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Comparative Analysis of Students' Interest in Basic Science Curriculum in Nasarawa State-Nigeria

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Abstract

The purpose of this paper is to make a comparative analysis of student's interest on Basic science and Technology curriculum in Nasarawa state. The study has a sampled population of 2,105 students in Nasarawa state of Nigeria made up of 1,277 lower middle Basic Science, (primary 1-6) and 828 junior secondary school students. The researcher decided to employ survey design and use chi-square statistics to analyse the data. It was observed in general that, the students were not satisfied with what was being taught in school, as the school programme failed to address issues of interests to them while in school. When asked what they wanted to learn at school, majority of these students in both the primary schools and junior secondary schools mentioned many activities that are not taught at school by the teachers-which have a direct link with their natural instinct and or inclination, based on the feeling of liking or disliking a given subject area. The most important issues of concern is the vocation on the students career option and the difficulties they faced at the time of decision as they are confronted at the end of their primary school and junior secondary school. Since schooling, is the determinant of the student's career and future life and coupled with the dissatisfaction with the school programme generally detected in this study, it becomes necessary for completely new basic science curriculum content to be considered for the best interest of our students in Nasarawa state.

Keywords: Science curriculum development, Natural instinct, Dissatisfaction with school programme, Contemporary school system, Science education.

1. Introduction

The development of student interest in science has long been accepted as an objective for school science teaching by science educators and teachers alike. The term ''interest in science'' has been employed to denote a range of meaning that extends from positive feeling toward science to complete absorption in scientific inquiry (Appleton, 1992 and Spearing and Rennie, 1996).

In Nigeria since independence in 1960, It is required that, for a child to pursue his studies up to university level, he or she generally needs to go through all the stages of the educational systems that are structured as thus: Pre-school, designed for children between 3-6years of age, Primary school, designed for children between 7-14years of age, Junior secondary school (JSS), designed for between 15-17years and finally, senior secondary school (SSS), designed for children between 16-17years of age. OECD (2006) stated that on graduation from senior secondary school, the student ought to be prepared to choose a career and then try the University Matriculation Examination (UME). While in SSS, Students are expected to choose a career leading to UME.

Interests had been interpreted as ''determinants of success second in importance to intelligence'' (Evans, and Fisher, 2000). Therefore several attempts are being made to base instruction on interests which is why numerous

studies were conducted with the aim of identifying basic science and technology curriculum content areas and teaching activities of interest to students in different school grades (Osborn, and Collins, 2000, and Osborn and Simon, 1996).

The Federal Government of Nigeria (1999) is prepared for a 25 years' time frame whose basic philosophy emphasizes Nigeria's commitment to the creation of an independent, integrated and self sustaining economy. It declares that education shall emphasize science at all levels. The objectives of the Federal Government in the policy as it relates to education is ''to re-orient the entire society towards scientific thinking in order to develop new technology and adapt existing ones to improve societal well-being and security (FGN, 1986)-with the objectives of:

- Evolving programmes for the recognition, encouragement, development and promotion of scientific and technological talents at all levels,
- Making it possible for the average child to have early contact with the concepts and materials related to science and technology,
- Ensuring a sound foundation during the 3 and 4 years of the 6:3:3:4 system of educational structure through:
  .entrenchment of basic science teaching in the primary and junior school curriculum
  .provision of well-trained, well-motivated basic science teacher
  .provision of adequate teaching laboratory aids
  .introduction of gainful practical activities such as model making, handicrafts, Gardening and farming (FGN, 1986).

Today, the concern with development of student's interest in science stems basically from two major considerations: Firstly, education in science is a basic component of the general education needed by all individuals in today's world, where science plays a major role in influencing present societies and shaping future ones. Secondly, manpower demands in technological development are such that science teaching should stimulate student's interests and eventually direct as many as possible to choose a career in science (NPEC,1999 and NTI, 2009).

Bearing the above two major considerations in mind, it is quite apparent that the identification, stimulation, and development of basic science and technology interests are of major importance. As of now, however, little progress has been made towards securing needed and valid answers to questions dealing with the development of science interests (Achor, 2001). Two of such unanswered questions are: What instructional procedures and classroom activities are most effective in fostering interest in basic science and technology? What variable (student-teacher, home, socio-economic, instructional, and psychological) influence the development of basic science and technology interest?

Research on interest in science generally, show that interest seems to be related to sex, science achievement, activities towards science, mechanical and abstract reasoning abilities, and practiced hobbies (wade, and Adams,(1989). Changes in students interest in basic science and technology seem to be more strongly influenced by teachers personalities and value systems rather than their training, teaching experience, and science background, (Maduabum, 1991, Bujuwoye, 1998, Okpara, 1991). It can be concluded that student interest in basic science and technology can be fostered through instruction, although little is known about the influence of some instructional, cultural, and motivational variables on its development (Mkpa, 1991).

In recent years, the decline in the number of students completing examinable science subjects at both junior and senior secondary schools has been widely documented (Brennan, 1994, Dekkers and De Laeter, 2001). Although this may be , in part, attributed to the increased availability of choice for students in subject areas that are more suited to their particular interests, it is nevertheless a worrying trend, given the increasing number of science professionals and teachers required in this burgeoning age of new technologies. Perhaps even more importantly the basic science and technology education system, as it exists, may be failing to capture the interest of our brightest students who would otherwise make enormous intellectual contributions to the future of Nigerian science and Nasarawa state in particular.

Therefore, changes in students interest in basic science and technology also seem to be more strongly influenced by teachers personalities and value systems rather than their training, teaching experience, and general science background. It can also be concluded that student's interest in basic science and technology can be fostered

through instruction, provision and use of appropriate instructional materials, cultural awareness, and motivational variables on its development.

2. Methodology

2.1 Instrument for Data Collection

Two questionnaires were used to analyse the data obtained from the various schools sampled that were applied to the students by their teachers who had been instructed with respect to the procedures to be followed i.e. primary school basic science questionnaire (PSBSQ) and junior secondary basic science questionnaire (JSBSQ). The first part of the questionnaire were applied to 1,513 students of both the primary school upper basic and junior (JSS) based on What the students wants to learn in school, why they want to learn at school and the second questionnaire was applied to 2,105 students of both the primary school (1,277) and junior secondary school (828) of the three senatorial zones based on the number of subjects they like most, the least favourite subject, which teacher prefers and the teacher likes less and also the profession they would engage in while in the university.

This investigation was carried out in Nasarawa State of Nigeria. The state covers a land area of 27,116.8 sq km and has a population of 3.2 million people (NPC, 1991). The state is situated on the centre of Benue-plateau highlands. It lies within the Guinea Savannah region along latitude 8, 54 N and Longitude 8, 39 E and experience tropical climate with a moderate rainfall of 1311.75cm and mean monthly temperature of 20 c and 34 c. Consisting of three Senatorial Zones that were used for this study.

This is a cross-sectional study among the primary lower basic science (basic foundation) and Junior Secondary School (JSS) Students in Nasarawa state, Nigeria, was conducted with the help of structured questionnaires and related literatures among the prominent primary 4, 5, and 6 and JSS 1, 2, and 3 in the state. The sample consisted of 2,105 students enrolled in primary basic (1,277) and JSS (828) at 36 schools (26 primary schools and 20 junior secondary schools) situated in the three senatorial districts (i.e. Nasarawa North, South, and West respectively) of the state and among these schools, 24 are Government Schools and 12 are private schools. The student's ages in both the primary and the junior secondary schools ranges between 9 to 13 and 13 to 20 years respectively. The distribution of the population based on Gender and type of schools (i.e. Govt. and or Private) as has been shown in Table 1. Looking at the table, it was observed that there were more boys than Girls in both the primary and the junior secondary schools. The research was carried out over a three years period in 2008/2009, 2009/2010 and 2010/2011 respectively.

3. Research Question

To what extent is the curriculum content of the Basic Science programme being implemented in primary and junior secondary schools in Nasarawa state?

4. Research Hypothesis

There is no significant difference between the mean perception of the students on the extent of curriculum implementation in both primary and junior secondary schools in Nasarawa state.

Table 1:- Sample Distribution

Group	Students (N)								
	Primary School (Basic foundation)				Junior Secondary School (JSS)				
	PRI 4	PRI 5	PRI 6	Total	JSS 1	JSS 2	JSS 3	Total	Total
Male	207	218	232	657	140	158	202	500	1157
Govt. School	157	186	162	505	78	101	156	335	840
Private School	50	32	70	152	62	57	46	165	317
Female	223	264	133	620	95	105	128	328	948
Govt. School	164	196	97	457	55	85	76	216	673
Private School	59	68	36	163	40	20	52	112	275
Total	**430**	**482**	**365**	**1,277**	**235**	**263**	**330**	**828**	**2,105**
Govt. School	321	382	259	962	133	186	232	551	1, 513
Private School	109	100	106	315	102	77	98	277	592

N = 2,105, PRI = 1,277, JSS = 828

5. Statistical Techniques

The statistical techniques used was the chi-square for the statistical validation of the results where P<0.05 was considered relatively significant.

6. Results and Data Analysis

This result presents the information gathered from the questionnaires and the analysis of data obtained from the sampled 2,105 Primary School (Middle Basic Science) and Junior Secondary school students sampled from the three senatorial Headquarters of the state. However, in most instances, the data shown here are a pool of all the responses, with the exception of the situations where there was a significant difference between private and government schools, and where this was stated in the text. Students replies related to what they want to learn, subjects and the career they preferred, were put together during the analysis.

Table 2: Frequency of Students who answered one or more of the Questions, which subject they preferred, what they want to learn in school, and career they preferred.

Table 2 discusses the various responses to the questionnaires by the students on the things they really like about

S/NO	Responses	% and (n)	PSS. (4)	PSS (5)	PSS (6)	TOTAL	JSS 1	JSS 2	JSS 3	Total	Total
1.	What are the things you really like about science in your school?	%	10.3	8.3	12.1	10.3	12.2	14.1	24.2	16.3	12.2
		(n)	(34)	(23)	(33)	(90)	(22)	(18)	(31)	(71)	(160)
2.	How and why are the different subjects taught in the school?	%	80.5	75.2	65.1	74.2	60.0	71.1	64.8	64.7	71.0
		(n)	(265)	(209)	(175)	(649)	(108)	(91)	(83)	(282)	(931)
3.	What career options do you want & learn in school?	%	9.1	16.5	22.3	15.5	27.7	14.8	11.7	19.3	16.8
		(n)	(30)	(46)	(60)	(136)	(50)	(19)	(15)	(84)	(220)
	Total (n)		329	278	269	875	180	128	128	436	1,311

Significant difference, P<0.05

basic sciences, how and why is the basic science taught and the career options they want in both primary school and junior secondary schools which were compared and analysed.

A total of 1,311 respondents from PSS, 4, 5 & 6 and JSS 1, 2, & 3 respectively produced a homogenous proportion of responses in all the levels under review, with 12.2%, 71.0% and 16.8% of responses given at the end of this research respectively. The 71.0% of the students indicated more/diverse interest about the basic science taught in the schools with the primary school having a total n-value of 875 and the junior secondary school having a total n-value of 436 on average interests. They seem to have a quite definite interest regardless of whether the basic science was taught or not at school as basic science and technology and biology, chemistry, physics, mathematics, etc, which are all infused as part of the school curriculum.

At primary school, the proportion of students that mentioned just one subject at the different levels was given by the percentages, 10.3%, 8.3% and 12.3%, while that given by the junior secondary school was given by 12.2%, 14.1% and 16.3% respectively for item 1. 80.5%, 75.2%, and 65.1, for primary school and 60.0%, 71.1% and 64.7% are for junior secondary school for item 2 respectively. Those of item 3 were given by, 9.1%, 16.5% and 22.3% for primary school and 27.7%, 14.8% and 11.7% are for junior secondary schools respectively. By this rate of percentages, it was only at the JSS3 (64.8) that student's interests seemed to become polarized. At 24.2% the students arrived at the end of junior secondary school (JSS 3) when they are really in need of the future career, with their interest well defined. The 16.8% of the total respondents mentioned more than one career options between the first and second questions indicating diverse interests in those career options. With 71.0% of the respondents indicating the basic science teaching and the activities offered and 12.2% indicating what the students really like about basic science, as part of the school curriculum. The probability of these results rests from the pressure created by the need that students at this stage have greater sense of autonomy/confidence regarding their own abilities and motivation they have towards their future career prospects.

Table 3: The Differences Between Students Interest in Basic Sciences and School Curriculum

S/NO:	DIFFERENCES BETWEEN BASIC SCIENCE AND SCHOOL CURRICULUM	Frequency of student % and (n)	Taught outside school	Taught in the school
1.	Basic science courses taught in school	% (n)	50.7 (360)	50.8 (310)
2.	Basic science topics not taught in school	% (n)	24.9 (176)	26.4 (161)
3.	All days activities in school	% (n)	21.9 (156)	19.8 (121)
4.	Types of professional occupations	% (n)	59.0 (360)	64.8 (460)
5.	Models from what is taught in school	% (n)	36.3 (258)	37.5 (229)
6.	Computer sciences taught in schools	% (n)	17.2 (122)	36.4 (222)
7.	Languages and Arts taught in school	% (n)	14.1 (100)	18.2 (111)
	students (n) Activities of the school & basic science subjects		710 1,600	610 937

The table discussed relative students interest in basic science and school curriculum generally which are related to other school activities already developed outside and inside the schools reviewed**.** 59**%** of those taught inside the school showed the lowest interests on the availability of professional prospects as compared to those taught outside the school with 65%. This shows that whatever is the need for the students to acquire knowledge lies greatly on the interest and the availability of career prospects for them to pursue in life.

At present, computer science tend to be restricted to the function of a teaching tool, like television or video for learning basic science and their languages, but, even then, in only a limited number of schools and even if available, the manpower needs that will handle it may be there as indicated by the low percentages of 17.2% and 36.4% respectively. Regardless of the school being private or Government school, is not generally covering the majority of the students' interest or providing the students with much of the career they preferred, related to the subject matter they would like to learn at school or even outside the school.

Table 4: Basic Science Students want to learn and the School Curriculum

S/NO:	Students frequency	% and (n)	Primary Sch. (Basic Sciences)	Junior Secondary school (JSS)	Total
1.	Subjects taught at school	% (n)	19.3 (186)	25.0 (86)	21.0 (272)
2.	All the kinds of subjects taught	% (n)	31.0 (295)	36.1 (125)	32.0 (420)
3.	Those subjects not taught at school	% (n)	37.3 (360)	26.0 (90)	39.3 (515)
4.	The only one subject taught at sch.	% (n)	12.8 (124)	13.0 (45)	07.9 (104)
	Students (n)		965	346	1311

Table 4 shows the relationships between basic science subjects students want to learn and the existing school curriculum for junior secondary school 1, 2, and 3, and senior secondary school 1. 2. and 3 respectively. 7.9% of the respondents mentioned the sole subjects that are taught at school which may indicate a lack of interest on the part of the students going by the 12.8% for junior secondary school and 13.0% for senior secondary school respectively. The various responses given by the respondents (students) are basic science, biology, physics, chemistry, PHE, Geography, and Geology. However, 39.3% of the respondents have their interests lying in subjects that are not normally taught at school like civil engineering, and other sciences.

Table 5: Relationships between levels of Acceptance rate of Basic Science and Gender affiliation

S/NO	SUBJECTS	MALE				FEMALE			
		NO.	Positive Citation	Negative Citation	Levels of Acceptance	NO.	Positive Citation	Negative Citation	Levels of Acceptance
1.	Biology	275	137	138	0.92	462	191	271	0.64
2.	Chemistry	139	65	74	0.74	311	114	197	0.67
3.	Economics	180	51	129	0.37	216	138	78	1.42
4.	English	96	65	31	2.26	114	91	23	3.96
5.	Geography	69	52	17	3.06	112	57	55	1.04
6.	Int. Science	31	26	05	5.20	82	74	08	9.25
7.	Mathematics	58	24	34	0.71	69	43	26	1.65
8.	Physics	54	51	03	17.00	59	45	14	3.21
9.	PHE	29	12	17	0.70	56	07	49	0.14
10.	Basic Sciences	16	10	06	1.27	32	10	22	0.45
11.	Others	28	21	07	2.72	21	19	02	9.50
	Total No. of Acceptance Level	975	514	461	42.98	1562	779	745	31.93

NOTE THAT: * Number of students is equal to the total number of those who answered, *what basic science is taught in school? *Basic science Subject not taught at school, *All kinds of basic science subject taught, *The only one basic science subject taught at school, *Others are related to subjects other than the basic sciences in the school curriculum, *The levels of acceptance related to differences between the positive and negative citations and *the levels of significance between the male and female students at p<0.05 respectively.

Looking at the relationships between levels of acceptance by both male and female (table 4), the females dislike mathematics more than the males (0.71 and 1.65, though this was not statistically explained by the researchers). By this relationships, physics, chemistry and biology (which are the basic sciences) were closely related and accepted concurrently by both sexes given by the various levels as, 0.71, 0.74 and 0.92 for males and 3.21, 0.67 and 0.64 respectively, with the females levels of acceptance in physics highly significant, at 3.21. SApart from the basic sciences offered in these schools, other subjects which form the bulk of the subjects offered as part of

the school curriculum, had the greatest acceptance by both the male and the female, just as is given by 2.72 and 9.50. This is in consonance with the work done by Wodi and Dokubo, (2009).

7. Conclusion

The development of students interest in basic science curriculum are avenues through which man interact and explain the universe, seeks to understand the world and make it better place. They are key drivers for socio-economic and educational transformations which must focus on innovation and invention. Though, these may or cannot be achieved if and when the required human and material resources are unavailable. Basic science is the instrument that sustains advancement and there is a global race in which neither Nasarawa state or even Nigeria at large should lag.

Fundamentally, the primary goal of science education cannot be simply to produce the next generation of scientist, rather, societies need to offer their young students an education in and about science and that this needs to be an education that will develop an understanding of the major explanatory themes that basic science has to offer and contribute to their ability to engage critically with it in their future lives. Knowledge about the basic science generally should be one that helps develop some of the key competencies that the Nigerian aspires to for its future citizens. Achieving this goal requires a long-term investment in curricula that are engaging, in teachers of basic science, by developing their skills, knowledge and pedagogy; and in assessment systems that adequately reflect the goals and outcomes we might aspire to for basic science education.

Despite the increased time spent at school, it has become clear that the school, regardless of being Government or private schools, is not capable of fulfilling the majority of the student's expectations at a moment when so great an amount of new knowledge is being generated and there are so many alternative sources of information. The interest manifested by the students in this work are generally based on subjective parameters which seem to be dependent on the teacher, the future usefulness of a given subject and of the pressures of the job market, since almost all the students surveyed (in both primary and JSS) would like to go to university after graduation from senior secondary schools, if given the varied aspect of motivation and conducive learning environment that will create positive interest in the students. Since not all that are infused into the school curriculum that students need to learn, their choice of a future career seems also to be on personal feelings, rather than on parental influence.

There is therefore the urgent need for total reform in Basic science curriculum contents, teaching strategies, quality of teachers, attitude of teachers to work, in skill development and infrastructural technology. If the Basic Science programme is to serve as a foundation for subsequent science studies as well as equip students with the basic scientific knowledge and skills necessary to build a progressive society, these areas must be taken seriously otherwise it will be difficult to achieve maximum benefits from the programme.

8. Recommendations

Based on the findings of the study, the following recommendations were made:

- Government should adequately fund primary and junior secondary school education so as to provide facilities and materials for Basic science.
- Government should establish Basic science quality control division at the primary and junior secondary school levels and empowering the unit to monitor and assess Basic Science Curriculum implementation through which lapses could be identified and remediation injected into the programme.
- Basic science should be taught using varying innovative and activity oriented methods
- Sufficient resources for teaching of Basic science should be provided and efficiently managed.
- Providing periodic and regular in-service training programmes (i.e. seminar, conferences and workshops) to basic science teachers.
- Curriculum planners and developers should identify and expunge irrelevant contents and incorporate current topics and new developments in the field of science to make the curriculum current and comprehensive.

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