

## Senior Secondary School Students' Attitude Toward Chemistry in Katsina Metropolis, Nigeria: Effect of Concept Mapping Instructional Technique

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**ABSTRACT:** *The study looked at Students' Attitudes toward Chemistry in Katsina Metropolis, Nigeria and their reaction to Concept Mapping Instructional Approach. Idea mapping was used to compare the mean attitude scores of male and female students who were taught the periodic table concept in Chemistry. The average attitude ratings of students who were taught the concept using concept mapping and those who were taught the identical concept using the lecture method following the treatment were compared in the study. From eleven Katsina public senior secondary schools, 11,094 Senior Secondary School II (SSII) Chemistry students comprised of the population. Two schools and 128 SS2 Chemistry students formed the study sample. Two research questions with corresponding hypotheses were raised and developed respectively to guide the investigation. Two classes were chosen at random and given the roles of experimental and control groups in the study. The preliminary and final tests controls were non-equivalent. The researcher employed the Concept Mapping Attitude Scale towards Chemistry (CMASTC) as the instrument for gathering data. The questions were answered using average and variation, and the assumptions were tested using t-test statistics. Results showed among other things, that there was no statistically significant difference in the mean attitude scores of boys and girls who were taught the periodic table concept using concept mapping compared to others exposed to same concept employing lectures. The study suggested, concept mapping has been shown to encourage a promising future for learners; teachers might employ it in classroom.*

**KEY WORD:** attitude; chemistry; concept mapping; instruction; technique

### INTRODUCTION

Nigeria needs to develop her populace scientifically and technologically in order to be abreast with and proffer solution to the global challenges. Acquisition necessary skills could

significantly aid in realizing the country's goal of self-sufficiency and the pursuit of scientific and technological advancement. According to Ajayi (2021) prioritizing investments in provision of relevant skills in science and technology is necessary for the nation to achieve her aspirations. Regrettably, the nation hasn't quite succeeded in realizing its intention to be self-sufficient. Chemistry as one of the major science subjects that has the curriculum content to impart the necessary scientific and technological skills to learners has been recording poor performance at secondary schools' national examinations. Kanni(2020) maintained that despite the significance of chemistry, its educational value that is pertinent to each learner's needs, a nation's economic and technological advancement, and researchers efforts to improve teaching and learning, student performance in the subject is still not encouraging, indicating that the level of performance is still insufficient.

This may not be unconnected with their attitude to the subject as individual's attitude is a relatively strong feeling that makes him or her more likely to react consistently favourably or unfavourably to certain things or circumstances (Otor, 2011). Interest, value, self-esteem, and preference are emotional conceptions and expressions that are related to attitude. It is also emphasizing Akpan (1999) is of the view that interest is directed towards a particular action, whereas attitude is focused on an object. Intelligent, attitude, personality, and type of school are the primary characteristics that influence students' decisions to study chemistry in secondary schools in Nigeria (Otor, 2011). According to Jegede and Okebukola (2012), socio-cultural factors play a role in the attitude gap between boys and girls. It is necessary to use a variety of strategies to help students understand difficult chemistry concepts and engage in interactive thought (Raymond, 2015). Students are motivated to learn as a result of the incorporation of these ideas. Students have the chance to work in groups when they use concept mapping, which promotes collaborative learning and also developing their attitude toward chemistry. Concept mapping are graphic representation of topics, ideas and their relationship which enables learners to connect such ideas for problem solving (Katagall, R, Dadda.R. and Goudar, S, 2015). This research is therefore an attempt to examine the senior secondary school students' attitude toward chemistry in katsina metropolis, Nigeria usin concept mapping instructional technique.

### **Statement of Problem**

Researcher noticed that Nigerian students' unfavorable attitudes toward chemistry may account for their unimpressive performance in the subject. Additionally, it has been determined that the primary factor influencing students' decision to study science in school is their attitude (Habor-Peters, 2001). Moreover, the researchers emphasized that whether or not students have positive views toward science, this will affect their choice of science courses at any level. It follows that more pupils have an inclination to perform better in the subject that interests them. The study looked at how students' attitudes toward chemistry change when a cutting-edge instructional method, such concept mapping, is applied in the classroom.

### **Objectives of the Study**

- i.** Examine disparity in average rating of learners exposed periodic table in Chemistry using treatment and those taught the same table without treatment.
- ii.** Determine the margin in average rating of sexes who received treatment and those who not.

### **Research Questions**

- i.** What determines the difference in average ratings of students taught table of elements in Chemistry employing treatment and others taught the same table without treatment?
- ii.** Is there margin in mean rating among sexes thought table of element employing intervention and those taught similar table without treatment?

### **Hypotheses**

**HO<sub>1</sub>:** Average rating does not show any significant differences among students taught table of element in Chemistry employing intervention and those taught the similar table without treatment.

**HO<sub>2</sub>** There are no notable average rating margin among sexes taught periodic table using treatment and those exposed to the same table without treatment.

### **METHODOLOGY**

This study employed pseudo-experimental-design. There was no randomization in the placebo among experimental group that underwent a pretest and post-test. The six-week experiment was conducted. All SS2 chemistry students in Katsina metropolitan were the study target demographic. A128 students out of 11,904 were involved in the study. A research design instrument titled concept mapping scale was utilized to gather data. The research hypotheses were tested using t-test whereas average and variations were utilized to answer concerns.

### **RESULTS**

**Research Question 1:** What determines the difference in average ratings of students taught table of elements in Chemistry employing treatment and others taught the same table without treatment?

**Table 1**

Groups	NO	X	SD	Mean Difference
Exp	64	33.72	4.69	4.03
Control	64	29.69	3.68	

**Table 1:** demonstrates that the control group's mean was 29.69, variation was 3.68, the mean of intervention subjects was 33.72 and its standard deviation was 4.69. Average disparity was 4.03 shows effect of the intervention, subjects exposed to table of elements using idea mapping had a more favorable attitude toward the concept than those who had not been taught the same concept using the lecture technique.

**Research Question 2:** Is there margin in mean rating among sexes thought table of element employing intervention and those taught similar table without treatment?

**Table 2:**

Groups	NO	X	STD	M.D
Boys	24	33.66	4.68	0.09
Girls	40	33.75	4.75	

**Table 2:** demonstrates that while the average score for boys was 33.66 and the error margin was 4.68, the mean rating of female stood at 33.75 variance was 4.75. The average difference of .09 reveals that the strategy was equally effective in teaching periodic table concepts to students of both sexes.

### Hypotheses

**HO<sub>1</sub>:** Average rating does not show any significant differences among students taught table of element in Chemistry employing intervention and those taught the similar table without treatment.

**Table 3.**

	NO	X	STD	X.D	DF	table- val	Cl- value	Remarks
Intervention	64	33.72	4.69					
				4.03	126	5.41	0.000	Rejected
Control	64	29.69	3.68					

$\alpha \leq 0.05$

**Table 4:** reveals that there is average disparity which is 4.03 positive to intervention subjects between the two groups. The estimated cl-value is 0.000,  $\alpha \leq 0.05$ , and the t-value is 5.41. The analysis's findings demonstrate that the p-value is lower than the alpha level. Therefore, assumption is not retained. It therefore indicates that there are notable distinction in the attitudes of learners exposed to periodic table concept in Chemistry using treatment and those who were taught the same concept using the lecture technique.

**HO<sub>2</sub>:** There are no notable average rating margin among sexes taught periodic table using treatment and those exposed to the same table without treatment.

**Table 5:.**

Variable	NO	X	STD	MD	DF	t- value	p-value	Remark
Boys	24	33.67	4.68					
				.83	62	.68	.944	Accepted
Girls	64	29.69	3.68					

$\alpha \leq 0.05$

**Table 5:** Shows that the mean differences that exist between male and female students is .83. t-val is .68 with a Cl-val of .944,  $\alpha \leq 0.05$ . Cl-val is greater than t-val therefore the assumption was retained.

## DISCUSSION

The research shows much disparity in learners attitude toward periodic table concept in Chemistry between the groups involved using treatment and placebo in the process of exposing them to the unit of instruction. It is not in collaborate with Yunus (2010), who noted differences in the attitude between the learners exposed to electricity concept employing idea mapping and lecture strategy. It also agree with Otor & Achor (2013) who discovered similar result while evaluation learner's attitude employing same strategies.

Lastly, study found no disparity in attitude rating between boys and girls exposed to periodic

table in Chemistry using concept mapping. It is not concur with Otor&Achor (2013), who revealed female students have more positive attitude towards concept mapping than their male counterparts.

## CONCLUSION

The concluded that students who were taught periodic table concept utilizing concept mapping showed significant difference in attitudes toward the concept than others that were taught using lecture method. Similarly, there was no disparity in average behaviour rating between boys' and girls' students exposed to periodic table concept using concept mapping.

## Recommendations

The following recommendations have been made:

1. Chemistry professors should adopt concept mapping as one of the teaching methods they might employ in the classroom because it has been proven to be beneficial in fostering students' interest in the subject.
2. Training institutes should promote the concept mapping technique among aspiring teachers. This could be an intentional attempt to convince them of its importance.

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