. Workshop ,seminar and conferences should be organized for Chemistry teachers to train them on
5. how to inculcate good study habits in their students.

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