Secondary School Students' Scientific Attitudes and Skills Development in the Niger Delta States of Nigeria: Role of the Development Commission

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ABSTRACT

This study was carried out to ascertain the implications of teaching and learning secondary school science in well equipped science laboratories, especially from the view points of the end users - the students, teachers and school administrators. The focus of the study was on the development of scientific and problem solving skills as well as attitude of the students towards science. The study sought justification or otherwise of the science laboratory equipment intervention initiative by Nigeria's Niger Delta Development Commission (NDDC) in some secondary schools in the region. Three research questions were raised. Hypothesis testing focused on whether or not there was gender bias in the responses. Relevant literature was reviewed, the summary showed consistent positive effect of science laboratory hands-on teaching strategies on attitudinal and skills developments among secondary school students. A descriptive design was adopted for the study. Research instruments constructed in the Likert format, targeted at the different categories of respondents, was used to gather data. A sample of 1,050 respondents drawn from 42 out of 50 schools that received NDDC intervention in all nine states in the region was used. Every state in the region was, therefore, represented. Data gathered was analyzed item by item, in proportions, while stated null hypotheses were tested with t-test statistics. Results showed that majority of the respondents returned "Agreed", based on a bench mark average score of 2.5, on the positive impacts of the science laboratory equipment intervention by NDDC on variables of the study. However, a few items received less than the 2.5 bench mark score and were noted. All null hypotheses tested were accepted. Recommendations were based on the findings, including that governments and education funding agencies should prioritize equipping of secondary school science laboratories while considering re-training of science teachers as part of any future science equipment intervention strategy, for maximum benefits.

Keywords: Scientific attitudes and skills, Science Laboratory, NDDC, Intervention.

INTRODUCTION

Science serves as the cornerstone for building economic growth and tackling the myriad of challenges of the 21st century, which include sustainable energy solutions, global security, lifelong health and well-being (20). In the modern educational landscape, the aim of classrooms is to equip students with necessary skills to become productive members of the workforce. For Nigeria to effectively address these global, as well as her peculiar challenges, it is imperative that its education system cultivates individuals with adept scientific skills (16).

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Central to this educational endeavor is the laboratory, where scientific experiments are conducted by educators for the benefit of students. These laboratory exercises encompass a range of activities designed to enhance students' scientific skills, fostering an understanding of both practical and theoretical concepts through problem-solving. This experimental approach not only encourages students to seek information through hands-on procedures but also improves the qualities of inquiry, investigation, and exploration of the unknown. Through these pain staking and in-dept approaches, lasting scientific attitudes are inculcated. Gradually, learners take up the roles of professionals, tackling issues of wealth creation for national development.

However, despite government efforts to promote science education in secondary schools, challenges like lack of science laboratories and insufficient science equipment persist. These challenges have contributed to low student engagement and poor performance in the sciences. In response to this unacceptable scenario, the Niger Delta Development Commission (NDDC,) in Nigeria was established with one of its mandates as the educational development of the region, which has as its hub, increasing youth access to education generally and science education in particular.

Recognizing the deficiency of science equipment and laboratories in many secondary schools in the Niger Delta region, the NDDC undertook intervention efforts, and as recent as 2021, donated essential science equipment to some secondary schools across the region. This intervention equipped four different laboratories per secondary school in the region, cutting across nine states of the federation. The laboratories equipped included Chemistry, Physics, Biology and Agricultural Science.

The researchers are of the opinion that such massive intervention aimed at enhancing the teaching and learning of science subjects, stimulating as well as nurturing the interest of young minds in science related studies, cannot go without observable and measurable effects in scientific skill acquisition and scientific attitude indices among the students of befitting schools. This study therefore, sets out to find out the benefits, in terms of scientific skills and attitudes development of students in secondary schools in the Niger Delta Region of Nigeria that benefited from NDDC interventions, especially in the recent times.

The following Research Questions were specifically formulated to guide the study:

1. What are the mean scores of science students on how NDDC interventions, especially the donation of science equipment, have helped to develop scientific attitudes and problem solving skills in the students?

2. What are the mean scores of science teachers on how NDDC interventions, especially the donation of science equipment, have helped to develop scientific attitudes and problem solving skills among science students?

3. What are the mean scores of secondary school administrators, especially the principals, on how NDDC interventions, especially the donation of science equipment, have helped to develop scientific attitudes and problem solving skills among science students?

The following hypotheses were tested in the study:

1. **H_{01}:** There is no significant difference between male and female science students' ratings regarding the development of scientific attitudes and problem solving skills among students in secondary schools benefiting from NDDC interventions, especially the donation of science equipment to their laboratories.

2. **H_{02}:** There is no significant difference between male and female science teachers' ratings regarding the development of scientific attitudes and problem solving skills among students in secondary schools benefiting from NDDC interventions, especially the donation of science equipment to their laboratories.

3. **H_{03}:** There is no significant difference between male and female principals' ratings regarding the development of scientific attitudes and problem solving skills among students in secondary schools benefiting from NDDC interventions, especially the donation of science equipment to their laboratories.

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LITERATURE REVIEW

The Importance of Science Education and Laboratory Instruction

Science education is considered the fulcrum of national development, hinging upon the transformation of critical thinking into problem-solving and innovation to solve modern-day problems. It is generally believed that a robust science curriculum is fundamental for building knowledge economy and propagating sustainable development. For the complete development of human capital required for economic growth, basic science foundation is a must (12.,8.,17.)

Laboratory instruction is an important aspect in the successful teaching of science (6). The laboratory is regarded not just as a space where demonstrations take place but also as one in which students work on hands-on inquiry activities (11). The hands-on approach is very important since it allows the theoretical thrust to meet real-world applications. Laboratory experiences enhance a deeper understanding of the scientific concept, developing manipulative skills (11) and fostering attitudes related to science; such as curiosity, objectivity, and perseverance (1). In essence, laboratory experiences inculcate problem-solving attitudes that are considered one of the prime objectives of modern science curricula. However, some challenges still trail this aspect of science education in many regions.

Challenges to Science Education in Developing Regions

Indeed, many developing regions, including parts of Nigeria, face serious challenges in imparting quality education. Science education, in particular, suffers heavily due to poor funding of schools, poor teacher motivation, the neglect of laboratories and hands-on approaches, inability of teachers and students to experience science in the real world as approximately as possible, lack of of student motivation to learn science and poor acquisition of scientific and problem solving skills, are just some of such challenges.

Some studies on secondary schools in Nigeria also point to the lingering challenges of poor infrastructure and equipment that impair students' interest and performance in science subjects. In most cases, the few available resources are channeled to aid some superficial methods of learning such as rote memorization, which is certainly inadequate in preparing an individual to enter the workforce rooted in science, technology and national development. The Niger Delta Region of Nigeria has always been plagued with a history of underdevelopment, the presence of abundant natural resources, notwithstanding. Here, the education sector is often caught up in socioeconomic and political issues (9). The Niger Delta Development Commission (NDDC) was instituted to, among other things, address these inequalities and disparities through remedial steps. The underlying principle of the commission's interventions is that development of education should lead to wider regional development (9.,11., 4.)

Educational Interventions and Their Impact

The donation of science equipment as an Educational Intervention is designed to address deficiencies in specific areas within the education system. This is done towards providing the necessary tools and resources which will enhance the teaching and learning process, thus improving academic performance. Several studies have explored the effectiveness of similar initiatives. Direct and indirect impacts of providing laboratory equipment are discernible in the development of the science student: In the direct impact, students gain access to hands-on experiments, which reinforces theoretical knowledge and they also develop practical skills. This direct engagement makes science more tangible and exciting. However, in the indirect impact, the presence of a functional laboratory can improve teacher morale and instructional quality. It allows teachers to implement more engaging and effective teaching methods, moving away from pure lecture-based instructions (10).

However, it should be noted that simply donating laboratory equipment does not guarantee improved outcomes. Studies have shown that the success of these programs often depends on several factors, including but not limited to teacher training and orientation factors**,** equipment maintenance and curriculum integration related issues (3).

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The Importance of Scientific Attitudes and Skills

Scientific attitude refers to a set of predispositions, ways of thinking, and intellectual traits characteristic of scientists. Some basic attitudinal dispositions of scientists maintained through their work include curiosity, rationality, open-mindedness, logical reasoning, objectivity, honesty, humility, delay of judgment till all facts emerge, and a penchant for evidence based conclusions. The development of these attitudes is crucial for students not only to persevere through their training but also to appreciate the doggedness of earlier scientists and their contributions as well as students' motivation to preserve the legacies of earlier scientists. In this way, scientific attitudes are transferred to various aspects of life's novel situations. This is the reason for the call for scientific literacy for all students (11.,13.)

Scientific skills, on the other hand, encompass practical abilities like problem-solving, problem-finding, formulating hypotheses, experimenting, observing, logical thinking, and data analysis (7., 5., 19.,14.) Skills are often enhanced through hands-on activities, practical work, and inquiry-based learning approaches in science education. Studies have consistently shown a positive relationship between students' positive attitudes towards science and their achievement in science (1., 2.) Several studies indicate that Nigerian students often exhibit poor performance in science subjects at the secondary school level due to several factors such as; low self-concept, lack of interest, inadequate qualified science teachers, and prevalent conventional teaching methods (15.,18.). Gender disparities have also been noted, with some studies suggesting a less positive attitude toward science among female students compared to their male counterparts (15)

METHODOLOGY

The design adopted in this study is descriptive. The study sought to measure the impact of secondary school laboratory equipment intervention by gathering data from students, teachers, and administrators. By analyzing the mean scores and test for the significance of differences between groups (e.g., male and female students), the research tipped to provide valuable insights into the effectiveness and equity of the intervention by NDDC. The design involved collecting and analyzing data from a representative sample with intention of generalizing the attributes of the sample on population. Of all the 50 secondary schools that benefited from science equipment donation by NDDC as an intervention, 42 (84%) were sampled from the entire nine (100%) of all states of the Niger Delta Region: Abia, Akwa Ibom, Bayelsa, Cross River, Delta, Edo, Imo, Ondo, and Rivers States. From the purposely selected secondary schools in the region, random sampling was used to select 20 science students, 04 science teachers from each school and of course, 01 principal, giving a total of 1,050 respondents comprising of 592 males and 458 females.

Data was collected using questionnaires developed by the researchers for science students, science teachers and school principals. Each questionnaire contained eighteen (18) items for both the principals and science teachers and twenty-five (25) items for science students. These were structured on the Likert scale to address the major research questions: Strongly Agree (SA), Agree (A), Disagree (D), and Strongly Disagree (SD), with corresponding nominal values of 4, 3, 2, and 1 respectively. Scores from 2.5 and above are accepted as 'Agreed' while scores below 2.5 are regarded as 'Disagreed' options. Data collection process involved the researchers and their assistants, who personally collected copies of the questionnaires in the forty-two (42) selected secondary schools on the spot, ensuring a 100% return rate.

Method of Data Analysis

The collected data was analyzed and interpreted. Percentages and arithmetic means were used to address the research questions. To test the hypotheses, t-test statistics was employed.

Data Analysis and Discussion of Findings

Data Analysis

The data was analyzed along gender lines to provide deeper insights into the intervention's impact

Below are the relevant tables providing answers for the various research questions that guided the study and comments of the observations made from the results:

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Research Questions 1: What are the mean scores of science students on how NDDC interventions, especially the donation of science equipment, have helped to develop scientific attitudes and science problem solving skills in the students?

Table 1: Mean Science Students Response on the Impact of the donated Science laboratory Equipment on the development of their scientific, problem-solving skills and attitudes.

S/N	ITEMS	SA		A		D		SD		χ		Remark	
		M	F	M	F	M	F	M	F	M	F	M	F
1	Our science teacher uses the science equipment donated to our school by NDDC to teach us science every day.	189	150	132	104	102	60	61	42	2.93	3.02	Ac	Ac
2	Our science teacher uses the science equipment donated to our school by NDDC to teach us science only on days we have practicals.	218	177	204	140	40	26	22	13	3.28	3.35	Ac	Ac
3	Our science teacher has never used any of the science equipment donated by NDDC to teach us science.	30	24	42	23	249	192	163	117	1.87	1.87	R	R
4	NDDC donated the most essential and important science equipment and chemicals to our schools.	191	164	209	146	54	34	30	12	3.16	3.30	Ac	Ac
5	All the science equipment donated to our school are of high quality and good condition.	261	197	151	125	54	21	18	13	3.35	3.42	Ac	Ac
6	The teaching and learning experiences in the science subjects have greatly improved since the donation of those science equipment.	206	177	199	140	50	21	29	18	3.20	3.34	Ac	Ac
7	The use of the science equipment by our science teachers to explain difficult scientific concepts has enhanced our understanding of science concepts.	187	159	235	149	44	33	18	15	3.22	3.27	Ac	Ac
8	Some of the science equipment are very sophisticated that the science teachers are not able to operate them.	207	154	196	137	60	41	21	24	3.22	3.18	Ac	Ac

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9	Due to the cost and sensitivity of some of these equipment, the science teachers do not allow us the students to handle them for fear of their being damaged.	209	188	176	127	63	22	36	19	3.15	3.36	Ac	Ac
10	The teaching of science subjects with the use of these science equipment has motivated me and enhanced my interest in science subject.	185	175	221	149	53	22	25	10	3.17	3.37	Ac	Ac
11	My interest in pursuing science- related careers has increased greatly.	209	170	200	148	51	26	24	12	3.23	3.34	Ac	Ac
12	Our school is no longer lacking science equipment in our various science laboratories.	216	160	197	145	55	32	16	19	3.27	3.25	Ac	Ac
13	The use of these science equipment donated by NDDC by our science teachers to teach us science has greatly improved the quality of science education in my school.	232	180	192	136	42	27	18	13	3.32	3.36	Ac	Ac
14	Many non-science students have started studying and enrolling in science subjects due to the fact that the use of science equipment in teaching us science has made science very interesting.	220	188	203	121	45	25	16	22	3.30	3.33	Ac	Ac
15	NDDC has provided training programs to our science teachers on how to effectively utilize this science equipment in teaching science in our school.	58	31	38	24	240	185	148	116	2.01	1.92	R	R
16	I have developed scientific skills for problem-solving in the learning of sciences due to the use of science equipment in teaching us science by our science teachers.	257	163	159	150	46	26	22	17	3.35	3.29	Ac	Ac
17	I have developed scientific attitudes in the learning of sciences due to the use of science equipment in teaching	219	154	178	160	46	15	41	27	3.19	3.24	Ac	Ac

	us science by our science teachers.												
	Grand mean score									**3.07**	**3.13**	**Ac**	**Ac**
	Number of respondents									484	356		

Note: χ = mean score; M = Males; F= Females; SA = Strongly Agree; A = Agree; D = Disagree; SD = Strongly disagree. **Critical mean score = 2.50**

Ac = Accepted; R = Rejected

Table 1 above displays the average responses from science students regarding the impact of NDDC-donated science laboratory equipment on the development of students scientific, problem solving skills and attitudes. Both male and female groups consistently rated the items positively, with most receiving an "Accepted" (Ac) remark, indicating that the intervention was generally viewed as having positive impact. Specifically, both groups' rating on item numbers 2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, and 14 were within the 'Agreed" range with mean scores exceeding the critical threshold of 2.5.

Among male students, the highest mean score was 3.35 (item No. 16), which testifies of the development of scientific problem-solving skills among them. Similarly, for female students, the highest mean score was 3.42 (item No. 5), reflecting the perception that the donated science laboratory equipment was of high quality and in good condition. Conversely, items No. 3 and No. 15 received the lowest mean scores for both groups, falling into the "Rejected" (R) category with scores below 2.50. Item No. 3, which states that the science equipment was never used by teachers, received a mean score of 1.87 from both male and female students, indicating strong disagreement with the statement. Similarly, item No. 15, concerning the provision of training programs for teachers, had mean scores of 2.01 for males and 1.92 for females, suggesting that this aspect of the intervention was less effective or perhaps overlooked.

The grand mean scores were 3.07 for males and 3.13 for females, showing a slight difference but both falling within the acceptance threshold, reflecting an overall positive perception of the impact of science equipment intervention in their schools.

Research Questions 2: What are the mean scores of science teachers on how the use of science equipment donated by NDDC in teaching science subjects has helped to develop scientific attitudes and scientific problem solving skills in students ?

Table 2:Mean Science Teachers response on the Impact of the donated Science laboratory Equipment on the development of their students scientific, problem solving skills and attitudes .

S/N	ITEMS	SA		A		D		SD		χ		REMARK	
		M	F	M	F	M	F	M	F	M	F	M	F
1	The donated science equipment by NDDC have enhanced my teaching methods and approaches to the teaching of science.	39	38	39	30	7	8	4	3	3.27	3.30	Ac	Ac
2	I have always used the donated science equipment to explain scientific concepts while planning my lessons.	46	47	31	22	10	7	2	3	3.36	3.43	Ac	Ac
3	I have always used the donated science equipment to explain	49	42	24	24	7	10	9	3	3.27	3.33	Ac	Ac

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	scientific concepts while teaching science in the classroom												
4	My science students have shown much engagement and engagement and enthusiasm for learning science since I started using the science equipment donated by NDDC to teach science.	41	43	30	23	12	7	6	6	3.19	3.30	Ac	Ac
5	Teaching with the science equipment donated by NDDC has improved the quality of science education in my school.	54	35	25	29	5	13	5	2	3.44	3.23	Ac	Ac
6	Teaching with the science equipment donated by NDDC has improved students' comprehension and retention of science concepts.	36	41	33	29	12	7	8	2	3.09	3.38	Ac	Ac
7	Teaching with the science equipment donated by NDDC has helped in addressing resource gaps in my school science laboratories.	8	9	11	9	48	34	22	27	2.06	2.00	R	R
8	The regular training of science teachers on how to utilize this science will help both the teachers and students.	42	43	31	27	12	6	4	3	3.25	3.39	Ac	Ac
	Grand mean score									3.12	3.17	Ac	Ac
	Number of respondents									89	79		

Note: χ = mean score; M = Males; F= Females; SA = Strongly Agree; A = Agree; D = Disagree; SD = Strongly disagree. **Critical mean score = 2.50**

Ac = Accepted; R = Rejected

Table 2 presents the average responses of science teachers on how the use of science laboratory equipment donation in teaching science subjects has helped to develop scientific and problem solving skills and attitudes in science students. Both groups consistently gave positive ratings to the items listed in table, with most receiving an "Accepted" (Ac) remark. This indicates that both male and female teachers generally found the science laboratory equipment intervention to have positive impact on secondary school educations and specifically on the parameters measured in this study: Items Nos.1, 2, 3, 4, 5, 6, and 8 were within the 'Agreed" range with mean scores exceeding the critical threshold of 2.50.

For male teachers, the highest mean score was 3.44 (item No. 5), showing that teaching with the donated science equipment was seen as having improved the quality of science education in their schools, especially in the area of students acquisition of scientific attitudes, problem solving and scientific skills. Female teachers had their highest mean score of 3.43 in item No. 2, which reflects the frequent use of the equipment to explain scientific concepts during lesson planning. However, item No.7 received the lowest mean scores for both groups, falling into the "Rejected" (R) category with scores below 2.50. This item which assessed whether the donated equipment addressed resource gaps in school science laboratories, had mean scores of 2.06 for male teachers

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and 2.00 for female teachers. This suggests that teachers felt the intervention did not fully meet the resource needs of science laboratories, pointing to an area that requires further attention.

The grand mean scores were 3.12 for male teachers and 3.17 for female teachers, both within the "Accepted" range as they exceeded the critical threshold of 2.50. However, there is a clear need for more comprehensive resource provision to fully address laboratory deficiencies.

Research Questions 3: What are the mean scores of school principals on how the use of science equipment donated by NDDC in teaching science subjects has helped to develop scientific attitudes and scientific problem solving skills in science students?

Table 3: Mean Principals Response on the Impact of the donated Science laboratory Equipment on the development of their students scientific, problem solving skills and attitudes .

S/N	ITEMS	SA		A		D		SD		χ		REMARK	
		M	F	M	F	M	F	M	F	M	F	M	F
1	The donated science equipment by NDDC have improved the academic performance of students in science subjects and have impacted positively on the learning environment in my school.	11	15	8	8	-	-	-	-	3.58	3.65	Ac	Ac
2	Science teachers are regularly trained to ensure effective utilization and maintenance of the donated science equipment.	-	1	1	9	15	9	3	4	1.89	2.30	R	R
3	Integrating the donated science equipment into the school curriculum and teaching practices are very challenging.	16	13	2	9	1	1	-	-	3.79	3.52	Ac	Ac
4	Students' enrolment in my school has increased due to the science equipment donated by NDDC.	14	16	5	6	-	1	-	-	3.74	3.65	Ac	Ac
5	The science equipment donated by NDDC has improved the quality of science in my school.	13	19	4	4	2	-	-	-	3.58	3.83	Ac	Ac
6	Teaching with the donated science equipment has improved students' comprehension and retention of scientific concepts in my school.	11	17	5	5	2	1	1	-	3.37	3.70	Ac	Ac
7	Teaching with the donated science equipment has helped in addressing resource gaps in my school's science laboratories.	10	13	8	10	1	-	-	-	3.47	3.57	Ac	Ac
8	The regular training of science teachers on how to utilize this science	16	13	3	9	-	1	-	-	3.84	3.52	Ac	Ac

	equipment will help both the teachers and students.												
	Grand mean score									**3.41**	**3.47**	**Ac**	**Ac**
	Number of respondents									19	23		

Note: χ = mean score; M = Males; F= Females; SA = Strongly Agree; A = Agree; D = Disagree; SD = Strongly disagree. **Critical mean score = 2.50** Ac = Accepted; R = Rejected

Table 3 presents the average responses of male and female school principals on how the use of science equipment donated by NDDC in teaching science subjects has helped to develop scientific attitudes and scientific skills for problem solving in science students. The results, which highlighted the views of male and female principals show that **both** groups consistently rated the items positively, with most receiving an "Accepted" (Ac) remark. This indicates that both male and female principals generally perceived the science laboratory intervention as having a positive impact on secondary school education, especially as it relates to science students acquisition of scientific attitudes and problem solving skills.. The findings suggest that the intervention improved the learning environment, enhanced students' comprehension and retention of scientific concepts, and addressed some resource gaps in school science laboratories. Specifically, items No. 1, 3, 4, 5, 6, 7, and 8 were within the 'Agreed" range with mean scores exceeding the critical threshold of 2.50.

Among male principals, the highest mean score was 3.84 (item No. 8), which highlights the importance of regular teacher training on the effective use of donated science equipment. This shows that male principals agree that this is essential for maximizing benefits to the students. Female principals had their highest mean score of 3.83 on item No.5. This reflects their strong agreement that the donated equipment has significantly improved the quality of science education in their schools, especially in the area of inculcating scientific attitudes and problem solving skills in science students.

In contrast however, item No.2 received the lowest mean scores from both groups, falling into the "Rejected" (R) category. Male principals recorded a mean score of 1.89, while female principals also had a low score of 2.30. This item, which focuses on the regular training of science teachers for the utilization and maintenance of the equipment, highlights a critical gap in the intervention. Lack of sufficient teacher training programs is seen as a limitation that could reduce the overall effectiveness of the donated science laboratory equipment to schools.

The grand mean scores were 3.41 for male principals and 3.47 for female principals, falling within the "Accepted" range as they exceeded the critical threshold of 2.50. These results show that the intervention significantly improved the learning environment, enhanced teaching practices, and motivated both teachers and students, especially helping students to acquire scientific and problem-solving skills and attitudes toward the learning of science.

Test of Hypotheses

The two null hypotheses of the study were tested using paired samples t-test. The null hypotheses were tested at 0.05, level of significance.

Hypotheses 1: There is no significant difference between male and female students' ratings regarding the development of scientific and problem solving skills and attitudes among science students in Secondary schools who benefited from NDDC science equipment intervention.

Table 4: Test of significant difference between male and female students' ratings regarding the development of scientific attitudes and scientific skills for problem solving among science students.

Groups	Number	Mean	S.D	D.F	t.Cal	t.tab	Level of Sig.	Decision (H_0)
Male students	484	3.072	0.44					

				838	-0.372	1.963	0.712	Not Reject
Female Students	356	3.130	0.47					

Source(s): Author Construction from SPSS version 27 computation, 2024. **P > 0.05**
Levene's test for equality of variances (F = 0.031 ; P = 0.862 ; Decision: Variances of the two groups are equal)

S.D = Standard Deviation; D.F = Degree of freedom; t.Cal = Computed t-ratio; t.tab = Critical t-ratio; Sig. = Significance.

From Table 4 it can be seen that male students had a mean score of 3.072 with a standard deviation of 0.44, while female students had a mean score of 3.130 with a standard deviation of 0.47. The calculated t-value was -0.372 (df = 838), and the observed p-value was 0.712. This p-value is greater than the acceptable significance level of 0.05 ($P \leq 0.05$). The Levene's test for equality of variances (F = 0.031; P = 0.862) confirmed that the variances of the two groups were equal as the p-value was greater than the 0.05 significance level.

Therefore, the null hypothesis was not rejected, indicating that there was no significant difference between male and female students' ratings regarding the impact of NDDC's science laboratory equipment intervention towards the development of scientific and problem solving skills and well as positive attitudes towards the study of science in the benefiting schools.

Hypotheses 2: There is no significant difference between male and female teachers' ratings regarding the development of scientific attitudes and scientific skills for problem solving among science students in Secondary schools who benefited from NDDC science equipment intervention.

Table 5: Test of significant difference between male and female teachers' ratings regarding the development of scientific attitudes and scientific skills for problem solving in science students.

Groups	Number	Mean	S.D	D.F	t.Cal	t.tab	Level of Sig.	Decision (H_0)
Male teachers	89	3.116	0.44					
				166	-0.234	1.974	0.818	Not Reject
Female teachers	79	3.170	0.46					

Source(s): Author Construction from SPSS version 27 computation, 2024. **P > 0.05**

Levene's test for equality of variances (F = 0.016 ; P = 0.901; Decision: Variances of the two groups are equal)

S.D = Standard Deviation; D.F = Degree of freedom; t.Cal = Computed t-ratio; t.tab = Critical t-ratio; Sig. = Significance.

Table 5 shows that male and female science teachers in secondary schools in the Niger Delta region reported similar mean ratings regarding the development of scientific attitudes and problem-solving skills in science students in their learning of science subjects. Male teachers had a mean score of 3.116 with a standard deviation of 0.44, while female teachers had a mean score of 3.170 with a standard deviation of 0.46. The calculated t-value was -0.234 (df = 166), and the observed p-value was 0.818. This p-value is greater than the acceptable significance level of 0.05 ($P \leq 0.05$). The Levene's test for equality of variances (F = 0.016; P = 0.901) confirmed that the variances of the two groups were equal as the p-value was greater than the 0.05 significance level.

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Therefore, the null hypothesis was not rejected, indicating that there was no significant difference between male and female teachers' ratings regarding the impact of NDDC's science laboratory equipment intervention towards the development of scientific and problem solving skills and well as positive attitudes towards the study of science in the benefiting schools.

Hypotheses 3: Gender does not significantly affect the rating of the male and female principals on the development of scientific attitudes and scientific skills for problem solving among science students in Secondary schools who benefited

Table 6: Independent samples t-test result of whether gender significantly affects the rating of the male and female principals on the development of scientific attitudes and scientific skills for problem solving among science students .

Groups	Number	Mean	S.D	D.F	t.Cal	t.tab	Level of Sig.	Decision (H_0)
Male principals	19	3.408	0.63					
				40	-0.213	2.021	0.834	Not Reject
Female principals	23	3.468	0.48					

Source(s): Author Construction from SPSS version 27 computation, 2024. **P > 0.05**

Levene's test for equality of variances (F = 0.206 ; P = 0.657; Decision: Variances of the two groups are equal)

S.D = Standard Deviation; D.F = Degree of freedom; t.Cal = Computed t-ratio; t.tab = Critical t-ratio; Sig. = Significance.

Table 6 shows the result of the independent samples t-test examining whether gender significantly affects the ratings of male and female school principals on the development of scientific attitudes and problem-solving skills in students towards learning science subjects. Male principals had a mean score of 3.408 with a standard deviation of 0.63, while female principals had a mean score of 3.468 with a standard deviation of 0.48. The calculated t-value was -0.213 (df = 40), and the observed p-value was 0.834. This p-value is greater than the acceptable significance level of 0.05 ($P \leq 0.05$). The Levene's test for equality of variances ($F = 0.206$; $P = 0.657$) confirmed that the variances of the two groups were equal as the p-value was greater than the 0.05 significance level.

SUMMARY OF FINDINGS

1. Both male and female students had same views of positive impact on their development of scientific attitudes and scientific skills for problem solving among students in secondary schools in the Niger Delta region of Nigeria.
2. Both male and female teachers had same views of positive impact on the development of scientific attitudes and scientific skills for problem solving among students in secondary schools in the Niger Delta region of Nigeria.
3. Both male and secondary school principals expressed same views of positive impact on the development of scientific attitudes and scientific skills for problem solving among students in secondary schools in the Niger Delta region of Nigeria.

DISCUSSION OF THE FINDINGS.

The use of high-quality science equipment by teachers in practical and theoretical lessons underscores its critical role in making complex concepts understandable to students, it has been found that students from schools

equipped with modern laboratory tools achieved higher engagement and understanding (12). The equipment's role in improving students' understanding of difficult concepts resonates with studies by Eze and Emma (6) and the study by Johnson and Parker (10), demonstrated that hands-on tools allow teachers to better connect theoretical knowledge to practical applications, making science more relatable and comprehensible. This must have afforded student the much needed time on task required for both acquisition of scientific attitudes and problem solving skills.

These results demonstrate that the NDDC-donated science equipment significantly contributed to developing scientific attitudes and problem-solving skills in students learning of science. Specifically, both male and female respondents' agreement on the observed effect of functional science equipment in helping students to acquire both scientific attitudes and problem solving skills attest to the fact that the practice of science itself and the manipulation of relevant equipment thereby, is a non-gender biased experience (19.,11).

CONCLUSION AND RECOMMENDATIONS

The donation of science laboratory equipment by the Niger Delta Development Commission to secondary schools in the Niger Delta region of Nigeria helped in developing scientific attitudes and the inculcation of scientific problem solving skills in the students of the benefiting schools. The study further revealed that gender is not an impediment on the perceived effects of using functional equipment to inculcate scientific attitudes and problem skills in secondary school students in the Niger Delta region of Nigeria.

Recommendations:

Consequent upon the conclusion above, the study recommends that:

1. Government and funding agencies should place equipping of secondary school science laboratories on their recurrent budgets as it helps to inculcate scientific attitudes and problem solving skill in science students.

2. Science teachers should be trained regularly on the use of new science equipment as some teachers may not have been exposed to such equipment in their career training.

3. School monitoring be improved to ensure that such huge investment as equipping secondary school laboratories, is worth the while of the students by effective engagement of both teacher, student and equipment in the teaching and learning process.

REFERENCES

1. Abrahams, I., & Millar, R. (2008). Does Practical Work Really Work? A Study of the Effectiveness of Practical Work as a Teaching and Learning Method in School Science. International Journal of Science Education, 30, 1945-1969.
2. Adetayo, J. O., & Aina, O. L. (2021). Gender disparities in STEM education: Implications for developing regions. International Journal of STEM Education Studies, 9(4), 241–256.
3. Agommuoh P. C., Onwukwe, E.O., Nwachukwu C.U. (2025). Donation of Science Equipment by Nigeria's Niger Delta Development Commission to Secondary Schools in The Region: A Help or Daunting Huddle for Teachers. International Journal of Education and Social Science Research 8(2):278-291 DOI:
4. Awogbemi T.O. (2023). Human Capital Development and Nigeria's Economic Growth. Journal of Public Administration, Finance and Law.
5. Chinda, W., & Achigbe, J. O. (2024). Science process skills and academic performance of students in Cross River State Colleges. FNAS Journal of Mathematics and Science Education, 6(1), 126-132
6. Eze, C. C., & Emma, N. I. (2021). The role of hands-on tools in bridging the gap between theory and practice in science education. African Journal of Science Education, 25(4), 67–82.
7. Gizaw, G., & Sota, T. (2025). Improving Science Process Skills of Students: A Review of Literature. Science Education International, 34(3), 217.
8. Gruzina, Y., Firsova, I., & Strielkowski, W. (2021). Dynamics of Human Capital Development in Economic Development Cycles. Sustainability, 13(14), 7854.

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9. Igharo, P. (2022). Investigating Niger Delta Development Commission's (NDDC's) Skills Acquisition Programme Evaluation Procedure with International Institute of Welding (IIW) Requirements in Niger Delta Region. Advance Journal of Education and Social Sciences, 7(3), 1–10.
10. Johnson, T., & Parker, J. (2020). Bridging the theory-practice gap in science education through the use of practical tools. Journal of Educational Innovation, 18(4), 56–67.
11. Kumari, Mwesigye and Balimuttajjo, 2024).Science Laboratory Education and Students' Perceived Behavior Science Education: A Review. Journal of Research Innovation and Implications in Education,8(4), 555-561.
12. Lentjushenkova, O. (2021). Human capital development at higher education institutions. Economics and Culture, 18(2), 26–36.
13. Lazaro, J. M. & Paglinwan, J. L. (2025) Laboratory Resource Availability and Students Engagement in Science. International of Research and Innovationin Applied Science, IX(XII), 146-153
14. Nwogu, U. O., Afolabi, T. O., & Oguntuase, B. O. (2019). Practical experiments and their impact on secondary school science achievement. Nigerian Journal of Science Education, 17(4), 203–214.
15. Mamah I. M., Nnadi, U. U. Ezugwu, I. J., Ezeudu , F.O., Eze, J. U. Ugwuanyi, C.S. (2022). Self-Esteem As A Predictor Of Science Students' AcademicAchievement In Enugu State, Nigeria: Implication For Educational Foundations. Webology (ISSN: 1735-188X) 19(3), 3340-3355.
16. Ofem, N. O., Ojiho, I. H., & Lekam, B. U. (2023). NDDC Developmental Strides and Well-being of Rural Dwellers in Southern Senatorial District of Cross River State, Nigeria. Journal of Public Administration and Governance Research, 1(2), 93–101.
17. Olofin S.O., Ogunjobi A.O., Falemu F.A., and Akinwumi I.O. (2023) Science Education as a Tool for Achieving Socio - Economic Development of Nigeria, International Journal of Development and Economic
18. Onah, Kingsley T. &Anamezie, R. C.(2022) Academic Interest as Predictor of Academic Achievement of Secondary School Physics Students. African Journal of Science, Technology and Mathematics Education 8(4), 320-326
19. Treepob, H., Hemtasin, C., & Thongsuk, T. (2023). Development of Scientific Problem-Solving Skills in Grade 9 Students by Applying Problem-Based Learning. International Education Studies, 16(4), 29-41.
20. Wendy, L. (2011). Science as the Driver of Economic Growth and Societal Well-being. The National Academies Press.