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INCORPORATING LOCAL PRACTICES INTO SENIOR SECONDARY TWO CHEMISTRY TOPICS FOR STUDENTS' INTEREST IN NIGERIA

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ABSTRACT

The study investigated the effect of incorporating local practices into senior secondary two Chemistry topics for students' interest in Lere, Kaduna State, Nigeria. The study adopted quasi-experimental design. A sample size of 57 Chemistry students was selected through a purposive sampling technique. The instruments for data collection was Incorporating Local Practices on Students Questionnaire (ILPSQ). The reliability coefficient of the instrument was 0.83. The research questions were answered using descriptive statistics of mean and standard deviation while t-test for independent samples was used to test the null hypotheses at 0.05 level of significance. The findings of the study showed Chemistry students taught using local practices knowledge showed high interest level than those taught in the control group. Also, male students slightly showed high level of interest in Chemistry when taught using local knowledge than their female counterparts Chemistry students in the public school slightly showed high interest level in Chemistry than those in the private school. There was no significant difference between the interest mean scores of students exposed to local practices and those not exposed to local practices. It was concluded that incorporating local practices knowledge in teaching Chemistry has significant effect on senior secondary II students' interest in Chemistry. It was also concluded that gender had no significant effect on Chemistry students' interest in Chemistry. The study recommended that teachers should actively incorporate local practices and examples into their Chemistry lessons. This could make the content more relatable and interesting for students, enhancing their engagement and understanding of the subject matter. By using familiar contexts, students could better grasp complex concepts and see the relevance of Chemistry in their daily lives. It was also recommended that school authorities should provide professional development opportunities for teachers so as to effectively integrate local practices into the curriculum.

Key Words: Acid-Base Gender Interest Local Practices Location

INTRODUCTION

The role of education is not just to impart knowledge but also to cultivate interest in subjects that contribute to personal and societal development. In Nigeria, chemistry is one of the most important subjects in the secondary school curriculum, providing a foundation for careers in medicine, engineering, agriculture, and other science-based professions. However, despite its importance, students' interest in chemistry, particularly at the Senior Secondary Two level, has been on a steady decline. This lack of interest often results in low performance, reduced enrolment in science courses, and a general apathy towards the subject.

One key reason for this decline in interest is the method of instruction. Traditional teaching methods in Nigerian schools often fail to engage students or connect the subject matter to their everyday experiences. Theoretical lessons, devoid of practical relevance, create a disconnect between what students learn in school and what they observe in their daily lives. This gap between classroom learning and real-world application leads to disinterest, as students struggle to find meaning or relevance in what they are being taught.

Interest is a decisive factor in the learning process. It is the dynamics of assimilation, and every process of equilibration is based on interest. Together with many other authors, it is believed that developing interest in a topic is an important pre-condition for self-directed learning, as well as

an important goal for school learning with regard to life-long learning, out-of-school behaviour and choice of profession. Since 1965, Herbart's modern pedagogy has emphasized the value of interest not only as a means, but as an educational end in itself. Modern interest research has confirmed Herbart's conception, and that interest-based motivation to learn has positive effect both on the learning process and on the quantity and quality of learning outcomes (Hidi, Renninger & Krapp, 2004).

Incorporating local practices into the teaching of chemistry has the potential to reignite students' interest in the subject. Local practices are the everyday activities and processes rooted in the cultural and environmental context of the students. These practices can be powerful tools in illustrating scientific concepts in ways that students can relate to. By connecting abstract chemical theories to the familiar practices of their communities, students are more likely to develop a genuine interest in the subject, seeing its practical value and relevance to their own lives. Research has shown that, incorporating local practices into the teaching of chemistry has shown significant potential in enhancing student achievement. This approach leverages culturally relevant examples and practices to make the subject matter more relatable and engaging for students. By connecting abstract chemical concepts to everyday life and local practices, educators can foster a deeper understanding and appreciation of chemistry among students. A study by Eilks and Hofstein (2015) demonstrated that using traditional Ugandan brewing methods in teaching fermentation processes led to improved student comprehension and interest in organic chemistry. Furthermore, gender is a variable that affects achievement in Chemistry, especially the traditional gender stereotype which sees the role of the female as relegated to the kitchen and as home makers. The rate of encouragement given to female students to be academically successful in the home or in most Nigerian communities is less compared to their male counterpart. This means that there are certain expectations some families associate to the gender of their children.

The process of making traditional soap from ashes and oil in rural Nigerian communities can be used to teach students about saponification, a fundamental chemical process. Similarly, using alum to purify water, a common practice in many villages, can be linked to lessons on coagulation and water treatment. When students see how chemistry applies to tasks they or their families engage in daily, their interest is piqued. This practical approach makes the subject less intimidating and more relatable, thus fostering a sustained interest. Moreover, research supports the idea that interest-driven learning leads to better academic outcomes. Piaget and other educational theorists have long emphasized the role of interest in learning, arguing that it is a crucial factor in cognitive development and self-directed learning. When students are interested in what they are learning, they are more motivated to engage deeply with the material, ask questions, and seek further understanding. This not only improves their immediate learning experience but also promotes a lifelong curiosity and love for learning. Regarding gender, the research findings are mixed: male students tended to report higher levels of academic achievement than female students (Papworth, 2016). However, women were more persistent when setting long-term goals (higher future time perspective) compared to men. Additionally, most researches on grit has indicated very few differences by gender (Bowman et al., 2015; Crede et al., 2016).

In view of the foregoing, incorporating local practices into Senior Secondary Two chemistry lessons is an effective strategy for increasing students' interest in the subject. By connecting chemistry to the students' cultural and environmental context, educators can make the subject more engaging and relevant. This approach has the potential to reverse the trend of declining interest in chemistry and inspire a new generation of students who are not only capable of mastering the subject but are also genuinely enthusiastic about it. As interest and engagement grow, so too will students' achievement, enrolment in science courses, and overall academic success.

OBJECTIVES OF THE STUDY

The study sought to;

1. determine the effect of incorporating local practices in improving the Senior Secondary Two Chemistry interest in acid – base, salt and chemical reactions in Lere, Kaduna State.
2. find out the influence of school type on students' interest when taught by incorporating local practices
3. determine whether school type has influence on the students' interest when taught by incorporating local practices.
4. find out is the influence of school location on students' interest when taught by incorporating local practice.

RESEARCH QUESTIONS

The following research questions were paused to guide the study:

1. What is the effect of incorporating local practices in improving the Senior Secondary Two Chemistry interest in acid-base, salt and chemical reactions in Lere, Kaduna State?
2. What is the influence of gender on the students' interest when taught acid-base, salt and chemical reactions using incorporating local practices in Lere, Kaduna State?
3. What is the influence of school type on the students' interest when taught by incorporating local practices?
4. What is the influence of school location on students' interest when taught by incorporating local practice?

HYPOTHESES

The following hypothesis was stated and tested at 0.05 level of significance

1. There is no significant difference between the interest mean scores of students exposed to local practices and those not exposed to local practices.

METHOD

The study adopted the pretest-posttest, control group quasi-experimental design with a 2x2x2 factorial matrix. In essence, the study consisted of one intervention (incorporation of local practices) and the control. The population of the study comprised all Chemistry students in SSII, Lere Local Government Area, Kaduna State, which together summed up 943, made up of 501 males and 442 females. The schools were made up of mixed sex. The sample was purposively chosen from SSII Chemistry class. The sample size was 30 students which comprised 18 males and nine females selected from School A and 14 males and 16 females from school B respectively. The instrument used for data collection was Incorporating Local Practices on Students Questionnaire (ILPSQ). ILPSQ consisted of 25 items on Chemistry students' interest in instructional materials. The instrument was structured on a four-point rating scale.

RESULTS

Research Question One: What is the effect of incorporating local practices in improving the Senior Secondary Two Chemistry interest in acid-base, salt and chemical reactions in Lere, Kaduna State?

Table 1: Descriptive Statistics of Chemistry Students' Interest in Chemistry in the Experimental and Control Groups

		Pre-test		**Post-test**		
Group	**N**	$\bar{x}_1$	***SD₁***	$\bar{x}_2$	***SD₂***	**Mean gain**
Experimental	27	43.26	8.23	62.67	8.81	19.41
Control	30	40.90	8.92	58.47	10.50	17.57
Mean Difference		**3.06**		**4.2**		**1.84**

Table 1 reveals that the pre-test mean interest scores of the experimental and control group were 43.26 and 40.90 respectively with their standard deviation scores of 8.23 and 8.92. The post-test mean interest scores of the groups were 62.67 and 58.47, respectively with their standard deviation scores of 8.81 and 10.50. The overall mean difference between their interest level was 1.84 in favour of the experimental group. This shows that the Chemistry students in the experimental group showed high interest level in Chemistry than those in the control group

Research Question Two: What is the influence of gender on students' interest when taught acid-base, salt and chemical reactions using incorporating local practices in Lere, Kaduna State?

Table 2: Descriptive Statistics of the Interest Level of Male and Female Chemistry Students in the Experimental Group

		Pre-test		Post-test		
Gender	**N**	$\bar{x}_1$	***SD₁***	$\bar{x}_2$	***SD₂***	**Mean gain**
Male Student	18	42.72	7.64	62.50	9.65	19.78
Female Student	9	44.33	9.70	63.00	7.33	18.67
Mean Difference		**1.61**		**0.5**		**1.11**

Table 2 reveals that the pre-test mean interest of male and female scores of the experimental group were 42.72 and 44.33 respectively with their standard deviation scores of 7.64 and 9.70. The post-test mean interest scores of the two genders were 62.50 and 63.00 respectively with their standard deviation scores of 9.65 and 7.33. The overall mean difference between the mean gains of the two genders was 1.11 in favour of the male students. This shows that the male students slightly showed high level of interest in Chemistry when taught using local knowledge than their female counterparts.

Research Question Three: What is the influence of school type on the students' interest when taught by incorporating local practices?

Table 3: Descriptive Statistics of Chemistry Students' Interest in Chemistry in the Public and Private Schools

		Pre-test		Post-test		
School Type	**N**	$\bar{x}_1$	***SD₁***	$\bar{x}_2$	***SD₂***	**Mean gain**
Private School	27	40.96	9.12	58.74	8.69	17.78
Public School	30	42.97	8.14	62.00	10.75	19.03
Mean Difference		**2.01**		**3.26**		**1.25**

Table 3 reveals that the pre-test mean interest scores of Chemistry students in public and private schools were 40.96 and 42.97 respectively with their standard deviation scores of 9.12 and 8.14. The post-test mean interest scores of the students based on school type were 58.74 and 62.00, respectively with their standard deviation scores of 8.69 and 10.75. The overall mean difference between their interest level was 1.25 in favour of the students in the public school. This shows that Chemistry students in the public school slightly showed high interest level in Chemistry than those in the private school.

Research Question Four: What is the influence of school location on students' interest when taught by incorporating local practice?

Table 4: Descriptive Statistics of Chemistry Students' Interest in Chemistry in the Urban and Rural Schools

		Pre-test		Post-test		
School Location	**N**	x_1	SD_1	x_2	SD_2	**Mean gain**
Urban	27	42.63	8.44	63.15	8.16	20.52
Rural	30	41.47	8.85	58.03	10.77	16.56
Mean Difference		**1.16**		**5.12**		**3.96**

Table 4 reveals that the pre-test mean interest scores of Chemistry students in urban and rural schools were 42.63 and 41.47 respectively with their standard deviation scores of 8.44 and 8.85. The post-test mean interest scores of the students based on school location were 63.15 and 58.03, respectively with their standard deviation scores of 8.16 and 10.77. The overall mean difference between their interest level was 3.96 in favour of the students in urban school. This shows that the Chemistry students in the urban school slightly showed high interest level in Chemistry than those in the rural school.

Hypothesis One: There is no significant difference between the interest mean scores of students exposed to local practices and those not exposed to local practice.

Table: 5: Summary of t-test Analysis of the difference between the Interest Mean Scores of Students in the Experimental and Control Groups

Group	N	$\bar{X}$	SD	*Df*	*t-value*	P-value.	Decision.
Experimental	27	62.67	8.81				
				55	1.626	0.110	Uphold
Control	30	58.47	10.50				

At 0.05 level of significance

Table 5 shows that the t-test calculated value was 1.626 with a p-value of 0.110 at df =55. Since the p-value is greater than the 0.05 level of significance (P = 0.110 > 0.05), we accept the null hypothesis which states that there is no significant difference between the interest mean scores of students exposed to local practices and those not exposed to local practices. Therefore, it is concluded that there is no significant difference between the interest mean scores of students exposed to local practices and those not exposed to local practice.

DISCUSSION

The findings of the study in Table 1 revealed that Chemistry students in the experimental group showed high interest level in Chemistry than those in the control group. This shows that the Chemistry students taught using local practices knowledge showed high interest level than those taught in the control group. The findings of the study concurred with findings of the study by Ogunniyi, and Ogude (2016) who carried out a study on the incorporation of indigenous knowledge systems into the teaching of chemistry to enhance students' understanding. The study found that integrating IKS into chemistry teaching improved students' interest, engagement and understanding of chemical concepts. Teachers identified several challenges, including a lack of resources and training, but also recognized the potential benefits of such an approach.

In addition, the findings of the study in Table 2 revealed that the male students slightly showed high level of interest in Chemistry when taught using local knowledge than their female counterparts. Though, the difference in the interest level between the two gender was not wide. Findings of the study is in line with the study by Ogunniyi, and Ogude (2016) who established that gender has no significant effect on the academic interest of senior secondary school students. The finding of the study in Table 3 showed that the Chemistry students in the public school slightly showed high interest level in Chemistry than those in the private school. The results of the study in

Table 4 revealed that Chemistry students in the urban school slightly showed high interest level in Chemistry than those in the private school. Also, the result of the study in Table 5 revealed that there was no significant difference between the interest mean scores of students exposed to local practices and those not exposed to local practices.

CONCLUSION AND RECOMMENDATION

From the findings of the study, it was concluded that incorporating local practices knowledge in teaching Chemistry has significant effect on senior secondary two students' interest in Chemistry. It was also concluded that gender has no significant effect on Chemistry students' interest in Chemistry. Cultural relevance and inclusivity incorporating local practices makes chemistry education more culturally relevant and inclusive, respecting and valuing students' backgrounds. This approach fosters a sense of belonging and reduces the cultural dissonance often experienced by students from diverse backgrounds in science classrooms. One significant challenge was the lack of resources and infrastructure to support the integration of local practices in chemistry education.

From the findings of the study, the following findings were made:

1. Teachers should actively incorporate local practices and examples into their Chemistry lessons. This can make the content more relatable and interesting for students, enhancing their engagement and understanding of the subject matter.
2. Students should take an active role in their learning by participating in discussions and activities that involve local practices. They should seek to understand how Chemistry principles apply to their surroundings and everyday experiences
3. School authorities should provide professional development opportunities for teachers to learn how to effectively integrate local practices into the curriculum
4. The government should consider revising the Chemistry curriculum to include more content that reflects local practices and indigenous knowledge

REFERENCES

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