TEACHERS' PERCEPTION OF THE RELATIONSHIP BETWEEN EMOTIONAL INTELLIGENCE AND ACTIVE ENGAGEMENT ON STUDENTS' ACADEMIC ACHIEVEMENT IN CHEMISTRY IN GOMBE METROPOLIS

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Abstract
This study examines the perception of teachers on the relationship between emotional intelligence and active engagement on students' academic achievement in Chemistry. Three (3) purposes, three research questions and three corresponding null hypotheses guided the study. The study adopted correlational research design. The study was carried out in Gombe Metropolis. Five schools were randomly sampled from a total of ten (10) public schools in Gombe Metropolis. Five science teachers from each of the five schools comprised the sample. Three instruments were used for the study; Namely-Emotional Intelligence Questionnaire, Active Engagement Questionnaire and Pro-forma. The instruments were validated by three (3) experts, from Test and Measurement, Educational Psychology and Chemistry Education unit, all from Faculty of Education, Federal University of Kashere. EIQ and AEQ yielded a reliability co-efficient of 0.89 and 0.92 respectively, using Cronbach's Alpha reliability method. The data were collected on the spot and Pearson Product Moment correlation coefficient was used to analyze and answer research question 1 and 2, while regression analysis was used to analyze and answer research question 3. The significant value from Pearson analysis was used to test hypothesis 1 and 2 while ANOVA output in regression analysis was used to test hypothesis 3, all at 0.05 level of significance. The findings showed that there is a moderate, positive and significant relationship between students' emotional intelligence, active engagement and academic achievement. Therefore, teachers should be trained on the importance of emotional intelligence and active engagement and how to incorporate these concepts into their teaching practices.

Keywords: Chemistry, Emotional Intelligence, Active Engagement, Academic Achievement, Teachers' Perception

Introduction
The alarming decline in academic achievement among students in chemistry is not merely a result of insufficient content knowledge or ineffective teaching methods, but rather, a deeper and often overlooked issue rooted in the emotional and psychological aspects of learning. The lack of emotional intelligence such as poor self-regulation, limited empathy, and difficulty managing stress coupled with minimal active engagement in the subject, is creating a barrier that prevents students

from fully grasping the complexities of chemistry. Without the emotional resilience to persevere through challenges or the motivation to actively participate in the learning process, students are unable to connect with the material in meaningful ways (Sibomana, Karegeya & Sentongo 2021). The disconnection from learning due to emotional intelligence can reduce student interest in learning, which may lead to poor academic achievement, especially in subjects that requires students to put in their best intellectually and emotionally. Among the factors that have been identified to be responsible for poor performance in chemistry are poor methods of instruction, teacher attitude, laboratory inadequacy, poor science background and non-availability of effective teaching and learning resources in classrooms (Agoro, 2018). The poor achievement of student in chemistry has continued to be a major cause of concern to all, particularly those in the mainstream of chemical education in Nigeria. Despite huge investment of the stakeholders in this sector, the performance of students continues to be generally poor.

Several other factors have been advanced to affect students' poor performance. Student factor, teacher factor, societal factor, the governmental infrastructural problem, language problem examination body related variables, curriculum related variables, test related variables, textbook related variables and home related variables. Kenni (2020) identified specific variables such as poor primary school background in science, lack of incentives for test, lack of interest on the part of students, students not interested in hard work, incompetent teachers in the primary school, large classes, and fear of the subject psychologically among others. To reverse this trend, it is crucial to recognize the integral role that emotional intelligence and active engagement play in fostering academic achievement in chemistry, and to develop strategies that address these critical areas.

Emotional intelligence is the ability to recognize, understand, manage, and utilize emotions effectively in oneself and in others. According to Gignac (2015) emotional intelligence involves skills such as emotional awareness, emotional regulation, and the ability to use emotions to facilitate thinking and decision-making. This indicate that emotional intelligence is a psychological skill that involves been aware of one's emotions, developing the ability to control it and as well channel it in the right way and direction. Therefore, emotional intelligence is the ability to recognize ones' emotions, control it, and use it in a constructive way to improve intellectually and socially. This is supported by Zeidner, Matthews, and Roberts (2014) that stated that emotional intelligence is a range of competencies, that includes emotional awareness, emotional regulation, and social skills, which contribute to personal and professional success. In this study, Emotional intelligence is the ability to recognize, understand, and manage one's emotions, as well as to empathize with others, which help students navigate challenges, build relationships, and maintain motivation, ultimately enhancing their learning and performance.

Students with high emotional intelligence have the ability to manage their emotions, which helps them stay focused, manage stress and perform better in academics and socially. Emotionally intelligent students are more likely to set and pursue academic goals, persevere through challenges, and maintain a positive attitude towards learning (Malala, Onderi & Ajowi, 2020). Karimi, Kwena and Anika (2020) maintained that emotional intelligence helps students communicate effectively, collaborate with peers, and build supportive relationships with teachers and

classmates, which can foster a positive learning environment. Students with higher emotional intelligence can cope with academic pressures and setbacks, reducing anxiety and burnout, which supports long-term success (Chikendu, 2022). A study by Ramana and Devi (2018) reported a positive relationship in a study on relationship between emotional intelligence and academic achievement among intermediate students. Similar results were reported in a study of Suleman, Hussain, Syed, Parveen, Lodhi and Mahmood (2019) that a strong and positive correlation exists between emotional intelligence and academic success among undergraduate students. Therefore, Emotional intelligence enhances students' ability to navigate academic and social challenges, boosting both learning outcomes and students' active engagement.

Students' active engagement is the interest, willingness and internal motivation to participate in academic and extra-curricular activities, such as group discussions, projects, and hands-on activities that boosts critical thinking, problem solving skills, and resilience which produces great academic outcomes. According to Odum, Meaney and Knudson (2021), student engagement involves listening, processing, discussing and problem solving which explains 74% of all observed learning behaviours. It is the time and effort students devote to activities that are empirically linked to desired outcomes (Wanner, 2015). Generally, student engagement is the active participation of students in a variety of academic and co-curricular or school-related activities, as well as a commitment to achieving learning objectives (Ginting, 2021). Therefore, for students to participate actively in class, the teachers have to give numerous opportunities for students to participate in activities and respond to questions and discussions. Grijpma et al (2024) maintained that, teachers need to be competent in cultivating a learning environment in which students can engage with each other and the subject matter to develop themselves

Students that participate actively in academic activities without any compulsion tends to achieve greater results in their learning outcomes, develop leadership skills, communication skills, critical thinking capabilities, and problem solving skills. According to Munna and Kalam (2021), student active engagement grant access to prior knowledge, creates opportunities of better personal understanding of problems, sharpen observational skills, build self-confidence and self-reliance and lead to cognitive development. When students engage in interactive and constructive ways with the subject matter, their learning increases (Chi & Wylie, 2014) In the same vein, student engagement in interactive student-centered activities improves students' knowledge, skills, and personal and professional competencies (Kassab, El-Sayed & Hamdy, 2022).

Studies have also shown that students who participate actively in curricular and non-curricular activities tend to achieve more academically. Studies like Munna and Kalam (2021) found that students' engagement increases students' self-confidence and self-reliance and sharpen their observational skills and cognitive development. This is supported by the findings of Jonsson and Panadero (2018) which found that students with positive academic self-concept, high self-efficacy, good self-regulation skills, and high achievement are more likely to engage with their feedback. Bundock, Shumway, Burnside and King (2023) found that students with higher rates of active engagement made higher academic outcome and students had higher rates of engagement in classes in which teachers used more strategies to facilitate engagement; these high engagement rates

were associated with higher achievement gains.

Objectives

The general objective of the study is to examine teachers' perception of the relationship between emotional intelligence and active engagement on students' academic achievement in Chemistry in Gombe Metropolis. Specifically, the study determined the:

1. teachers' perception on the relationship between emotional intelligence and students' academic achievement in Chemistry.
2. teachers' perception on the relationship between active engagement and students' academic achievement in Chemistry.
3. teachers' perception on the relationship among emotional intelligence, active engagement and academic students' achievement in Chemistry.

Research Questions

The following research questions guided the study;

1. What is teachers' perception on the relationship between emotional intelligence and students' academic achievement in Chemistry?
2. What is teachers' perception on the relationship between active engagement and students' academic achievement in Chemistry?
3. What is teachers' perception on the relationship among emotional intelligence, active engagement and academic students; achievement in Chemistry?

Hypotheses

The following hypotheses were formulated and were tested at 0.05 level of significance:

1. Teachers' perception on the relationship between emotional intelligence and students' academic achievement in Chemistry is not significant.
2. Teachers' perception on the relationship between active engagement and students' academic achievement in Chemistry is not significant.
3. Teachers' perception on the relationship among emotional intelligence, active engagement and academic students' achievement in Chemistry is not significant.

Methodology

The study adopted correlational research design. This is because the study sought to determine the magnitude and direction of the relationship among teachers' perception on the relationship among emotional intelligence, active engagement and academic students' achievement in Chemistry The study was carried out in Gombe Metropolis. The sample size for the study is 25 science teachers. The sample was drawn using two stage sampling. First, the names of the ten public secondary schools were written in a piece of paper, folded and put in a container and then shuffled. The first paper was picked and opened, the name of the school that was picked was written down. Then the paper was folded and returned to the container, the same process was repeated until five different schools were drawn from the ten public schools in Gombe metropolis. In the second stage five science teachers were selected from the five school that emerged from the science teachers include; Mathematics, Chemistry, Physics, Biology and Agricultural science teachers, summing up to a total of 25 science teachers.

Three instruments were used for the study were; Emotional Intelligence Questionnaire (EIQ), Active Engagement Questionnaire (AEQ) and Chemistry Pro-

forma. The instruments were validated by three (3) experts, one from Test and Measurement Unit, one from Educational Psychology Unit and one from Chemistry Education Unit, all from Faculty of Education, Federal University of Kashere. EIQ and AEQ yielded reliability co-efficient of 0.89 and 0.92 respectively using Cronbach's Alpha reliability method. The data were collected on the spot and Pearson Product Moment correlation coefficient was used to answer research question 1 and 2 while regression analysis was used to answer research question 3. The significant value from Pearson analysis was used to test hypothesis 1 and 2 while ANOVA output in regression analysis was used to test hypothesis 3, all at 0.05 level of significance.

Result

Research Question 1

What is teachers' perception on the relationship between emotional intelligence and students' academic achievement in Chemistry?

Table 1: Pearson product moment correlation coefficient analysis of teachers' perception on the relationship between emotional intelligence and students' academic achievement in chemistry

		Emotional Intelligence	Academic Achievement
Emotional Intelligence	Pearson Correlation	1	.528
	Sig. (2-tailed)		.000
	N	86	86
Academic Achievement	Pearson Correlation	.528	1
	Sig. (2-tailed)	.000	
	N	86	86

The result in Table 1 shows teachers' perception on the relationship between emotional intelligence and students' academic achievement in chemistry in Gombe Metropolis. The result shows that a correlation coefficient of .528 were obtained for teachers' perception of the relationship between emotional intelligence and students' academic achievement in chemistry in Gombe Metropolis. This indicates that teachers' perceive a moderate and positive relationship between students' emotional intelligence and their academic achievement in chemistry.

Hypothesis 1

Teachers' perception on the relationship between emotional intelligence and students' academic achievement in Chemistry is not significant. The results in Table 1, shows that an associated probability level of .000 was obtained for teachers' perception on the relationship between emotional intelligence and students' academic achievement in chemistry. The associated probability level of .000 was less than 0.05 set as benchmark for taking decision. The hypothesis which states that teachers' perception on the relationship between emotional intelligence and students' academic achievement in chemistry in Gombe Metropolis is not significant was

rejected. The inference drawn is that teachers' perception on the relationship between emotional intelligence and students' academic achievement in chemistry in Gombe Metropolis is significant.

Research Question 2

What is teachers' perception on the relationship between active engagement and students' academic achievement in Chemistry?

Table 2: Pearson Product Moment Porrelation Coefficient Analysis of Teachers' Perception of the Relationship between Active Engagement and Students' Academic Achievement in Chemistry

		Active Engagement	Academic Achievement
Active Engagement	Pearson Correlation	1	.611
	Sig. (2-tailed)		.000
	N	86	86
Academic Achievement	Pearson Correlation	.611	1
	Sig. (2-tailed)	.000	
	N	86	86

The result in Table 2 shows teachers; perception on the relationship between active engagement and students' academic achievement in chemistry in Gombe Metropolis. The result shows that a correlation coefficient of .611 was obtained for teachers' perception on the relationship between active engagement and students' academic achievement in chemistry in Gombe Metropolis. This indicates that teachers perceive a moderate and positive relationship between active engagement and students' academic achievement in chemistry in Gombe Metropolis.

Hypothesis 2

Teachers' perception on the relationship between active engagement and students' academic achievement in Chemistry is not significant. The results in Table 2 shows that an associated probability level of .000 was obtained for teachers' perception on the relationship between active engagement and students' academic achievement in chemistry in Gombe Metropolis. The associated probability level of .000 was less than 0.05 set as benchmark for taking decision. The hypothesis which states that teachers' perception on the relationship between students' active engagement and academic achievement in chemistry in Gombe Metropolis is not significant rejected. The inference drawn is that teachers perceive a significant relationship between active engagement and students' academic achievement in chemistry in Gombe Metropolis.

Research Question 3

What is teachers' perception on the relationship among emotional intelligence, active engagement and academic students; achievement in Chemistry?

Table 3: regression analysis on teachers' perception on the relationship among emotional intelligence, active engagement and students' academic achievement in chemistry

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.679[a]	.461	.448	2.45673

a. Predictors: (Constant), Active Engagement, Emotional Intelligence

The result in Table 3 shows teachers' perception on the relationship among emotional intelligence, active engagement and students' academic achievement in chemistry in Gombe Metropolis. The result shows that a correlation coefficient of .679 was obtained for teachers' perception of the relationship among emotional intelligence, active engagement and students' academic achievement in chemistry in Gombe Metropolis. This shows that teachers' perception on the relationship among emotional intelligence, active engagement and students' academic achievement in chemistry in Gombe Metropolis is moderate and positive. The result also shows that a coefficient of [determination of .461 was obtained for teachers' perception on the relationship among emotional intelligence, active engagement and students' academic achievement in chemistry in Gombe Metropolis. This implies that teachers perceive that 46% variation in students' academic achievement is attributed to emotional intelligence and active engagement.

Hypothesis 3

Teachers' perception on the relationship among emotional intelligence, active engagement and academic students' achievement in Chemistry is not significant.

Table 4: Analysis of Variance (ANOVA) of simple linear regression analysis of teachers' perception on the relationship among emotional intelligence, active engagement and students' academic achievement in chemistry

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	427.659	2	213.830	35.429	.000[b]
Residual	500.947	83	6.036		
Total	928.606	85			

a. Dependent Variable: Academic Achievement
b. Predictors: (Constant), Active Engagement, Emotional Intelligence

The result in Table 4 shows that an F-value of 35.429 with an associated probability value of .000 was obtained for teachers' perception on the relationship among emotional intelligence, active engagement, and students' academic achievement in chemistry in Gombe Metropolis. Since the associated probability value of .000 was less than 0.05 level of significance. The hypothesis which states that teachers' perception on the relationship among emotional intelligence, active engagement and students' academic achievement in chemistry in Gombe Metropolis is not significant was rejected. The inference drawn is that teachers perceive that the relationship among emotional intelligence, active engagement and academic achievement in chemistry in Gombe Metropolis is significant.

Discussion of Findings

The result shows that teachers' perception on the relationship between emotional intelligence and students' academic achievement in chemistry in Gombe Metropolis is moderate and positive. The result also revealed that teachers' perception on the relationship between emotional intelligence and students' academic achievement in chemistry is significant. This suggests that students with higher emotional intelligence are more likely to perform well academically in chemistry. This relationship may be attributed to the ability of emotionally intelligent students to effectively manage stress, stay motivated, and engage in positive interactions with peers and teachers, all of which are crucial for academic success. These findings align with previous research by Malala, Onderi and Ajowi (2020) whose finding showed that emotionally intelligent students are more likely to set and pursue academic goals, persevere through challenges, and maintain a positive attitude towards learning. This is supported by Chikendu (2022) that found that emotional intelligence enhances students' ability to navigate academics and social challenges, boosting both learning outcomes and students' active engagement. Therefore, a positive correlation exists between emotional intelligence and academic outcomes (Ramana & Devi, 2018). The result also corroborates with the findings of Suleman, Hussain, Syed, Parveen, Lodhi and Mahmood (2019) that a strong and positive correlation exists between emotional intelligence and academic success among undergraduate students.

The result shows that teachers' perception on the relationship between active engagement and students' academic achievement in chemistry in Gombe Metropolis is moderate and positive. The result also revealed that teachers perceive that the relationship between active engagement and students' academic achievement in chemistry in Gombe Metropolis is significant. This suggests that students who are actively engaged in their learning process tend to achieve better academic results. Active engagement likely enhances students' understanding and retention of the material, leading to improved performance. This conclusion is supported by the research of Jonsson and Panadero (2018) whose findings indicated that students who engage more in academic activities develop self-efficacy and good self-regulation skills. This is supported by Munna and Kalam (2021) that found that students' engagement increases students' self-confidence and self-reliance and as well sharpen their observational skills and cognitive development. Likewise, Bundock, Shumway, Burnside and King (2023) found that students with higher rates of active engagement made higher academic outcome. All these research supports that student active engagements in studies help boost academic achievement.

The result also shows that teachers' perception on the relationship among emotional intelligence, active engagement and students' academic achievement in chemistry in Gombe Metropolis is moderate and positive. The result further shows that teachers perceive that the relationship among emotional intelligence, active engagement and students' academic achievement in chemistry in Gombe Metropolis is significant. This finding underscores the interrelated nature of these two factors and their combined impact on students' academic success. It suggests that both emotional intelligence and active engagement contribute jointly to improving academic outcomes. This observation is consistent with research by Kassab, El-Sayed and Hamdy (2022) who found that student engagement in interactive student-centered activities improves students' knowledge, skills, and

personal and professional competencies. This is also supported by Chi and Wylie (2014) whose research indicated that when students engage in interactive and constructive ways with the subject matter, their learning increases. Also, Wang and Eccles (2020) found that a combination of intrinsic motivation (related to emotional intelligence) and active engagement leads to better academic performance.

Conclusion

Based on the findings, the study concludes that teachers perceive that emotional intelligence and active engagement play crucial roles in enhancing students' academic performance in chemistry, and students who are emotionally intelligent are better equipped to handle academic challenges, while those who are actively engaged in their learning process achieve higher academic outcomes. Thus, fostering emotional intelligence and active engagement can significantly improve students' academic achievement.

Recommendations

Based on the findings, the study recommends that schools should integrate emotional intelligence training programs into their curriculum to help students develop skills such as self-awareness, self-regulation, motivation, empathy, and social skills. Educators should adopt teaching methodologies that promote active engagement, such as interactive lessons, group activities, and hands-on experiments, to enhance students' interest and participation in chemistry. Teachers should be trained on the importance of emotional intelligence and active engagement and how to incorporate these concepts into their teaching practices.

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