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COMPARISON BETWEEN RESEARCH IN PHYSICS AND OTHER CORE SUBJECTS USING THE SCIENCE TEACHERS ASSOCIATION OF NIGERIA CONFERENCE PROCEEDINGS FROM 1997 TO 2004

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Abstract

Research is one of the most important tools that can be used to advance knowledge and to enable man relate more to his environment, solve scientific problems and resolve conflicts. In the classroom situation, it is important that teachers must not only be concerned with their actual teaching responsibilities but should also be very conversant with and interested in research, their findings and their implications for teaching and learning purposes in schools. This study attempts to find out to what extent and the area of contributions which Physics teachers have made into research by publishing in the annual Science Teachers Association of Nigeria (STAN) Conference Proceedings. The sample used for this study was Physics publications in the STAN Conference Proceedings between 1997 and 2004. The instrument used to collect data for this research was designed by the researcher. This study concluded that Physics teachers contributions to research in the teaching and learning Physics has not been encouraging compared to those of other core science subjects teachers and Mathematics. The worst hit is in the areas of Physics curriculum and achievement in Physics which have not been researched into adequately.

Background

Physics is the scientific study of matter, energy, force and motion and the way they relate to each other. In reality, Physics is not a purely abstract subject. Like other science subjects, Physics has a 'pure' theoretical side and an applied side.

Physics traditionally incorporates mechanics, electromagnetism, optics and thermodynamics and now include modern disciplines such as quantum mechanics, relativity and nuclear Physics. Other science areas involve the applications of Physics and have contributed to its

growth. These sciences include astronomy, physical chemistry, aerodynamics and hydrodynamics and so on. Given the nature of Physics which combines theory and practical, it provides a good training for the exposition of the concepts and principles used in technology. It is a very interesting and essential subject because it closely links the principles learnt and the phenomena observed in the classroom with application in industry, medicine, engineering and the field of work of general human endeavors. There is Physics in many things: its various applications in electronic devices, automatic control systems, in aircraft and space vehicles are well known. Sometimes, the often simplistic definition of technology as applied science is most apt in relation to physics. Physics is intact science in action. Physics in action focuses on Physics in everyday life as its application in sports and other areas are vivid and often revealing.

Physics education is relevant in making students observe and understand phenomena around them and explain them in terms of the Physics involved, the principles of their existence which lead to the development of a better understanding of the problem under consideration and come up with a more appropriate design and strategy

which could be used to solve problems.

Because of the difficulties experienced in the teaching and learning Physics particularly in terms of manpower, material resources and research, it is important that teachers must not only be concerned with their actual teaching responsibilities but should also be very conversant with and interested in research, their findings and their implications for teaching and learning purposes in schools. Research will enhance their academic and professional growth, promote the satisfactory utilisation of available resources and contribute generally to their pool of knowledge in planning and development. A use of appropriate teaching methods and strategies will enhance better understanding of the subject which is generally perceived more difficult than other science subjects like chemistry and biology.

In order to assist teachers in the area of improving the teaching and learning of Physics especially through research, a body known as the Science Teachers Association of Nigeria was inaugurated on June 21st, 1957 in Lagos by a group of sixteen science teachers. This was at the invitation of Mr. F.I. Ajemogobia who was a Physics teacher and the Acting - Principal

of Kings College, Lagos. Mr. Ajemogobia was at the meeting unanimously elected the first President of the association with Mr. Chimere Ikoku (Now Prof. Chimere Ikoku) as the first Secretary. The first branch of the association formed outside Lagos was inaugurated at Ibadan by a group of nine science teachers. The Ibadan branch was initiated by the twin brothers Femi and Dotun Oyewole. With this humble beginning of two branches with less than thirty members, STAN has grown steadily with branches in all the states of the federation.

All science teachers (from primary to university) and administrators in the country are eligible for membership of the association. Membership of STAN is categorized as follows: students' membership, associate membership, full membership, fellowship, institutional membership, life membership and honorary life membership. The major activities of the Science Teachers Association of Nigeria (STAN) which are aimed at the professional development of its members include:

- Organisation of annual conference lasting one week and usually in August in rotation on state basis.

- Organization of seminars and workshops.
- Curriculum development.
- Collaboration with ministries and agencies like the West African Examinations Council (WAEC), the Joint Admissions and Matriculation Board (JAMB), the Nigeria Educational Research and Development Council (NERDC), Federal Ministry of Science and Technology (FMST), National Teachers' Institute (NIT) and the National Commission for Colleges of Education (NCCE).
- Collaboration with International Council of Associations for Science Education (ICASE).
- Production of journals, proceedings, bulletins and textbooks.

The problem

This study was designed to find the extent and the area of contribution which Physics teachers have made into research by publishing in the annual Science Teachers Association of Nigeria (STAN) Conference Proceedings compared to the contributions of their colleagues in the other core science subjects and Mathematics.

Research Questions

1. In what areas have Physics

papers been published in the STAN conference proceedings from 1997 to 2004?

2. What are the findings in the Physics papers published in the STAN Conference Proceedings from 1997 to 2004?
3. What is the extent to which Physics papers have been published relative to papers in the other core science subjects and Mathematics in the papers published in the STAN conference proceedings from 1997 to 2004?

Population

The population used for this study is the entire Physics papers published in the STAN conference proceedings since the inception of STAN.

Sampling

The study involves Physics papers published in the Science Teacher Association of Nigeria (STAN) Conference Proceedings from 1997 to 2004. This is a sample of convenience and was chosen such that it covers at least a period of which the findings and positions in the papers would still be relevant to instruction and research in Physics education.

Instrument

The instrument used for data collection for this research was record observation such that it supplies vital information about the papers analysed.

Data Analysis

Data generated for this study were analysed and presented in four (4) different tables shown below. Table 1 shows the year of publication, number of publication in each core science subjects and Mathematics and the type of publication. Table 2 shows the percentage distribution of the papers in each core science subjects and Mathematics. Table 3 shows the number and type of each core science subject and Mathematics papers published. Table 4 shows the percentage distribution of the area of study of each of the core science subjects and Mathematics.

Data Presentation

The results obtained from the analysis of the STAN Conference Proceedings are presented as follows:

Table 1
Year of Publication, Number of Papers in each of the Science Core Subjects and Mathematics and the Type of Publication

| YEAR | BIOLOGY | | | CHEMISTRY | | | MATHEMATICS | | | PHYSICS | | |
|--------------|---------------------|-----------|--------------|---------------------|-----------|--------------|---------------------|-----------|--------------|---------------------|-----------|--------------|
| | TYPE OF PUBLICATION | | NO.OF PAPERS | TYPE OF PUBLICATION | | NO.OF PAPERS | TYPE OF PUBLICATION | | NO.OF PAPERS | TYPE OF PUBLICATION | | NO.OF PAPERS |
| | | | | | | | | | | | | |
| 1997 | 5 | 3 | 2 | 5 | 3 | 2 | 6 | 3 | 3 | 5 | 3 | 2 |
| 1998 | 6 | 2 | 4 | 5 | 4 | 1 | 9 | 5 | 4 | 8 | 6 | 2 |
| 1999 | 6 | 5 | 1 | 7 | 5 | 2 | 8 | 5 | 3 | 4 | 4 | - |
| 2000 | 10 | 1 | 3 | 11 | 5 | 6 | 16 | 12 | 4 | 5 | 2 | 3 |
| 2001 | 1 | 1 | - | 5 | 2 | 3 | 5 | 5 | - | 5 | 5 | - |
| 2002 | 8 | 6 | 1 | 8 | 6 | 2 | 10 | 6 | 4 | 5 | 4 | - |
| 2003 | 2 | 1 | 1 | 5 | 1 | 4 | 7 | 5 | 2 | 1 | - | 1 |
| 2004 | 4 | 2 | 2 | 2 | 1 | 1 | 5 | 5 | - | 1 | - | 1 |
| TOTAL | 42 | 27 | 15 | 48 | 27 | 21 | 66 | 46 | 20 | 34 | 24 | 8 |

KEY: EMP. = EMPIRICAL PAPERS

POS. = POSITION PAPERS

Table 2 shows the number of papers in each of the core science subjects and mathematics published in the STAN Conference Proceedings and their percentage distribution.

The total number of papers published on core science subjects and mathematics = 190

| S/N | SUBJECT | NUMBER OF PAPERS | PERCENTAGE (%) |
|-----|--------------|------------------|----------------|
| 1. | BIOLOGY | 42 | 22.10 |
| 2. | CHEMISTRY | 48 | 25.26 |
| 3. | MATHEMATICS | 66 | 34.74 |
| 4. | PHYSICS | 34 | 17.90 |
| | TOTAL | 190 | 100 |

Table 3 shows percentage distribution of the types and number of papers on the core science subjects and Mathematics published in the STAN Conference Proceedings from 1997 to 2004

The total number of the type of physics published = 34

| SN | TYPE OF PAPER | NUMBER OF PAPER | PERCENTAGE (%) |
|----|---------------|-----------------|----------------|
| 1. | EMPIRICAL | 24 | 70.59 |
| 2. | POSITION | 10 | 29.41 |
| | TOTAL | 34 | 100.00 |

Table 4 shows the percentage distribution of the area of study on the core science subjects and Mathematics published in the STAN Conference Proceedings from 1997 to 2004. The Total Number of Type of Study = 34

| SN | AREA OF STUDY | NUMBER OF PAPERS | PERCENTAGE (%) |
|----|------------------------|------------------|----------------|
| 1. | Classroom Instruction | 20 | 58.82 |
| 2. | Curriculum Evaluation | 2 | 5.88 |
| 3. | Achievement in Physics | 12 | 34.74 |
| | TOTAL | 34 | 100 |

Discussion of Findings

This study attempted to find out the extent to which physics teachers have contributed and in what areas of research have the contributions been made and published in the Science Teachers Association of Nigeria (STAN) Conference Proceedings from 1997 to 2004. This was done by comparing the number of published papers in Physics to those of the other core science subjects and mathematics within the period stated above. The results obtained are presented in Tables 1, 2, 3 and 4.

This study revealed that for the past eight years, 190 papers on the core science subjects and Mathematics were published in the Science Teachers Association of Nigeria (STAN) Conference Proceedings from 1997 to 2004, 4(22.10%) of the papers were written on Biology, Chemistry; 48(25.26%), Mathematics; 66(34.74%) and Physics; 34(17.90%) as shown in Table 2 above.. It was also

revealed in Table 3 that of the 34 Physics papers published in the STAN Conference Proceedings, 24(70.59%) were empirical while 10(29.41%) were position papers.

The study also indicated that out of the 34 papers published on Physics in the STAN Conference Proceedings between 1997 to 2004, 20(58.82%) were written on classroom instruction, 2(5.88%) were written on curriculum evaluation and 12(35.30%) were written on achievement in physics as revealed in Table 4.

Conclusion

This study drew attention to the fact that teaching and learning of Physics are faced with a lot of difficulties. The study revealed that Physics has the lowest number of papers published in the Science Teachers Association of Nigeria (STAN) Conference Proceedings from 1997 to 2004 compared to the number published on the other core science subjects and Mathematics. The

inadequacy of research on Physics education especially in the area of curriculum evaluation of our senior secondary school Physics curriculum was highlighted and this was corroborated by the findings of Okonkwo (1996) which revealed that adequate attention has not been paid to research into science education especially Physics education. Lack of research in curriculum evaluation has made the present Physics curriculum in our secondary schools inadequate in terms of organisational structure and effective teaching. This has also contributed greatly to the overall

poor performance of students at external examinations as revealed by the findings of Owolabi (1999). Attention should also be paid to achievement in Physics, an area which has also suffered in terms of research. On the whole Physics teachers' effort on research has not been encouraging compared to that of their colleagues in other core science subjects and Mathematics. In order to solve some of the numerous problems facing Physics teaching and learning today, emphasis must be placed on research as one of the ways of improving our educational system.

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