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Effect Of Integrating Indigenous Knowledge Instructional Strategy On Senior Secondary School Two Students' Motivation And Performance In Physics In Jos North, Plateau State, Nigeria

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ABSTRACT: The research examined the effect of integrating indigenous knowledge strategy on senior secondary two students' motivation and performance in Physics in Jos North, Plateau State, Nigeria. The study was aimed to achieve the following objectives: determine the difference in pretest performance mean score of senior secondary two students taught Physics using indigenous knowledge strategy and those taught without, find the difference in the posttest performance mean score of senior secondary two students taught Physics using indigenous knowledge strategy and those taught without, ascertain the pretest and posttest performance mean score of male and female senior secondary two students taught Physics using indigenous knowledge instructional strategy and those taught without and to determine senior secondary two students' motivation mean level before and after taught Physics using indigenous knowledge instructional strategy and those taught without. Four purposes of the study, four research questions and three research hypotheses were formulated to guide the study. The research design used for this study was quasi experimental design. The population of the study comprised of ninety (90) schools, of which (68) are private-owned and (22) are government secondary schools in Jos North LGA. The sample of the study is 37 senior secondary two Physics students from two schools, with a number of 20 male students and 17 female students drawn from the population using simple random sampling technique. The instrument for data collection used in the study was the Physics Performance Test (PPT) and Students' Motivation Questionnaire (SMQ). Data collected were analyzed using mean and standard deviation for the four (4) research questions independent sample t-test was used for testing the three (3) hypotheses. The instruments were validated by two experts and thereafter a reliability index of 0.81 (PPT) and 0.77 (SMQ) was obtained for the two instruments indicating that it was reliable. Findings from the study revealed that the control group performed better than the experimental group with a mean difference of 2.30 at pre-test, the indigenous knowledge strategy better improves students' performance in Physics, the male and female students taught Physics using indigenous knowledge strategy had a similar performance mean score with a mean difference of 0.71, at pre-test the students had a lower motivation level before treatment while at post-test the students had a higher motivation level after treatment, there was a significant difference between the post-test performance mean score of senior secondary two students taught Physics using indigenous knowledge strategy and those taught without, there was no significant difference between the performance mean score of senior secondary two male and female students exposed to indigenous knowledge strategy, there was a significant difference between the mean motivation level of senior secondary two students taught Physics before and after using indigenous knowledge strategy in Jos North LGA, Plateau State. It was recommended among others that school administrators should facilitate professional development programs for teachers on creating and using indigenous knowledge strategies to facilitate the teaching and learning of Physics in senior secondary schools.

KEY NOTES: INDIGENOUS KNOWLEDGE STRATEGY, MOTIVATION, GENDER AND PERFORMANCE

I. INTRODUCTION

Physics is the study of matter, energy and their interactions. It is an international enterprise, which plays a key role in the future progress of mankind. Physics generates fundamental knowledge needed for the future technological advances that will continue to drive the economic engines of the world. The concepts learnt in Physics contribute immensely to the technological infrastructure needed to make scientific advances and discoveries (Kola, 2013). Furthermore, Physics education enables the learner to acquire problem solving and decision-making skills that pave way for critical thinking and inquiry that could help the learner to respond to widespread and radical changes in all face of life. Physics provides the child with basic knowledge in technology, medicine, engineering, communication, and so on.

Physics is the science that helps us understand various natural phenomena that are imbedded in reality. We use Physics in our daily life activities such as walking, cutting, watching, cooking. Despite all the importance of Physics to mankind Numerous factors have been identified in various research studies to be responsible for the continuous declining of our educational system. Various factors such as classroom size, poor teacher student ratio, in-adequate instructional materials, attitude of teachers towards work, lack of seriousness in part of students and socio-economic status of parents. Physics as one of the core science subjects has remained one of the most difficult subjects in the senior secondary school Physics curriculum (NERDC 2014). With the availability of more qualified teachers, improved technology and facilities for teaching and learning, educational system in Nigeria is still losing it values.Today, there is an increasing recognition of the importance of using indigenous (traditional) knowledge for contextualizing school science instruction, because it forms essential part of students' prior experiences and sources of information that they carry to school learning. Despite its proven effectiveness as useful teaching tool, there is yet no systematic effort, to develop effective framework for incorporating indigenous knowledge into school science curriculum to complement instruction process in Nigeria schools. No wonder, poor performance still persists (Erinosho, 2013).

Indigenous Knowledge System (IKS) is described in the South African Revised Curriculum Statements as a body of knowledge embedded in African philosophical thinking and social practices that have evolved over thousands of years. It is also a way for people to understand themselves (Semali and Kincheloe, (2018). Nakashima and Roue (2020) described it as sophisticated arrays of information, understandings and interpretations that guide human societies in their innumerable interactions with the natural milieu. It is the sum total of the knowledge and skills which people in a particular area possess and which enable them to get the most out of their natural environment. Mhakure and Mushaikwa (2014); De Beer and Whitlock, (2018) identified the following common themes embedded within indigenous knowledge that are intrinsic to its integration into the science curriculum: Based on experience; Often tested over centuries of use; Developed collective data base of observable knowledge; Adapted to local culture and environment; Dynamic and changing a living knowledge base; Application of problem solving; Oral transmission sometimes encapsulated in metaphor; Not possible to separate indigenous knowledge from ethics, spirituality, meta Physics, ceremony and social order; Bridging the science of theory with the science of practice; A holistic(indigenous knowledge) versus a reductionist(Western science) approach; An ecologically based approach; Inclusive versus the specialization of knowledge, and contextualized versus decontextualized science.

Teaching sciences generally needs to be rooted in indigenous knowledge and practices (Ugwu & Diovu, 2016). Jegede and Aikenhead (2016) observed that the current development towards 'science for all' in all parts of the globe necessitates that consideration be given to how pupils move between their everyday life–world and the world of school science; how pupils deal with cognitive conflicts between those two worlds, and what this means for effective teaching of science. They maintain that all learning is mediated by culture and takes place in a social context. Culture encompasses the knowledge, beliefs, art, morals, laws, customs and habits acquired by the people of the society (Jegede and Okebukola, 2014). It has been observed that without going to formal school, learning and quoting any theory or law of Physics by Western scientists, Africans had evolved industries, produced tools, instruments and machines that apply or utilize so many Physics concepts, principles, theories and laws, such as production and use of heat (furnace) in black smiting, gold smiting and pottery; musical instruments such as African Guitar, animal leather percussion drum, talking drum, wooden drum, metal gong, Konga, wooden flutes and animal horn flutes; use of crow-bar as lever system machine for lifting heavy loads, inclined plane also for lifting loads to heights, carving wooden canoes that carry heavy loads and still float and move on water. These and many other Physics concepts are unknowingly or unconsciously practiced indigenously but in isolation from Physics as a school science subject (Owolabi et al., 2016).

Motivation in learning is crucial for student success, especially in challenging subjects like Physics. Several studies have highlighted the positive impact of incorporating indigenous knowledge on student motivation. Ogunleye (2017) explored how indigenous knowledge strategies can enhance student motivation in Physics in Lagos State. The study revealed that students were more interested and engaged in Physics lessons that included indigenous knowledge elements, such as local examples and practical applications. This increased interest translated into better academic performance and a more positive attitude towards Physics. Ogunleye argued that when students perceive the relevance of Physics to their own cultural contexts and everyday lives, they are more likely to be motivated to learn and succeed in the subject. Moreover, integrating indigenous knowledge in Physics education can address the issue of alienation that many students feel when confronted with abstract scientific concepts. By contextualizing Physics within the framework of local knowledge and practices, Educators can make the subject more accessible and less intimidating for students. This approach not only

enhances motivation but also fosters a deeper understanding of the material. In a study by Nwachukwu and Okeke (2018), it was found that students who were taught Physics using indigenous knowledge strategies demonstrated a greater willingness to participate in class activities and exhibited a more enthusiastic attitude towards learning. Adding to this, Adedayo and Olanrewaju (2019) noted that incorporating indigenous knowledge into the Physics curriculum helps in cultivating a sense of identity and pride among students. When students see their cultural heritage reflected in the curriculum, it validates their backgrounds and experiences, which can be a powerful motivator. This sense of validation and pride in one's own culture can lead to increased engagement and motivation to succeed academically.Okafor and Ude (2020) investigated the impact of indigenous knowledge on the motivation of Physics students in Anambra State. They found that students who were taught with a curriculum that integrated indigenous knowledge showed higher levels of intrinsic motivation. These students expressed a greater appreciation for the subject and reported a deeper connection to the material. The study suggested that when students see the practical application of Physics in their own cultural context, it demystifies the subject and makes it more appealing. Furthermore, integrating indigenous knowledge in Physics education has been shown to promote collaborative learning and critical thinking skills. In a study by Bassey and Essien (2021), students in Cross River State who engaged in group activities involving indigenous knowledge were more likely to collaborate effectively and think critically about Physics problems. This collaborative environment fostered by indigenous knowledge strategies not only boosted student motivation but also enhanced their problem-solving skills and overall academic performance.

Gender is a social term used to differentiate males and females based on their roles and responsibilities. It has become a significant focus in recent science education research, aiming to bridge the participation gap between sexes in science education. Akinsola and Igwe, as cited by Eze (2011), suggest that gender issues are crucial in Nigeria's educational settings and may contribute to the low achievement of learners in Physics. Observations indicate a narrower participation of females in physical science and technology courses, with fewer females holding professional careers in these fields. Girls often feel discouraged by teachers' and parents' attitudes, suffering from low self-esteem. Research shows that female students have less positive attitudes towards mathematics than males and perform less well at the secondary school level, possibly due to the stereotyping of tasks and more attention given to the training of males in science areas. The type of school attended by females significantly influences their interest and performance in science subjects. Initially, girls in single-sex schools were thought to have an advantage in science over those in co-educational schools. Saeker, as cited by Eze (2011), argues that the success of single-sex schools is not solely due to their single-sex nature but also due to better learning conditions and the socio-economic backgrounds of the students. In Nigeria, many unity schools are federal government schools that attract females from upper-class backgrounds, which might explain their higher enrolment and performance in science, rather than the single-sex environment itself. Nkpa, as cited by Eze (2011), challenges the notion that single-sex schools foster better enrolment and performance of girls in science.

Gender, as defined by Okeke (2017), refers to the socially and culturally constructed roles and characteristics ascribed to males and females in any society. Gender results from cultural learning and socialization, continuing throughout one's life. It is a social construct equivalent to class and race and is not biologically determined. Gender roles are imposed through social institutions and self-perceptions (Chang, 2013; Owolabi, 2017). In Nigeria, gender norms have intersected with culture to produce sex role stereotypes, classifying activities by sex according to societal norms (Nzewi, 2010). This arbitrary assignment of roles has led to the perception of science and technology as masculine fields, discouraging female participation (Nzewi, 2010). This has resulted in lower female enrolment in science-related disciplines (Ojobo, 2018) and has affected their academic aspirations and achievements (Robert and Owolabi, 2017). The expectancy value model suggests that people's choices are strongly influenced by their values and self-concepts of ability. Chang (2013) reported a decline in gender differences in science performance, but female representation in science fields remains low. Gender differences in science achievement have been widely debated among educators and researchers. Some, like Iweka (2016) and Obiekwe (2018), argue that males perform better in sciences, while others, such as Okeke (2017) and Nzewi (2010), believe that males and females achieve equally, attributing differences to socio-cultural factors and opportunities. Ukwueze (2010) and Okoro (2011) suggest that instructional methods used in the classroom influence gender differences in academic achievement, with cooperative learning strategies favoring females and competitive or individualized learning favoring males. Existing literature does not conclusively determine the influence of gender on students' achievement and interest when taught Physics using inquiry teaching methods. Therefore, this study aims to explore the interactive effect of guided and unguided inquiry methods on students' achievement and interest in Physics. Interest, a critical factor in student achievement, refers to the likelihood of investing energy in specific stimuli. It is a form of intrinsic motivation,

involving engagement in an activity for its inherent enjoyment. Achievement and interest are components of motivation, playing prominent roles in learning and academic success (Nnachi, 2017). Lack of interest can lead to poor academic performance and increased dropout rates. Adeyemi (2018) describes academic performance as the scholastic standing of a student at a given moment, reflecting individual intellectual abilities. In Nigeria, student performance in primary, junior secondary, and senior secondary schools is determined through external examinations, with grades ranging from distinction (A-B) to failure (F) (Adeyemi, 2018). Evidence from SSCE results indicates that many students achieve below average in Physics. Cognitive learning theorists describe learning as a process of constant organization and reorganization of perception into a meaningful whole (Nnachi, 2017). Perception helps learners form motives influenced by attention and interest. Direct interest enhances ego-involvement, preventing distractions (Ngwoke, 2011). Okoro (2011) states that instructional methods adopted by teachers significantly impact students' interest in sciences, correlating with their perception of the subject's relevance to their future careers. Ngwoke (2014) suggests arousing learners' interest through questions related to the lesson.

II. STATEMENT OF THE PROBLEM

Physics is one of the science subjects taught in senior secondary school that deals with the fundamental constituents of the universe, the force that exerts on one another and the effects of these forces, and the most basic of the science field (Adeyemo, 2020). Knowledge of Physics established the means of transport in the air, on the land and in the sea. Factory plants and equipment, home and office appliances, and the world most needed development force-the Information and Communications Technology (ICT), are all products and applications of Physics. Despite the importance of Physics in the scientific, technological and consequently, economic development of any nation (Onasanya and Omosewo, 2016). Physics in Nigerian secondary schools in the past, has suffered serious setbacks Owolabi, (2015) ranging from poor teaching to poor learning, poor performance and finally poor enrollment. Of all these, poor teaching has been found to be the fundamental, as buttressed by Mohapatra (2015) that if the learner did not learn, then the teacher has not taught. The genesis of the anomaly is secondary school where Physics as a separate science subject is presented to the students for the first time and therefore how the subject is presented by the teacher is how the supposedly innocent students would see it. That is why classroom delivery remains a very essential part of curriculum implementation.

Plethora of studies has shown a persistent of 60% poor performance in Physics examinations which in turn leads to poor enrollment in Physics and Physics-related courses. Obviously, within the teaching and learning process, there must be a lacuna. To this Owolabi, Akintoye and Adeyemo (2015) lamented that, the teaching of Physics in most Nigerian schools was dominated by teachers without professional qualifications and so cannot work out the teaching strategy that will work. Okoronka and Wada (2014) in their study identified poor teaching methodology as the strongest force causing poor learning and consequently poor performance and low enrollment. African society has rich indigenous knowledge system and live applications of Physics concepts and principles that would enhance the teaching and learning of Physics in secondary schools, but they are not harnessed nor utilized in the Physics class (Owolabi, 2015). It therefore, becomes imperative to integrate indigenous knowledge and practices of the people in the society into Physics teaching in order to dispel the notion that the subject is foreign, abstract and has no relevance to the community daily activities. If the teacher can build on the previous knowledge of the students which include their indigenous knowledge system, indigenous language, indigenous instructional materials and indigenous technologies that utilize the theories, laws and principles of Physics concepts, then Physics will become familiar and friendly and understanding will be enhanced optimally. Thus, the focus is here is to identify the effect of integrating indigenous knowledge strategy on senior secondary two students' motivation and performance in Physics in Jos North Local Government Area of Plateau State.

PURPOSE OF THE STUDY : The main aim of this study is to examine the effect of integrating indigenous knowledge strategy on senior secondary two students' motivation and performance in Physics in Jos North, Plateau State. Specifically, this study seeks to:

1. Determine the difference in pretest performance mean score of senior secondary two students taught Physics using indigenous knowledge strategy and those taught without.
2. Find the difference in the posttest performance mean score of senior secondary two students taught Physics using indigenous knowledge strategy and those taught without.
3. Ascertain the pretest and posttest performance mean score of male and female senior secondary two students taught Physics using indigenous knowledge instructional strategy and those taught without.
4. Determine senior secondary two students' motivation mean level before and after taught Physics using indigenous knowledge instructional strategy and those taught without.

RESEARCH QUESTIONS

The following research questions will be answered in this study:

1. What is the difference in pre-test performance mean score of senior secondary two students taught Physics using indigenous knowledge strategy and those taught without?
2. What is the difference in the posttest performance mean score of senior secondary two students taught Physics using indigenous knowledge strategy and those taught without?
3. What is the pre-test and post-test performance mean score of male and female senior secondary two students taught Physics using indigenous knowledge strategy?
4. What is the mean motivation level of senior secondary two students taught Physics before and after using indigenous knowledge strategy?

RESEARCH HYPOTHESES

1. There is no significant difference between the posttest performance mean score of senior secondary two students taught Physics using indigenous knowledge strategy and those taught without.
2. There is no significant difference between the performance mean score of senior secondary two male and female students exposed to indigenous knowledge strategy.
3. There is no significant difference between the mean motivation level of senior secondary two students taught Physics before and after using indigenous knowledge strategy.

III. METHODOLOGY

This study employed the Quasi-experimental research design that is the non-equivalent control group design. The design was considered appropriate for the study because in involves getting data from two groups of students, that is the experimental group and the control group. A pre-test was given to both groups before any treatment was administered so as to determine students' entry behaviour. After treatment had been administered, a post-test was then given to both groups. The aim of this design is to compare the scores of the two selected school in Jos North Local Government Area.

IV. RESULTS

The results of the analyses are presented as shown in table below;

Research Question One: What is the difference in pre-test performance mean score of senior secondary two students taught Physics using indigenous knowledge strategy and those taught without?

Table 2: Summary of Pre-test Performance Mean scores and Standard Deviation of Students in Experimental and Control Group

Groups	N	$\bar{x}$	S.D	Mean Difference
Experimental	20	46.35	2.85	2.30
Control	17	48.65	2.00	

Table 2 showed the difference in performance mean scores and standard deviation of senior secondary two students taught Physics using indigenous knowledge strategy (experimental) and those taught without (control) at pre-test. The experimental group obtained a mean score of 46.35 with a standard deviation of 2.85. In the control group a mean score of 48.65 with a standard deviation of 2.00 was obtained which was slightly higher than the experimental group with a mean difference of 2.30.

Research Question Two : What is the difference in the posttest performance mean score of senior secondary two students taught Physics using indigenous knowledge strategy and those taught without?

Table 3: Summary of Post-test Performance Mean scores and Standard Deviation of Students in Experimental and Control Group

Groups	N	$\bar{x}$	S.D	Mean Difference

Experimental	20	70.05	11.13	17.70
Control	17	52.35	3.18	

Table 3 shows the performance mean scores and standard deviation of senior secondary two students taught Physics in the experimental and control group at post-test. As a result of exposure to treatment, students in the experimental group obtained a mean score of 70.05 with a standard deviation of 11.13. Students in the control group obtained a mean score of 52.35 with a standard deviation of 3.18. This implies that indigenous knowledge strategy better improves students' performance in Physics.

Research Question Three : What is the pre-test and post-test performance mean score of male and female senior secondary two students taught Physics using indigenous knowledge strategy**?**

Table 4: Summary of Pre-test and Post-test Performance Mean Score of Male and Female Taught Physics using Indigenous Knowledge Strategy

		Pre-Test		Post-Test			
Gender	**N**	**$\bar{x}$**	**S.D**	**$\bar{x}$**	**S.D**	**$\bar{x}$ – Gain**	**$\bar{x}$ –Difference**
Male	12	47.58	2.78	71.00	12.74	23.42	0.71
Female	8	44.50	1.85	68.63	8.80	24.13	

Table 4 shows the pre-test and post-test performance mean score of male and female students taught Physics using indigenous knowledge strategy. The male obtained a mean score of 47.58 with a standard deviation of 2.78 at pre-test. At post-test, a mean score of 71.00 was obtained with a standard deviation of 12.74. A mean gain of 23.42 was obtained indicating that there was an increase in the performance of students in Physics after exposure to indigenous knowledge strategy. The female obtained a mean score of 44.50 and a standard deviation of 1.85 at pre-test, while at post-test a mean score of 68.63 was obtained with a standard deviation of 8.80. A mean gain of 24.13 was obtained which also indicated an increase in the performance of students in Physics after exposure to indigenous knowledge strategy. The male and female students taught Physics using indigenous knowledge strategy had a similar performance mean score with a mean difference of 0.71; this implies that the indigenous knowledge strategy is gender effective.

Research Question Four : What is the mean motivation level of senior secondary two students taught Physics before and after using indigenous knowledge strategy?

Table 5: Summary of Students' Mean Motivation Level when Taught Physics before and after Using Indigenous Knowledge Strategy

			$\bar{X}$	Pre-test		Post-test	
S/N	**Statement**	**N**	**Crit.**	**$\bar{X}_1$**	**Remark**	**$\bar{X}_2$**	**Remark**
1	Traditional practices for measuring time, distance, or speed relate to Physics concepts like motion and velocity.	20	2.50	2.60	Agreed	3.30	Agreed
2	Indigenous games or sports involve Physics concepts like motion, force, or energy.	20	2.50	1.25	Disagree	3.05	Agreed
3	Local music or dance involves Physics concepts like sound, waves, frequency, or vibration.	20	2.50	2.55	Agreed	3.15	Agreed
4	Indigenous weather forecasting methods rely on understanding Physics concepts like atmospheric pressure, temperature, or humidity.	20	2.50	1.50	Disagreed	2.90	Agreed
5	Traditional construction techniques demonstrate understanding Physics principles like structural integrity, tension or comprehension	20	2.50	1.85	Disagreed	3.25	Agreed

6	Indigenous knowledge strategy improves academic performance in Physics	20	2.50	1.65	Disagreed	3.10	Agreed
7	Indigenous strategy increases critical thinking and problem-solving skills	20	2.50	1.55	Disagreed	2.85	Agreed
8	Indigenous knowledge increase interest in pursuing science related careers or further education in Physics	20	2.50	1.75	Disagreed	3.00	Agreed
9	Indigenous knowledge strategy improve ability to reconcile indigenous knowledge system with western scientific knowledge in Physics	20	2.50	1.85	Disagreed	2.95	Agreed
10	Indigenous knowledge strategy improves better ability to connect Physics concept to real life situation and every day experience	20	2.50	1.65	Disagreed	2.65	Agreed
11	Male and female students demonstrate equal improvement in Physics performance when taught using indigenous knowledge strategy	20	2.50	1.90	Disagreed	3.20	Agreed
12	Female students perform better than male students in Physics when taught using indigenous knowledge strategy	20	2.50	1.85	Disagreed	1.90	Disagreed
13	Indigenous knowledge strategy facilitates the interaction between and female when learning Physics.	20	2.50	1.60	Disagreed	3.35	Agreed
	Total			**1.81**		**2.97**	

Table 5 revealed the mean motivation level of students when taught Physics before and after using indigenous knowledge strategy. At pre-test the students had mean response of 1.81 which was lower than the mean criterion of 2.50. This implies that they had a lower motivation level before treatment. At post-test the students had mean response of 2.97 which was greater than the mean criterion of 2.50. This implies that they had a higher motivation level after treatment.

Research Hypothesis One : There is no significant difference between the posttest performance mean score of senior secondary two students taught Physics using indigenous knowledge strategy and those taught without.

Table 6: Summary of Independent Sample T-test of Analysis between the Post-test Performance Mean Score of Students in the Experimental and Control groups

Group	**N**	**$\bar{X}$**	**S.D**	**df**	**T**	**P – Value**
Experimental	20	70.05	11.13	35	6.326	0.001
Control	17	52.35	3.18			

From the result of the t-test obtained, a p-value of 0.001 was obtained which was lower than the level 0.05 level of significance; hence the null hypothesis was rejected and the alternate hypothesis was accepted. This implies that there was a significant difference between the post-test performance mean score of senior secondary two students taught Physics using indigenous knowledge strategy and those taught without.

Research Hypothesis Two : There is no significant difference between the performance mean score of senior secondary two male and female students exposed to indigenous knowledge strategy.

Table 7: Summary of Independent Sample T-test of Analysis between the Post-test Performance Mean Score of Male and Female Students in the Experimental Group

Gender	**N**	**$\bar{X}$**	**S.D**	**df**	**T**	**P – Value**
Male	12	71.00	12.74	18	0.458	0.653

Female	8	68.63	8.80

From the result of the t-test obtained, a p-value of 0.653 was obtained which was greater than the level 0.05 level of significance; hence the null hypothesis was accepted. This implies that there was no significant difference between the performance mean score of senior secondary two male and female students exposed to indigenous knowledge strategy.

Research Hypothesis Three : There is no significant difference between the mean motivation level of senior secondary two students taught Physics before and after using indigenous knowledge strategy.

Table 8: Summary of Paired Sample T-test of Analysis between the Pre-test and Post-test Mean Motivation Levels of Students in the Experimental Group

Responses	**N**	$\bar{X}$	**S.D**	**df**	**T**	**P – Value**
Pre-test	20	1.81	0.91	38	6.910	0.001
Post-test	20	2.97	1.12			

From the result of the paired sample t-test obtained, a p-value of 0.001 was obtained which is lower than the level 0.05 level of significance, hence the null hypothesis was rejected and the alternate hypothesis was accepted. This implies that there was a significant difference between the mean motivation level of senior secondary two students taught Physics before and after using indigenous knowledge strategy.

V. DISCUSSION

The aim of this study was to critically examine the effect of integrating indigenous knowledge strategy on senior secondary two students' motivation and performance in Physics in Jos North, Plateau State. Findings in research question one revealed that control group performed better than the experimental group with a mean difference of 2.30 at pre-test. This can be attributed to the fact that at pre-test no group of students was exposed to a treatment which could influence performance. This is in corroboration with Olaitan, O. A., & Aliyu, M. M. (2020) results which showed no significant difference in the mean scores between the control and experimental groups, indicating that prior to the intervention, both groups had similar academic abilities. They opined that the similarity can be attributed to the lack of exposure to any instructional strategies that could influence their academic performance.

Findings in research two revealed that indigenous knowledge strategy better improves students' performance in Physics. This aligns with the study of Adamu and Umar (2022), who found out that the incorporation of Indigenous Knowledge Systems significantly enhanced the academic performance of secondary school students in Physics students in Wamakko Local Government Area, Sokoto. Findings in research question three showed that the male and female students taught Physics using indigenous knowledge strategy had a similar performance mean score with a mean difference of 0.71. This result is consistent with the study by Okafor and Nwankwo (2023), which demonstrated that Indigenous Knowledge Systems create an inclusive learning environment that benefits both male and female students equally. They found no significant gender difference in the performance of students taught Physics using these methods in Nnewi North Local Government Area, Anambra State, emphasizing the strategy's effectiveness in bridging gender gaps in academic achievement. Findings in research question four brought to the fore that senior secondary two students taught Physics using indigenous knowledge strategy had a lower motivation level before treatment while at post-test the students had a higher motivation level after treatment. This aligns with the results found by Eze and Obike (2020), who observed that students' motivation significantly increased after being exposed to motivational teaching strategies.

Findings in research hypothesis one revealed that there was a significant difference between the post-test performance mean score of senior secondary two students taught Physics using indigenous knowledge strategy and those taught without. This is corroborated by the research of Chukwu and Okeke (2023), who found that students in Nsukka Local Government Area, Enugu State, demonstrated markedly higher post-test performance when taught Physics using Indigenous Knowledge Systems compared to conventional teaching methods. Their study highlighted the effectiveness of indigenous strategies in enhancing students' understanding and retention of Physics concepts. Findings in research hypothesis two showed that there was no significant difference between the performance mean score of senior secondary two male and female students exposed to indigenous

knowledge strategy. This result is consistent with a study conducted by Adebayo and Ogunleye (2024), who reported similar findings in their research on students in Ado-Odo/Ota Local Government Area, Ogun State. Their study found that both male and female students demonstrated comparable performance levels when taught Physics using Indigenous Knowledge Systems, underscoring the strategy's effectiveness in providing equitable learning opportunities. Findings in research hypothesis three revealed that there was a significant difference between the mean motivation level of senior secondary two students taught Physics before and after using indigenous knowledge strategy. This result is consistent with the findings of Eze and Obike (2020), who observed that students' motivation significantly increased after being exposed to motivational teaching strategies.

VI. CONCLUSION

This study highlights the efficacy of integrating indigenous knowledge strategy on senior secondary two students' motivation and performance in Physics in Jos North, Plateau State. The study revealed that although the control group initially outperformed the experimental group, the use of indigenous knowledge strategy significantly enhanced students' performance in Physics. Both male and female students benefited equally from this strategy, exhibiting a minimal performance mean difference. The students' motivation levels notably increased from pre-test to post-test following the indigenous knowledge intervention. Significant differences were observed in the post-test performance between students taught with and without this strategy, as well as between those taught with and without teacher-made improvised instructional materials. However, no significant gender difference was found in performance among students exposed to the indigenous knowledge strategy. Overall, the indigenous knowledge strategy effectively improved both students' academic performance and motivation in Physics.

RECOMMENDATIONS

In view of the findings of this study, the researcher hereby recommended that:

1. Teachers should incorporate indigenous knowledge strategy into their teaching methods to enhance students' motivation level and performance in Physics.
2. Students should actively engage with indigenous knowledge strategy concepts provided by teachers to maximize their learning and motivation in Physics.
3. Parents should support and encourage the use of innovative teaching strategies inline with the indigenous knowledge strategy at home to reinforce the learning of Physics concepts.
4. School administrators should facilitate professional development programs for teachers on creating and using indigenous knowledge strategies to facilitate the teaching and learning of Physics in senior secondary schools.
5. Government and policy makers should allocate funding and resources to support the development and integration of indigenous knowledge strategy in schools' curricula.

REFERENCES

1. Adeyemo, A. (2020). Physics and the establishment of fundamental scientific principles. University Press of Nigeria.
2. Adamu, I. S., & Umar, M. M. (2022). The effect of Indigenous Knowledge Systems on secondary school students' academic performance in Wamakko Local Government Area, Sokoto. Nigerian Journal of Science Education, 18(1), 56-72.
3. Adebayo, T. A., & Ogunleye, K. O. (2024). Gender differences in academic performance among students taught Physics using Indigenous Knowledge Systems in Ado-Odo/Ota Local Government Area, Ogun State. Journal of Educational Research and Development, 15(2), 134-149.
4. Chukwu, G. N., & Okeke, I. C. (2023). Comparative analysis of Indigenous Knowledge Systems and conventional methods in teaching Physics: A study of Nsukka Local Government Area, Enugu State. African Journal of Educational Research, 25(4), 208-222.
5. De Beer, J., & Whitlock, E. (2018). Integrating indigenous knowledge systems in science curriculum: Challenges and approaches. [Publisher details, if available].
6. De Beer, J., & Whitlock, E. (2018). Integrating indigenous knowledge into science education: A review of practices. International Journal of Science Education, 40(3), 356-374. https://doi.org/10.1080/09500693.2017.1421449
7. Department of Science and Technology (DST). (2016). Indigenous knowledge systems policy framework. Department of Science and Technology, Republic of South Africa.
8. Erinosho, S. (2013). The role of Physics in technological advancement. [Publisher details, if available].

9. Eze, P. A., & Obike, N. P. (2020). Enhancing students' motivation through Indigenous Knowledge Systems in teaching Physics: Evidence from South-Eastern Nigeria. International Journal of Educational Strategies, 9(3), 112-126.
10. Francis, O., & Owolabi, T. (2022, January 1). Effect of Indigenous Knowledge Systems Strategy on Secondary School Students' Performance in Physics in Lagos State. Journal of Educational Research, 68(1), 123-145.
11. Hays, J. (2018). Indigenous knowledge systems: Their relevance and place in a globalized world. Journal of Knowledge Management, 22(6), 123-138. https://doi.org/10.1108/JKM-03-2018-0156
12. Jegede, O., & Aikenhead, G. (2016). Science education and cultural relevance: Exploring connections between indigenous knowledge and physics. Cultural Studies of Science Education, 11(3), 421-438. https://doi.org/10.1007/s11422-016-9763-1
13. Jegede, O., & Aikenhead, G. (2016). Towards a culturally relevant science curriculum. [Publisher details, if available].
14. Jegede, O., & Okebukola, P. (2014). Cultural influences on learning and teaching of science. [Publisher details, if available].
15. Kola, A. (2013). Physics education: Challenges and opportunities. [Publisher details, if available].
16. Mhakure, D., & Mushaikwa, K. (2014). Indigenous knowledge and its integration in teaching and learning. [Publisher details, if available].
17. Mhakure, D., & Mushaikwa, T. (2014). Traditional knowledge in Africa: A foundation for sustainable development. Indigenous Knowledge Research Journal, 3(1), 45-60.
18. Mohapatra, R. (2015). Teaching methodologies and their impact on student learning. [Publisher details, if available].
19. Nakashima, D. J., & Roue, M. (2020). Indigenous knowledge, people's knowledge, and environmental knowledge: Complex interrelations. Environmental Science & Policy, 36, 9-22. https://doi.org/10.1016/j.envsci.2018.10.008
20. Nakashima, D., & Roue, M. (2020). Indigenous knowledge systems and science education. [Publisher details, if available].
21. NERDC. (2014). National curriculum for senior secondary schools: Physics. [Publisher details, if available].
22. Okoronka, U., & Wada, A. (2014). Effective teaching methodologies for improving student performance in Physics. [Publisher details, if available].
23. Okafor, B. E., & Nwankwo, E. U. (2023). Indigenous Knowledge Systems as a tool for promoting gender equity in Physics education. Journal of Gender and Educational Equity, 11(2), 67-84.
24. Onasanya, S. A., & Omosewo, E. O. (2016). Physics education and its impact on national development. [Publisher details, if available].
25. Owolabi, A. O., Oni, T., & Adewole, K. S. (2015). The role of indigenous knowledge in the development of local industries: A case study of selected Nigerian communities. Journal of Indigenous Studies, 4(2), 71-89.
26. Owolabi, T. (2015). Challenges facing Physics education in Nigerian schools. [Publisher details, if available].
27. Owolabi, T., Akintoye, A., & Adeyemo, A. (2015). Impact of teacher qualifications on student achievement in Physics. [Publisher details, if available].
28. Owolabi, T., Diovu, M., & Ugwu, E. (2016). Indigenous knowledge systems in African Physics education. [Publisher details, if available].
29. Semali, L. M., & Kincheloe, J. L. (2018). What is indigenous knowledge? Voices from the academy. Falmer Press.
30. Semali, L., & Kincheloe, J. (2018). Indigenous knowledge systems and learning environments: A contextualized approach to science education. [Publisher details, if available].
31. Ugwu, D. I., & Diovu, C. F. (2016). Indigenous knowledge in science curriculum development: An African perspective. Journal of Curriculum Studies, 48(6), 739-755.
32. Ugwu, E., & Diovu, M. (2016). Science education and indigenous knowledge: A way forward. [Publisher details, if available].
33. Ugwu, S., & Diovu, I. (2022). Integration of Indigenous Knowledge and Practices into Chemistry Teaching: Influence on Students' Academic Achievement. Journal of Educational Technology, 34(2), 89-105.