



The Perceptions of Junior High School Students and Teachers towards Teaching and Learning of Integrated Science at Komenda-Edina-Eguafo-Abrim District

David Baidoo-Anu^{1*} and Grace Essuman Mensah^{2*}

¹Department of Education and Psychology, University of Cape Coast, Ghana.

²Department of Basic Education, University of Cape Coast, Ghana.

Authors contribution

The authors designed, analyzed, interpreted and prepared the manuscript.

Article Information

DOI: 10.9734/AJESS/2018/40173

Editor(s):

(1) Vlasta Hus, Associate Professor, Department of Elementary Teacher Education, Faculty of Education, University of Maribor, Koroška cesta 160, Slovenia.

Reviewers:

(1) M. Rajendran, Department of English, Apollo College of Arts and Science, Madras University, India.
(2) Moisés Damián Perales Escudero, Department of Language and Education, Universidad de Quintana Roo, Mexico.
Complete Peer review History: <http://prh.sdiarticle3.com/review-history/24481>

Original Research Article

Received 9th January 2018

Accepted 23rd March 2018

Published 8th May 2018

ABSTRACT

The purpose of the study was to find out the perceptions of Junior High School students and their teachers towards teaching and learning of integrated science at Komenda-Edina-Eguafo-Abrim District. Specifically, the study aims to find out the perception of teachers on the availability and adequacy of science teaching and learning resources and the perception of junior high school students in KEEA district towards the teaching and learning of Integrated Science. A descriptive survey design was used for the study. The target population of this study was the entire public basic schools teachers in KEEA District. Multi-stage random sampling technique was used to select the students for the study. The study found out that non-availability of science laboratory, inadequate science apparatus in helping with teaching and learning, an inadequate library for research in teaching and learning of integrated science and inadequate furniture in the classroom for teaching and learning of integrated science were the major problems perceived by teachers. The study again found that the students have positive perception towards the teaching and learning of integrated science. However, they perceive integrated science as a difficult subject.

Conclusions: It was recommended that Government should provide the district with the necessary teaching and learning materials to aid the teaching and learning of integrated science in the KEEA district.

*Corresponding authors: Email: baidooanu@gmail.com;

Keywords: Perceptions; teaching and learning; teachers; students; junior high school.

1. INTRODUCTION

Education may be seen as a process by which individuals acquire knowledge, skills and attitudes, which enable them to develop their faculties in full. One of the benefits of good education is that it enables individuals to contribute to the development of the quality of life for themselves, their communities and the nation as a whole. When these dimensions of education are achieved, then science learning has become meaningful and fulfilling to the [1].

Science education is concerned with the developing of technologically literate citizens who understand how science, technology, and society influence one another and who can use this knowledge in their everyday activities. The development of science and technology is also recognized worldwide as vital for a nation's overall economic development. When used effectively science and technology are able to improve productivity and meet the needs of society.

Rein and Beach [2] state the rationale of science education as follows; a study of science is crucial because it has the potential for improving the quality of life and making the world safer, empowers people, giving them greater control over their lives by providing path ways for finding answers to questions. The general aims for science education at Junior High School (JHS) level quotes from the teaching syllabus for science at JHS are meant to help students to develop understanding of scientific concepts and principles; develop an appreciation for the application of science to life; think and act scientifically; develop scientific attitudes towards life; understand the operation of simple appliances and gadgets used in everyday life; develop skills for producing simple gadgets and appreciate their environmental challenges and develop ways for conserving the environment [3].

1.1 Statement of the Problem

The main goals of the Ghanaian Junior High School (JHS) science curriculum include creating a scientific and technological culture among Ghanaians and to make every Ghanaian citizen a scientific and technological literate (Curriculum Research and Development Division (CRDD), [4] and Ministry of Environment, Science and Technology, [5]. Science teachers are to relate

the science content to the cultural and societal setting of the child so that their students can apply the knowledge to solve societal problems [4]. Problems occur when the student is unable to identify what knowledge is needed to address a problem outside the classroom context in which it was taught [6]. Ghana's performance in Science remains one of the lowest in Africa and the world [7]. TIMSS [8] evidence shows that students are not achieving at expected levels and that Ghana has the largest gap in achievement in science at Basic Education Certificate Examination. The Trends in International Mathematics and Science Study [TIMSS] [8] report seems to portray a high correlation between students' achievement in integrated science and factors such as teachers, students and the school environment. This raises a serious question about the quality of teaching of Science especially in the Basic Schools which forms the foundation for the study of Science in both Secondary and Tertiary Levels of Education.

Bajah [9] identified science classroom, science laboratory, service point, equipment/apparatus, glassware/plastics, time and time table, integrated science curriculum or syllabus and scheme of work as very imperative in teaching and learning of integrated science. He indicated all these resources should be at the disposal of the integrated science teacher, who needs to use it for the attainment of the goal of science education.

The specific objectives of this study, therefore, seeks to find out the perception of teachers on the availability and adequacy of science teaching and learning resources and the perception of junior high school students in KEEA district towards the teaching and learning of Integrated Science.

Research Questions

To achieve the objectives of this study, the following research questions were formulated to guide the study:

1. What are the perceptions of teachers on the availability and adequacy of science teaching and learning resources?
2. What are the perceptions of students towards the teaching and learning of integrated science?

1.2 Literature Review

This session reviews literature related to the topic. The objective is to explore what major authors and writers have written on the topic.

Students' perception of integrated science has to do with how students view the subject, based on the information their senses have received and how these information has been analyses and interpreted [10]. Science is often perceived as a difficult subject by many: some describe it as confusing, and others suggest that it is boring [11]. Physics in particular seem to be deliberately avoided by a number of students pursuing higher-level science education in many parts of the world to the extent that its enrolment at the secondary and tertiary levels is the lowest among the other science discipline such as chemistry, biology, botany, and zoology in Europe due to the perceived difficulty of the subject [12].

In a study conducted by the European Commission [12] which was titled "Europe Needs more Scientist" the study examined the condition of science and technology in the European Union and paid special attention to the number of peoples entering science and technology education and careers. Its came out that, in many highly developed countries, there is a noticeable decline in the recruitment of students to science and technology studies. In the study, it was noted that lack of interest in science and technology studies and careers in some countries was because most young people in such countries held a negative perception of science and technology education. Such assertion is often voiced out in the most public debate. Most said that science and technology are blamed for many of the evils of modern society, like pollution, destructions of the environment, overuse of natural resources and even modern war and conflicts.

Johnson [13] commented on the perceived difficulty of the science subject by secondary school students. He indicated that this difficulty might be due to the problems of perceptions, attitudes and thinking of students. His analysis of the nature of the perceived difficult topics led him to propose that this difficulty may be caused by complexity due to ideas and concepts existing at the three different levels: macro, micro and representational or symbolic. Using the concept "water" to explain these levels: this concept can be taught at the macro level where students can observe properties of the water. It can also be

taught at the micro level where, for example, students are taught that water consists of molecules of hydrogen and oxygen. At the representational level, these molecules can be represented as a symbol H₂O.

However, in Chiodo and Byfords [14] phenomenological study with 48 students, student's favourite subjects were Mathematics, Science or English because of their value in the future careers. Most of the students stated that science is their favourite subject since it has bearing with their future carriers.

Moreover, on instructional materials, Bloom, Englehart, Furst, Hill, & Krathwohl, [15] posit that teaching and learning resources aid teaching and learning to be more effective and easier. They assert that children learn by doing and observing and this calls for real practical work in the integrated science classroom.

According to Bajah [9], resources for teaching integrated science can be categorized into two major parts; these are: material /physical/non-human resources and human resources. Both the human and non-human resources at the integrated science teacher's disposal are inseparable. The reason for this is not farfetched. Science is an experimental subject, which involves the use of materials, equipment and apparatus for effective delivery in the classroom.

2. METHODOLOGY

The purpose of the study was to find out the perceptions of Junior High School students and their teachers towards teaching and learning of integrated science at Komenda-Edina-Eguafo-Abirim District. A descriptive survey design was used for the study. The target population of this study was the entire public basic schools teachers in KEEA District. Multi-stage random sampling technique was used to select the students for the study. Concerning the teachers' purposive sampling method was used to select all the science teachers as purposive for the interested was in science teachers in the selected schools in the KEEA District. There are 290 students, and 14 integrated science teachers were selected as samples. The questionnaire was deemed most appropriate for the study. The questionnaires were designed respectively for school teachers and students. The questionnaire for teachers was made up of two sections, A and B. Section A sought to elicit demographic data of the teachers, section B was made up of 7 items

which sought information on the perception of teachers on the availability and adequacy of science teaching and learning resources. The students' questionnaire was made up of 2 sections, A and B. Section A sought to elicit demographic data of the students. Section B was made up of 7 items, and it elicited information on the perception of junior high school students towards the teaching and learning of integrated science. The instrument was pre-tested to check understanding and ambiguity and correct any misunderstandings which would be due to the framing and construction of the items and also to ensure reliability and validity. The reliability statistic for the students' and teachers' questionnaire had a Cronbach alpha of 0.81 and 0.79 respectively. The validity and reliability of the instrument were established to make sure that it is internally consistent within itself.

Percentages were used to analyze the background information of the participants. Responses to the various items in the questionnaires were also added, tabulated and statistically analyzed. All items of the questionnaires were coded. Items in the form of four-points Likert scale were rated between 4-1, with four which is being the highest and 1 being the lowest. Percentages and frequencies were used to analyse the background information of the participants. We used percentages and frequencies to answer research question one and research question two. Percentages and frequencies were used to ensure clear understanding and interpretation of the data analysis.

3. RESULTS AND DISCUSSION

This section of the chapter presents the analysis of the background data of the respondents.

Table 1. Distribution of respondents by gender (students)

| Gender | Frequency | Percentage |
|--------|-----------|------------|
| Male | 163 | 56.2 |
| Female | 127 | 43.8 |
| Total | 290 | 100.0 |

The gender distribution of the respondents is presented in Table 1. The males were 163 representing 56.2% while the females were 127 representing 43.8%. This implies that there were

more male students who took part in the study as compared to their female counterpart.

Table 2. Distribution of respondents by gender (teachers)

| Teaching experience | Frequency | Percentage |
|---------------------|-----------|------------|
| Male | 13 | 92.9 |
| Female | 1 | 7.1 |
| Total | 14 | 100.0 |

Table 2 illustrated the distribution of gender of the teachers who took part the study. The Table shows that 13 of the respondents representing 92.9% were males whereas only 1 of the respondents representing 7.1% was female. This implies that there were more male teachers who took part in the study than female teachers.

Table 3. Teaching experience of teachers

| Teaching experience | Frequency | Percentage |
|---------------------|-----------|------------|
| 2 - 5 years | 2 | 14.3 |
| 6 - 10 years | 5 | 35.7 |
| Above ten years | 7 | 50.0 |
| Total | 14 | 100.0 |

Table 3 shows the number of years of teaching of the teachers involved in the study. The results indicated that 2 of the respondents representing 14.3% have taught for 2–5 years, 5 of the respondents representing 35.7% have taught for 6–10 years and 7 of the respondents representing 50.0% have taught for ten years and above. This implies that a greater percentage of the teachers involved in the study have taught for a long time and they have much knowledge in the teaching of Integrated Science.

Research Question 1

What is the perception of teachers on the availability and adequacy of science teaching and learning resources?

This section answers research question one. It tends to find out the perception of teachers on the availability and adequacy of science teaching and learning resources. The analysis of the responses is presented in Table 4.

Table 4. Perception of teachers on the availability and adequacy of science teaching and learning resources

| Statement | Adequate | Not adequate | Not available |
|----------------------------------------------------------------------------------------------------------------------------|----------|--------------|---------------|
| | f (%) | f (%) | f (%) |
| 1. Are the teaching and learning materials (TLMs) in your school adequate to help in the teaching and learning of science? | 0(00.0) | 11(78.5) | 3(21.5) |
| 2. Is the science laboratory adequate in helping with the teaching and learning of integrated science in the school? | 3(21.5) | 0(0.0) | 11(78.5) |
| 3. How adequate are the science apparatus in helping with teaching and learning of integrated science in the school? | 2(15.4) | 11(84.6) | 0(0.0) |
| 5. Does the school library aid teaching and learning of integrated science | 3(21.4) | 7(50.0) | 4(28.6) |
| 6. How adequate are the classrooms for teaching and learning of integrated science in the school | 10(71.5) | 4(28.5) | 0(0.0) |
| 7. How adequate are the furniture in the classroom for teaching and learning of integrated science in the school? | 5(35.7) | 8(57.2) | 1(7.1) |

From Table 4 it was revealed that the teaching and learning materials (TLMs) in the respondents' school were not adequate to help in the teaching and learning of science. Eleven (78.5%) of the respondents agreed to the statement, 3 (21.5%) of them stated that it was not available and none of them indicated that it was adequate. The researcher probed further to know whether the science laboratory in their school is adequate in helping with the teaching and learning of integrated science in the school or not. It was revealed that 11 of the respondents representing 78.5% indicated science laboratory is not available in their schools, 3 (21.5%) indicated that it is available in their school and it is adequate for them?

Furthermore, responses from the item "How adequate are the science apparatus in helping with teaching and learning of integrated science in the school?" show that 2 (15.4%) of the respondents indicated that the science apparatus is adequate for them, 11 (84.6%) of them also indicated it is not adequate and none of them indicated that it is not available.

Pertaining to the item "Does the school library aid teaching and learning of integrated science" it was noted that 3 (21.4%) of the respondents pointed that it was adequate, 7 (50.0%) of them indicated it is not adequate and 4 (28.6%) of them indicated that it is not available.

The researcher delved to know the adequacy of of classrooms for teaching and learning of integrated science in the school. Responses on the statement indicated that 10 (71.5%) of the respondents indicated that it was adequate, 4 (28.5%) of them indicated that it was not adequate and none of them indicated that it was not available. Finally, 5 (35.7%) of the respondents affirm that the furniture in the classroom for teaching and learning of integrated science in their school were adequate, 8 (57.2%) of them indicated that it was not adequate, and only 1(7.1%) of them indicated that it was not available in their school.

The above findings support the work of Bloom, Englehart, Furst, Hill, & Krathwohl, [15] who posited that teaching and learning resources aid teaching and learning to be more effective and easier. They assert that children learn by doing and observing and this calls for real practical work in the integrated science classroom. Therefore inadequate resources to aid teaching and learning of science results in poor performance in science. Also, Ossei-Anto, [16] and Ofori [17], indicated that the availability and accessibility of relevant teaching and learning resources are significant in having an impact on the performance of both teachers and students. According to the GES, resources that facilitate teaching and learning of integrated science in schools include: laboratory, good classrooms, workshops, offices, library facilities, tools, science apparatus and many more.

Also, according to Adane [18] teachers should ensure that they prepare and effectively use teaching and learning materials in their lesson presentation. Teaching and learning materials in a simple sense are materials which can be seen or heard and which contributes to the learning process. Therefore, any medium which gives students the opportunity to use as many senses as possible is the best medium in learning. The main purpose for the use of the teaching and learning materials is to make teaching and learning more meaningful to their children. By using teaching and learning materials, the teacher attempts to stimulate the senses of the students as much as possible to ensure their full involvement in the learning situations.

Fuller [19] identified a school library as an instructional resource which may significantly influence students' achievement. He found out that one effect of library and its activity have been positive in 15 out of 18 analyses. Those schools with well-equipped library normally maintain high academic performance.

Research Question 2

What are the perceptions of students towards the teaching and learning of integrated science?

From Table 5, concerning "Integrated science is the only subject area with the primary responsibility of providing scientific literacy to people in the country" statement, 203 of the respondents representing 70.4% agreed to the

item even as 85 of the respondents representing 29.6% responded negatively.

In response to "I have less interest in learning integrated science", 140 (49.0) of the respondents affirm the statement while 146 (51.0%) of the respondents responded negatively to the statement.

Asked whether Integrated science is the most difficult core subject one has to study or not, the results indicated that 177 of the respondents representing 61.9% agreed to the statement while 109 of the respondents representing 38.1% disagreed to the statement. Upon asking the respondent whether Integrated science is irrelevant, boring and unimportant therefore should be taken out of the school curriculum or not, it was revealed that 61 (21.3%) of the respondent attest to the statement while the majority of the respondents (that is, 225 representing 78.7%) detest to statement.

Two hundred and sixty-one of the respondents representing 91.5% agreed to the statement Integrated science helps shape lives for the future carrier with 24 (8.5%) of the respondents who disagreed with the statement.

Talking about students being forced to allocate more time to the studying of integrated science, 203 (70.7%) agreed to the statement while 84 (29.3%) disagreed with the statement. Furthermore, responses from the statement

Table 5. The perceptions of students towards the teaching and learning of integrated science

| SN | Statement | Agree f (%) | Disagree f (%) | Total f (%) |
|----|---------------------------------------------------------------------------------------------------------------------------------------|----------------|-------------------|----------------|
| 1 | Integrated science is the only subject area with the primary responsibility of providing scientific literacy to people in the country | 203 (70.4) | 85 (29.6) | 288 (100) |
| 2 | I have less interest in learning integrated science | 140 (49.0) | 146 (51.0) | 286 (100) |
| 3 | Integrated science is the most difficult core subject one has to study | 177 (61.9) | 109 (38.1) | 286 (100) |
| 4 | Integrated science is irrelevant, boring and unimportant therefore should be taken out of the school curriculum | 61 (21.3) | 225 (78.7) | 286 (100) |
| 5 | Integrated science helps shape lives for the future carrier | 261 (91.5) | 24 (8.5) | 285 (100) |
| 6 | Students are forced to allocate more time to the studying of integrated science | 203 (70.7) | 84 (29.3) | 287 (100) |
| 7 | Integrated science should be studied by only those who want to read science at the SHS | 63 (21.9) | 225 (78.1) | 288 (100) |

"Integrated science should be studied by only those who want to read science at the SHS" indicated that, 63 (21.9%) affirm the statement with 225 (78.1) of them who responded negatively to the statement. This, in turn, support the argument made by the Ministry of Environment, Science and Technology (2009), that integrated science syllabus is a conscious effort to raise the level of scientific literacy of all students and equip them with the relevant basic scientific knowledge needed for their own living and also needed for making valuable contribution for the productivity of the country.

The findings from the support the work of Maharaj-sharma [11] who found that Science is often perceived as a difficult subject by many: some describe it as confusing, and others suggest that it is boring and this turn to affect their performance in the subject. Again, the findings support the work of Johnson [12] who commented on the perceived difficulty of the science subject by secondary school students. He indicated that this difficulty might be due to the problems of perceptions, attitudes and thinking of students.

4. CONCLUSION

The purpose of the study was to find out the perceptions of Junior High School students and their teachers towards teaching and learning of integrated science at Komenda-Edina-Eguafo-Abirim District. The first objective was to find out teachers' perception of adequacy and availability of science teaching and learning resources in KEEA district. The study found non-availability of science laboratory, inadequate science apparatus in helping with teaching and learning, inadequate library to teaching and learning of integrated science and inadequate furniture in the classroom to aid teaching and learning of integrated science in KEEA district. It was again revealed that integrated science is the most difficult core subject one has to study. However, students have positive perception towards the teaching and learning of integrated science.

6. RECOMMENDATION

Based on the findings and the conclusions of the study, the following recommendations are made; integrated Science teachers in KEEA should endeavour to make the subject more practical oriented to motivate students. This will help them

find the subject relatively easier. Again, the government should provide the district with the necessary teaching and learning materials to aid the teaching and learning of integrated science in the KEEA district.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Anderson GM. Determinants of success in university introductory economics courses. *Journal of Economic Education* (Spring), 2006;25(6):67-78.
2. Rein HJ, Beach MD. Teaching and learning in the elementary school: Focus on curriculum. New Jersey: Prentice Hall; 1997.
3. Ministry of education. Teaching syllabus for integrated science; Senior High School. Accra: Delcam FB Ltd. 2001;1-3
4. Curriculum research and development division [CRDD]. Teaching syllabus for integrated science (Junior High School). Accra: Ghana Education Service; 2007.
5. Ministry of environment, science and technology. Teaching syllabus for integrated science (Junior High School). Accra: CRDD; 2007.
6. Smith P. At a glance: Facilitating learning through effective teaching. Adelaide SA: National Centre for Vocational Education Research; 2010.
7. Anamuah-Mensah J, Mereku DK, Ampiah JG. TIMSS 2007 Ghana report: Findings from IEA's trends in mathematics and science study at eight Grade. Accra: Adwinsa Publications Limited; 2009.
8. Trends in international mathematics and science study (TIMSS). Grade 4 mathematics assessment items. Boston: TIMSS & PIRLS International Study Center; 2011.
9. Bajah ST. Stepping into science: The ELSSA way. *STAN Bulletin*. 1986;15(2): 6-8.
10. Schreiner C, Sjoberg S. Sowing the seed of ROSE. Background rational and questionnaire development and data collection for ROSE. (The relevance of education)- A comparative study of student's views on science and science

- education. University of Oslo: Norway Press; 2004.
11. Maharaj-Sharma R. What are student's ideas about the concept of an electric current? A Primary School Perspective. Caribbean Curriculum. 2011;18:67-86.
 12. European commission. Europe needs more scientists. Report by the High Level Group on Increasing Human Resource for Science and Technology in Europe. Belgium: European Commission; 2004.
 13. Johnson HD. Traditional verses non-traditional teaching: Perspectives of students in Introductory Statistics Classes. Journal of statistics Education. 1991;13: 78-89.
 14. Chiodo JJ, Byford J. Do they really dislike social studies? A study of middle school and high school students. Social Studies Research. 2004;28:16-26.
 15. Bloom BS, Engelhart MD, Furst EJ, Hill W. H, Krathwohl D. Taxonomy of educational objectives: Handbook I: Cognitive domain. New York: David McKay; 1956.
 16. Ossei-Anto TA. Integration of science resources. Journal of Educational Management. 1999;3:76-89.
 17. Ofori SA. Teacher management and support services in secondary schools. A Case study of Accra Academy. Unpublished M. Ed thesis, University of Cape, Coast, Cape coast; 2005.
 18. Adane LF. Factors affecting low academic achievement of students in kemp methodist junior high school in Aburi. Unpublished Thesis; 2013.
 19. Fuller B. How to raise children's literacy. The influence of family, teacher, and classroom in northeast Brazil. Comparative education review, 1985;4(1):1-35.

© 2018 Baidoo-Anu and Mensah; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Peer-review history:
The peer review history for this paper can be accessed here:
<http://prh.sdiarticle3.com/review-history/24481>