THE AREAS OF INTEGRATED SCIENCE STUDENTS FIND DIFFICULT IN INTEGRATED SCIENCE SYLLABUS: A CASE STUDY OF FEDERAL COLLEGE OF EDUCATION, EHA-AMUFU

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Abstract

In Federal College of Education, Eha-Amufu, the persistent incomplete results by Integrated Science students at the end of N.C.E. programme necessitated the investigation of difficult areas Integrated Science students find problem in their syllabus. The results of Integrated Science students from 2006/2007 to 2007/2010 were used for the study since the identified science subjects (Biology, Chemistry, Physics and Mathematics) are aspects of Integrated Science. The subjects most students fail are assumed to be difficult for them. The results revealed that most failed physics course more than other subjects. Physics was declared difficult for Integrated Science students. It is recommended that this study should be carried out in other Colleges of education to know if similar results will be obtained. Also Integrated Science teachers should remedy students who are deficient in physics knowledge before teaching the physics aspect of Integrated Science.

Since the introduction of "integrated" into science curriculum, considerable interests have been shown by scientists and science educators, regarding its teaching and learning. For better understanding of the concepts, many science educators have attempted to define the term "integrated".

Okeke (2000) defined Integrated Science as an approach to the teaching of science in which concepts and principles are presented so as to express a fundamental unity of scientific thought and avoid undue stress or distinctions between the various scientific field.

Also, stressing the unified nature of Integrated Science, Cohem (1977) reported that "an integrated science course eliminates the repetition of subject matter from various sciences and does not recognize the traditional boundaries when presenting topics or theme". Howell (1970) also alluded to Integrated Science when he wrote that the essence of beginning course in science is to begin to teach students what science is and how scientists work. Integrated Science fulfilled these functions and can be regarded as a form of unified science.

Proponents of single subject disciplines perceive integration as "an undesirable trend if not a vain hope". They argued that it is impossible to devise an Integrated Science scheme in which the separate science disciplines i.e. physics, chemistry, biology, mathematics, geography, science education courses are not recognizable. The Integrated Science courses that are offered at the Colleges of Education in Nigeria are

almost in line with the above statement. Even though the courses are presented in a unified theme, but still, the separate science descriptive are highly recognizable. Because the National Commission for Colleges of Education (NCCE) syllabus is made up of many subjects and students that are admitted did not do all the subjects, they tend to find the course they offered at the secondary school easy, while those they did not offer difficult. This study therefore, tries to identify the courses students find difficult or easy, using Federal College of Education, Eha-Amufu as a case study.

The Philosophy and Objective of NCE Integrated Science

The philosophy of the Nigerian Certificate in Education (NCE), Integrated Science according to NCCE (2002) is anchored on the following areas:

(a) The fundamental unity of science
(b) The use of scientific method as a common approach in solving problems of scientific nature.
(c) The role of functions of science in everyday life.

In preparing teachers of Integrated Science, the principal objectives include:

(i) Enabling students gain the concept of the fundamental unity of science.
(ii) Instilling in students a commonality of approach to problems of a scientific nature i.e. scientific method.
(iii) Increasing students understanding of the role and functions of science in everyday life and in the world in which they live.
(iv) Making students well informed and scientifically literate.
(v) Enabling students acquire and demonstrate the intellectual competence and professional skills necessary to the teaching of Integrated Science in primary and junior secondary schools, as an inquiry based subject, in conformity with the National Curriculum.
(vi) Developing in students the ability to impart and encourage in their pupils the spirit of inquiry into living and non-living things in the environment.
(vii) Developing the ability and motivation in students to work and think in an independent manner;
(viii) Enabling students carry out scientific investigation, emphasizing co-operation, development of appropriate scientific processes and skills and improving their written and communication skills.

General Admission Requirements for Integrated Science at NCE Level

(a) A Senior Secondary School Certificate (SSSC, WAEC or NECO), G.C.E. "O" Level with passes in 5 subjects including English Language, three of which must be at credit level at the same sittings or four at two sittings. Two of the credits must be relevant to the course the candidate wishes to offer (Ewesor & Afomatofa, 2007).

Additional Admission Requirements for Integrated Science

Candidates wishing to study Integrated Science at the NCE level must satisfy general entry requirements which include a pass in Mathematics and English language.

For candidates with senior secondary school certificate or G.C.E. "O" Level, the credit passes must come from any two of the following groups:

(a) Biology/Health Science/Agricultural science.
(b) Physics
(c) Chemistry
(d) General Science or Integrated Science.

Statement of Problem

It has been noted in the past that in spite of Federal Government positive efforts towards education, the performance of students in science based courses has not been encouraging (Maduabum, 1990). This problem which exists mainly in secondary schools can also be witnessed in Colleges of education. At Federal College of Education, Eha-Amufu, the performance of students in Integrated Science when compared with that of student in other subjects in arts and social sciences has been poor. Integrated Science as a subject is made up of many subjects in combination, for example – Physics, Chemistry, Biology, Mathematics, Geography, Science Education etc. Because of its multidisciplinary nature, students of Integrated Science always find it very difficult to understand all the subjects contained in the Integrated Science course outline. This lack of knowledge of some subjects in Integrated Science contribute to poor performance of students in Integrated Science. This is a big problem and if it is not addressed immediately, might result to only few students will be graduating from Integrated Science department; since they may be failing one subject or the other.

It is therefore very necessary to find out the areas of Integrated Science courses which most students find difficult and that is what this paper has addressed.

Research Question

For the purpose of this study, the following research question has been proposed.

What areas of Integrated Science syllabus do students find difficult?

Methodology

The purpose of this study is to find out the areas of Integrated Science syllabus that most students find difficult. The study was carried out at Federal College of Education, Eha-Amufu. Result of students of Integrated Science students from 2006/2007 to 2009/2010 were used for the study. Since Integrated Science as a subject is made up of many subjects, the researcher identified those subjects as physics, chemistry, biology and mathematics. The researcher examined the performance of students in these subjects in order to identify the areas they passed or failed. The statistical data used for the study was percentages.

Data Presentation and Analysis

Table I: Summary of the Physics, Chemistry, Biology and Mathematics Courses Offered by the Set 2006/2007 – 2008/2009.

Summation of Courses According to Subjects and Year		Total Population Sampled	Number of Passes	Number of Failure	Percentages	
					Passes	Failure
2006/2007	Maths	404	343	61	84.90	15.10
	Physics	168	114	54	67.86	22.14
	Biology	213	162	51	76.05	23.95
2007/2008	Biology	392	315	78	80.36	19.64
	Physics	397	343	54	86.40	13.60
	Chemistry	356	273	83	76.68	23.32
2008/2009	Biology	406	356	50	87.69	12.31
	Physics	177	101	76	57.06	42.94

Table II: Summary of the Courses Offered by the Set I Above.

	Subjects	Total Population Sampled	Number of Passes	Number of Failure	Percentages	
					Passes	Failure
Over all Summation for Three Years of Programme Set I 2006/2007	Maths	404	342	61	84.90	15.10
	Physics	724	558	184	75.20	24.80
	Biology	1011	833	179	82.30	17.70
	Chemistry	356	273	83	76.68	23.32

From the table above, it can be seen that the performance of students in the subjects that make up Integrated Science are as follows: Mathematics (Passes = 84.90%; Failures 15.10%); Physics (Passes 77.20%; Failures = 24.80%); Biology (Passes = 82.30%; Failures = 17.70%); Chemistry (Passes = 76.68%, Failure = 23.32%).

From the table above, it can be observed that students fail physics courses more and therefore find physics courses difficult.

Table III: Summary of Physics, Chemistry, Biology and Mathematics Courses Offered by the Set II (2007/2008 – 2009/2010)

Summation of Courses According to Subjects and Year		Total Population Sampled	Number of Passes	Number of Failure	Percentages	
					Passes	Failure
	Maths	474	331	143	69.80	30.20
2007/2008	Physics	259	182	77	70.30	29.70
	Biology	204	172	32	84.30	15.70
	Biology	454	338	116	74.44	25.60
2008/2009	Physics	473	364	109	76.95	23.00
	Chemistry	469	381	88	81.24	18.76
2009/2010	Biology	483	409	74	84.68	15.32
	Physics	225	185	40	82.22	17.78

Table IV: Summary of the courses offered by set II above.

	Subjects	Total Population Sampled	Number of Passes	Number of Failure	Percentages	
					Passes	Failure
Over all Summation for Three Years of Programme Set II 2007/2008	Maths	474	331	143	69.80	30.20
	Physics	957	731	226	76.40	23.60
	Biology	1141	919	222	80.50	19.50
	Chemistry	469	381	88	81.24	18.76

From the table above, it can be observed that the performance of students in the subjects that made up of Integrated Science are as follows: Mathematics (Passes = 69.80%, Failure = 30.20%), Physics (Passes = 76.40%, Failures = 23.60%), Biology (Passes = 80.50%, Failures = 19.50%); Chemistry (Passes 81.24%, Failures = 18.76%). From the table at above, it can be observed that students fail physics courses more and therefore find physics courses difficult.

Table V: Shows the Combination of Summary of Result of Set I and Set II

	Subjects	Total Population Sampled	Number of Passes	Number of Failure	Percentages	
					Passes	Failure
Over all Summation for Set I and Set II	Maths	878	673	205	76.65	23.35
	Physics	1699	1289	410	75.87	24.13
	Biology	2153	1752	401	81.40	18.60
	Chemistry	825	654	171	79.27	20.73

From table V above, it can be seen that when the results of set I and set II are combined, the following observations were made: Mathematics (Passes = 76.65%, Failures = 23.35%); Physics (Passes = 76.87%, Failures = 24.13%); Biology (Passes = 81.40%, Failures = 18.60%); Chemistry (Passes = 79.27%, Failures = 20.73%). From the combination of set I and set II, it can be concluded that students find the physics part of Integrated Science syllabus difficult.

Discussion of Results

The major findings from this study show that students find physics and mathematics aspects of Integrated Science very difficult. Up to 30.16% of the students failed the Physics aspect of Integrated Science and may not graduate or obtain NCE on completion of their programme leading to reduction in the number of teachers of Integrated Science that will go into the field.

This reduction in the number of teachers will contribute to lack of Integrated Science teachers and that will lead to poor performance of students in both primary and junior secondary school sciences. Past studies (Nwaze, 1994) have shown that the most outstanding problems in Nigeria is the inadequate training of Integrated Science teachers. According to him, since the teacher is a crucial factor in any curriculum implementation, his mastery of the subject, his training experience and teachers characteristics will go a long way in the realization of the objectives of science teaching. Some students admitted to read Integrated Science did not offer physics, chemistry etc at the senior secondary school level yet, they have to study these subjects. These subjects form part of Integrated Science syllabus.

The poor foundation in physics must have seriously contributed to student's poor performance in physics at the NCE level. With this mass failure of students, teachers of Integrated Science should ensure that remedial courses are given to students who do not have enough knowledge in physics before being admitted to read Integrated Science at the college of education level.

Conclusion

This study identified areas students find difficult in Integrated Science syllabus. Integrated Science is a subject that is made up of many subjects namely Physics, Chemistry, Biology and Mathematics. The results of students for two sets were collected and examined to identify the subject most students fail. The subjects most students fail are assumed to be difficult for them. After analysis, it was noted that most students fail physics more than other subjects and as a result, physics was declared a difficult subject for the Integrated Science students.

Recommendations

Based on the finding of the study, the following recommendations have been made:

This type of study should be conducted in other colleges of education so as to know whether the same result would be obtained.

Integrated Science teachers should remediate students who are deficient in Physics before teaching the Physics aspect of Integrated Science courses. This will help to reduce the number of students who usually find the physics aspect of Integrated Science syllabus very difficult.

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