

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/360515873>

# ATTITUDES OF BIOLOGY TEACHERS TO RESEARCH AND RESEARCH FINDINGS

Article · January 2004

---

CITATION

1

READ

1

1 author:



[Anthony Ossai Ukpene](#)

University of Delta, Agbor, Delta State

33 PUBLICATIONS 5 CITATIONS

[SEE PROFILE](#)

UKPEWE, ANTHONY

17/3/04



# Science Teachers Association of Nigeria

REFOCUSING RESEARCH IN SCIENCE, TECHNOLOGY AND  
MATHEMATICS (STM) EDUCATION



## Proceedings of the 45th Annual Conference 2004

MATTHIAS A. G. AKALE

Editor



Sponsored by  
Heinemann Educational Books (Nigeria) Plc

## PAPER 25

### ATTITUDES OF BIOLOGY TEACHERS TO RESEARCH AND RESEARCH FINDINGS

**Mr. Ukpene Anthony Ossai**

Principal Lecturer, Dean, School of Science Education, Federal College of Education (Technical) Bichi, Kano State

#### Abstract

*The study was intended to investigate the relative capacities of biology teachers in Colleges of Education to carry out research activities as demanded by their profession, as well as their extent of utilization of research findings of others in improving their delivery of instruction. Using a 20-item questionnaire to generate information from biology lecturers in three Colleges of Education in Kano State, the study notes that the lecturers exhibit a relatively high passion for doing research, but seldom consult journals for purposes of using the research findings of others to introduce innovations into their methods of teaching.*

#### Introduction

Teaching and learning in the era penultimate to the crave for science and technology development in the country was motivated by the drive to produce a citizenry that is equipped with capacities for reading, writing and arithmetic. The major strategy of teaching then had been to encourage the mastery of learning experiences through constant drills and repetition of course contents, and to complete items listed on the curriculum before the terminal examination was due. This strategy of teaching which encouraged learners to memorise contents of learning experiences is today referred to in learning circles as the lecture method.

The re-orientation of the nation's philosophy of education to achieve national development through science and technology education brought to the fore, the absolute inadequacies inherent in the lecture method. James and Awodi (1997), hinted that the lecture method which is predominantly used in most Nigerian schools encourages learning by rote, and provides little or no room for active students' participation in the lessons. Nwagbo (2001), quoting research reports of Ali 1984, Okeke 1986, and Olarenwaju 1986, noted that teachers shy away from the more effective activity-oriented teaching methods in preference for methods that are easy but most times inadequate and inappropriate. It had been observed that the quality of any educational programme in any country is the function of those who teach it (Akpan, 1987). It is therefore, expected that teachers through whom science and technology was expected to be developed, should be intellectually and professionally competent and dynamic enough to adapt to the dynamic world of today's scientific and technology growth and development. To buttress this point it was emphasized that even a good curriculum in a well-stocked laboratory would still not give the desired result in the hands of an incompetent teacher.

Biology as a curriculum subject, had witnessed a high level enrolment than any other science subjects in the final year external examinations (James and Awodi 1997). Conversely, there has not been a corresponding increase in students' performances in the examinations, even in schools where necessary facilities for the teaching and learning of science are available. To stem this trend, several authorities have advocated, through research endeavours, diverse innovative teaching – learning strategies and methods, having noted that the lecture method was no longer feasible as a method of attaining the goals of instructional objectives in biology. Through the research efforts by scholars several scrupulous methods of teaching and learning have been recommended. Nwagbo (1999), suggested the use of the guided-inquiry method which can adequately elicit the desired behavioural outcome by blending theory and practical work. Nwagbo (2001) further postulated that this method promotes cognitive achievement in biology amongst students at all levels of scientific literacy. Ajewole (1990), on the other hand, stressed that the guided-discovery method was significantly better in the transfer of learning experiences. Here, the teacher provides illustrative materials for students to study on their own after which leading questions might be asked to guide students to think through the problem and provide solutions and draw conclusion through the adoption of the

processes of science. For Okeke (1986), in Nwagbo (1999), promoting positive attitude among students towards biology is better achieved through inquiry-oriented and problem-solving teaching strategies, while James and Awodi (1997) reported that the inquiry method is very effective in yielding higher achievement among slow learners in biology and other science subjects. According to Ogunniyi (1986), in Yunusa (2003), problem-solving method allows the teacher to suggest problems to students and act as guide, a leader, a resource person, and internal sensor and moderator to help students further their inquiries and encourage them to tackle the problem on their own. It allows students to perform mental processes such as observing, classifying, measuring, forming hypothesis, analyzing which lead to discovery and generalization, he stressed.

Similarly, concept mapping now presents itself as a veritable technique for teaching and learning. Simply put, it is a graphical arrangement of key concepts to show meaningful relationships among the selection of concepts to be studied. Hence the method enables teachers to select, organize and represent subject matter content in a concise manner. For students, concept mapping is a powerful strategy for note taking during lectures, summarizing and synthesizing what they are reading and in writing reports. Ezeugo and Agwagah (2000), reported that concept mapping heuristics is predicted on Asubel's assimilation theory of cognitive learning which places central emphasis on the influence of students' prior knowledge on meaningful learning.

Despite the availability and recommendation of these innovative methods of teaching which have been tested and found viable for the improvement of learning in biology, the teachers still exhibit absolute loyalty and dependence on the expository method in which they simply deliver a pre-planned instruction to the learners with or without the use of learning materials. They show reluctance in embracing the new methods. Using the recurring poor performance of students in the science subjects as a basis, Ogunleye (1995), Nzewi and Osisioma (1995), in Osuafor (1999), alleged that the results of most research findings have not yielded the desired effect as they most probably lie buried in journals where they were published.

### **Statement of Problem**

Several methods of teaching biology have been suggested so as to enhance the attainment of instructional goals in the subject and beef up the level of performances in the final year external examinations. Contrary to expectations however, most teachers still fashion their instructions after the expository method of teaching. It had also been alleged that most research findings are seldom made use of by teachers, rather they end up as good presentations in conferences and workshops, or lie buried in journals and conference proceedings where they were published. This paper is therefore, motivated to find out: -

- i. how practically involved had the biology lecturers been in carrying out research activities.
- ii. the level of utilization by biology lecturers in Colleges of Education (COE's) of teaching methods recommended through research findings.

### **Research Questions**

- i. Are biology lecturers in COE's given opportunities to do research?
- ii. How do biology lecturers in COE's make use of research findings?
- iii. Are the lectures aware of the several methods available for teaching biology as recommended through research works of others?
- iv. Are the biology lecturers making the most auspicious use of diversified methods of teaching as suggested through the research findings of others?

### **Methodology**

#### **Population**

The population of the study comprises of the lecturers that are professionally qualified and are actively involved in the teaching of biology in three Colleges of Education in Kano State, namely: Federal College of Education (Technical), Bichi; Federal College of Education, Kano and State College of Education, Kumbotso. Due to the relative small size of the population about 90% of it was sampled for the study.

#### **Instrumentation**

The research instrument used in the investigation was a questionnaire made up of two sections - A,

B1 and B2. Section A was developed by the researcher while section B1 and B2 were adapted from Osuafor (1999). The instrument was face validated by three lecturers from the Biology Department and one lecturer from the Test and Measurement Department of F.C.E. (Tech.) Bichi. The questionnaire was administered to each college with the help of a research assistant and collected back after three days.

## Results

**Table I:** Opportunities available for research activities in COEs

		Bichi		Kano		Kumbotso		Total		Percentage	
		n=5		n=15		n=6		n=26			
		X	$\bar{X}$	x	$\bar{X}$	x	$\bar{X}$	x	$\bar{X}$		
1.	Do you have provisions for research grant in your college?	Yes	3	0.60	6	0.40	1	0.17	10	0.39	38.46
	No	2	0.40	9	0.60	5	0.83	16	0.61	61.54	
2.	If response to 1 is yes who is the major contributor to the grant?	College	3	0.60	6	0.40	1	0.17	10	0.39	38.46
		UNESCO									
		NGO									
3.	Have you ever applied for the research grant?	Yes	-		4	0.27	1	0.17	5	0.19	19.23
	No	5	1.0	11	0.73	5	0.83	21	0.81	80.77	
4.	How many times have you benefited from the grant?	NIL	5	1.0	10	0.67	5	0.83	20	0.77	76.92
	Once	-	-	4	0.27	-	-	4	0.15	15.39	
	2-3times	-	-	-	-	-	-	-	-	-	
	4&above	-	-	1	0.06	1	0.17	2	0.08	7.69	
5.	Apart from degree-earning research works, have you ever engaged in other research activities?	Yes	5	1.0	12	0.80	5	0.83	22	0.85	84.62
	No	-	-	3	0.20	1	0.17	4	0.15	15.39	
6.	How many students' research works have you supervised?	NIL	3	0.60	3	0.20	-	-	6	0.23	23.08
	One	-	-	-	-	-	-	-	-	-	
	2-3	2	0.40	4	0.27	-	-	6	0.23	23.08	
	4&above	-	-	8	0.53	6	1.00	14	0.54	53.85	
7.	How many personal research works have you published in reputable journals?	NIL	1	0.20	3	0.20	1	0.17	5	0.192	19.23
	1	2	0.40	2	0.13	-	-	4	0.154	15.39	
	2-3	2	0.40	5	0.33	3	0.50	10	0.385	38.46	
	4&above	-	-	5	0.33	2	0.34	7	0.269	26.92	

**Table II:** Use of research findings by biology lecturers in COEs.

		Bichi		Kano		Kumbotso		Total		Percentage	
		n=5		n=15		n=6		n=26			
		X	$\bar{X}$	x	$\bar{X}$	x	$\bar{X}$	x	$\bar{X}$		
1.	What is your major source of reference material in your job?	Journal	-	-	2	0.13	1	0.17	3	0.12	11.54
	Textbook	5	1.0	13	0.87	5	0.83	23	0.88	88.46	
	Internet	-	-	-	-	-	-	-	-	-	
2.	In what ways have research findings of other works been relevant to you?	Literature review	3	0.60	8	0.53	4	0.67	15	0.58	57.69
	Teaching	2	0.40	7	0.47	2	0.33	11	0.42	42.31	
	Pleasure reading	-	-	-	-	-	-	-	-	-	

**Table III:** Biology lecturers' familiarity with recommended teaching methods

	Methods	Bichi		Kano		Kumbotso		Total		Percentage
		n = 5		n = 15		n = 6		n = 26		
		X	x	x	X	x	X	x	X	
1.	Lecture/expository	4	0.80	11	0.73	2	0.33	17	0.65	65.39
2.	Lecture/demonstration	5	1.00	14	0.93	6	1.00	25	0.96	96.15
3.	Instructional analogy	2	0.40	3	0.20	1	0.17	6	0.23	23.08
4.	Concept mapping	1	0.20	3	0.20	2	0.33	6	0.23	23.08
5.	Discovery/inquiry	4	0.80	9	0.60	3	0.50	16	0.62	61.54
6.	Guided discovery	4	0.80	7	0.47	3	0.50	14	0.54	53.85
7.	Field trip/excursion	5	1.00	11	0.73	3	0.50	19	0.73	73.08
8.	Problem-solving	3	0.60	7	0.47	4	0.67	14	0.54	53.85
9.	Project method	1	0.20	7	0.47	4	0.67	12	0.46	46.15
10.	Laboratory/experimentation	3	0.60	9	0.60	4	0.67	16	0.62	61.54
11.	Assignment	5	1.00	9	0.60	3	0.50	17	0.65	65.39

**Table IV:** Teaching methods mostly used by biology lecturers in COEs

	Methods	Bichi		Kano		Kumbotso		Total		Percentage
		N = 5		n = 15		n = 6		n = 26		
		X	x	x	X	x	X	x	X	
1.	Lecture/expository	2	0.40	6	0.40	2	0.33	10	0.38	38.46
2.	Lecture/demonstration	4	0.80	12	0.80	5	0.83	21	0.81	80.77
3.	Instructional analogy	1	0.20	1	0.07	1	0.17	3	0.12	11.54
4.	Concept mapping	-	-	2	0.13	2	0.33	4	0.15	15.39
5.	Discovery/inquiry	-	-	3	0.20	2	0.33	5	0.19	19.23
6.	Guided discovery	-	-	2	0.13	4	0.67	6	0.23	23.08
7.	Field trip/excursion	-	-	6	0.40	2	0.33	8	0.31	30.77
8.	Problem-solving	2	0.40	6	0.40	4	0.67	12	0.46	46.15
9.	Project method	2	0.40	7	0.47	4	0.67	13	0.50	50.00
10.	Laboratory/experimentation	2	0.40	9	0.60	4	0.67	15	0.58	59.69
11.	Assignment	3	0.60	8	0.53	2	0.33	13	0.50	50.00

## Discussion

The investigation notes from table I that most biology lecturers in Colleges of Education are ignorant of the availability of the provision for research grant which is funded by the NCCE and administered by the respective College Management for award to prospective researchers, as claimed by 61.54 percent of the respondents. It is also observed that only 50 percent of the respondents who had been aware of the availability of the research grant ever applied and utilized the funds. Furthermore, the study reveals that only a few number of lecturers (15.39 percent) have not engaged in research activities apart from those for which academic qualifications were earned. This presupposes that most biology lecturers in COEs embark on self-sponsored research activities without making use of the research grant awarded by the Colleges. This is supported by the cumulative percentages of 76.93 respondents who have supervised between two to four or more students projects, and 80.77 that have published their works in reputable journals.

The study also revealed that only 11.54 percent of the lecturers consult journal publications as a source of reference materials for their teaching, while a glaring 88.46 percent depend on textbooks. Unfortunately, research findings and postulates on new methodologies and approaches to teaching are published in journals which are sparingly consulted, undoubtedly for purposes of literature reviews. This result agrees with the findings of Osuafor (1999), who posited that most research findings end up as good presentations in conferences or seminars or lie buried in journals where they were published without being used by teachers for improvement in their teaching assignment. From the study most biology lecturers endorsed their familiarity with the different teaching methods

investigated, that is having heard about it at one time or another in their professional career, except for instructional analogy and concept mapping which recorded the least popularity among the teachers. Despite the general acclaim of being familiar with most of the modern teaching strategies evolved through research endeavours of other scholars, majority of the lecturers still deliver instruction through the conventional lecture method (80.77 percent), assignment (50 percent), project (50 percent) and laboratory methods (59.69 percent), which Nwagbo (2001) described as easy but inadequate and inappropriate. They either shun or are not well informed on how they could make effective use of the innovative methods such as guided inquiry/discovery, instructional analogy and concept mapping which have been tested and recommended as effective methods of delivery of instructions to learners in biology.

### Summary of Findings

1. Some biology lecturers in Colleges of Education are not aware of the availability of research grant from which they could benefit, although a large number of them demonstrated a relatively high passion to embark on research activities.
2. Most biology lecturers in Colleges of Education depend on textbooks rather than journals as their primary source of reference materials. They consult journals where available, mainly for purposes of literature reviews when writing papers for conferences or for publications.
3. Most biology lecturers do not make use of modern instructional methods, rather they rely on the orthodox lecture and laboratory demonstration methods for lesson delivery.

### Recommendations

1. Biology lecturers should avail themselves of the opportunities available to them by harnessing the provisions of research grants for meaningful research works.
2. The lecturers should cultivate the habit of trying out new methods of teaching available in journals with peer groups for perfection before using them on the whole class. They should also break the jinx of absolute dependence on textbooks.
3. Institutions should endeavour to acquire complete sets of journals and update them from time to time through subscriptions.
4. Lecturers should beef up their capacities to do research so that they can thoroughly supervise their students' project.

### Conclusion

The biology lecturers in Colleges of Education have demonstrated a high passion for embarking on research activities even though many of them do not seek assistance through funding or grants. It is feared however, that the passion might have been borne out of the desire to obtain requirements for job enhancement and not to enhance the quality of lesson delivery, as evident from the percentage that still cling tenaciously to the lecture/demonstration method of delivering instruction. In order to minimize this trend most biology teachers would need exposures in diverse ways to keep abreast with modern innovative strategies of lesson delivery that have been taught out through research and research findings.

### References

- Ajewole G.A. (1990). *Effects of guided discovery and expository instructional methods on students transfer of learning*. Journal of the Science Teachers Association of Nigeria. Vol. 26. No. 2. pp. 59-66.
- Akpan E.U.U. (1987). "Winning more students for science". *The factors of attitude, sex, intelligence, personality and type of school*. Proceedings of the 28<sup>th</sup> Annual Conference of STAN. Pp. 52-56.
- Ezeugo, N.C. and Agwagah, U.N.V. (2000). *Effect of concept mapping on students achievement in algebra*. Implication for Secondary Mathematics Education, in the 21<sup>st</sup> Century. Abacus. Journal of the Mathematical Association of Nigeria. Vol. 25, No.1. pp. 1-12.
- James T. and Awodi S. (1997). *The relative effects of inquiry and lecture methods on the performance of high and low achievers in Senior Secondary School Biology*. Journal of the Science Teachers Association of Nigeria. Vol. 32. No. 1 & 2, pp. 59-64.
- Nwagbo, C. (1999). *Effects of guided discovery and expository teaching methods on the attitude towards biology of students of different levels of scientific literacy*. Journal of the Science

- Teachers Association of Nigeria. Vol. 34. Nos. 1&2. pp. 66-73.
- Nwagbo, C. (2001). *The relative efficacy of guided inquiry and expository methods on the achievement in biology of students in different levels of scientific literacy*. Journal of the Science Teachers Association of Nigeria. Vol. 36. Nos. 1&2. pp. 43-51.
- Osuafor, A.M. (1999). *Extent of use of research findings on instructional strategies in science education*. Journal of the Science Teachers Association of Nigeria. Vol. 34. Nos. 1&2. pp. 106.
- Yunusa, M.S. (2003). *Problem-solving strategy: An innovation for effective teaching and learning of biology in Nigeria*. Isa-Kaita Multidisciplinary Journal of Education Dutsin-Ma. Vol. 1. No.1. pp. 126-129.