

BIOLOGY TEACHERS NEED FOR PROFESSIONAL DEVELOPMENT IN TEACHING EVOLUTION IN SENIOR SECONDARY SCHOOLS IN MINNA METROPOLIS, NIGER STATE, NIGERIA

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Abstract: -The study investigated Biology teachers need for professional development in teaching Evolution in Senior Secondary Schools in Minna Metropolis. The research design employed was descriptive survey; the research instrument used was Biology Teachers Need for Professional Development Questionnaires (BTNFPDQ). Four research questions were raised to guide the study. Thirty Biology teachers were randomly selected out of the seventy Biology teachers in Minna Metropolis. The validation of the instrument was done by the experts and, the reliability of the instrument was carried out and yielded a reliability coefficient of 0.78. The findings of the study show that although Biology teachers have mastery of Evolution topics, there is still the need for teachers to undergo professional development. It was recommended, among others, that every Biology teachers should undergo professional development in biological concepts, especially Evolution topics before teaching it. This could be achieved through personal study and other staff development programmes.

Keywords: -Teacher Professional Development, Biological Concepts, Science Education

Introduction

In education, research has shown that quality teaching and school leadership are the most important factors in improving student achievement, for teachers to be as effective as possible; there is a need for professional development. Initial teacher education is a beginning point as teachers must require an ongoing program of professional development to meet ever-changing demands. To Alberta Teachers Association (2017), Professional Development is needed to prepare teachers not only to keep pace with changes in technology, curriculum, teaching techniques and social realities, but also to predict future needs of their students and the educational system. Professional development refers to many types of educational experiences related to an individual's work; this experience could be formal in terms of conferences, seminar or workshop, as well as informal discussions among work colleagues, independent reading and research, observations of a colleague's work or other forms of learning, from a peer (Ibrahim, 2013). In order to advance in their careers, it is important for teachers to seek out opportunities of Professional Development which are ongoing and associated with standards and evaluation. Professional Development has to do with life-long learning and growing as an educator. It has the ability to improve teaching skills and progress. There is always more to learn and new skills to attain (Candace, 2010). Professional Development is an important medium through which teachers' knowledge of their own subjects is refreshed and deepened. Teachers are also able to learn new and improve ways of helping student learn. Professional Development is considered the primary mechanism that schools can use to help teachers continuously learn and improve their skills over time (Andrew, 2014). Of all the available ways to strengthen educators' performance level, Professional development is the most thriving way. Professional development is the only way educators can learn so that they are able to better their performance and raise student achievement (Hayes, 2010). The more professional development teachers get, the more likely students are to succeed. (Guest submission, 2015). Professional Development is also a necessity in the teaching of evolution by biology teachers. Evolution, which predates human existence, is a core aspect of biology that cannot be ignored.

In order for biology teachers to be able to teach evolution efficiently and effectively, there is a need to undergo professional developmental programs. According to Friedrichsen, Linke & Barnett (2016), the teaching of evolution most times puts pressure on secondary schools biology teachers to deemphasize or omit evolution from their curriculum. In this growing pressure, professional development can offer support to teachers. Evolution in the broadest sense leads to an understanding that the natural world has a history and that cumulative change through time has occurred and continues to occur. Understanding evolution is critical for understanding biology. Evolution is the only scientific explanation for the diversity of life. Excluding evolution from the science curricula or compromising its treatment deprives students of this fundamental and unifying scientific concept to explain the natural world. Evolution is relevant to the understanding of the natural history of life forms and to the understanding of the organization of current life forms. However, those organizations can only be understood in the light of how they came to be by way of the process of evolution. Consequently, evolution is central to all fields of biology (Katcha & Yabagi, 2015). Learning about evolution have immense practical value that extends beyond understanding our world, this include solving biological problems that influence our lives (Howarth, 2012). The student performance plays an important role in producing the best quality graduates who will become great leaders and manpower for a country thus responsible for the country's economic and social development which to a greater extent is determined by the efficiency and effectiveness of the teachers. There is the need for Professional Development of teachers in education.

Statement of the Problem.

Due to the increasing misconception of evolution and the lack of emphasis laid on evolution from the curriculum by biology teachers, the students will lack the required knowledge or have limited knowledge about evolution which is the building block for the discovery of how the world came to be and the predictions of how the world will be in future. According to Agboghoroma and Oyovwi (2015) research reports and the WAEC chief examiners annual reports, they have continued to highlight students' weakness in answering questions relating to difficult concepts in areas such as Genetics, Ecology and Evolution. For students that intend to study Medicine, Environmental conservation, Agriculture, etc, a good knowledge and understanding of evolution is very important. One of the way through which this can be achieved is the way and manner biology teachers' present evolution to their students which could either arouse the interest of the learners in evolution or make the students lose interest in evolution. Also, for effectiveness of learning process, there is a need to have gained mastery of the topic to be taught. Professional development is an avenue for the teacher to gain mastery on the concept of evolution. Also through professional development, teachers become aware of the present research work in evolution, they are able to discuss and share ideas with other colleagues and also get instructional materials. The primary aim of this study was to examine the need for professional development of Biology teachers in teaching Evolution.

Research Questions

1. To what extent do Biology teachers understand the content of Evolution topics?
2. What are the obstacles perceived as barriers to Evolution instruction?
3. To what extent does educational qualification influences the Biology teachers' need for professional development?
4. What is the extent of need for biology teachers to undergo professional development programs in teaching Evolution?

Methodology

The study employed survey research design. The population of the study was restricted to teachers of some selected Senior Secondary Schools in Minna metropolis of Niger state. Seven Secondary Schools were selected as samples with a total of 30 respondents who were Biology teachers. The research instrument for the study was a 20 items questionnaire titled Biology Teachers Need for Professional Development Questionnaire (BTNFPDQ) and was based on 4-point Likert scale. It was validated by the experts, trial tested to determine its reliability. The research questionnaires were administered and data collected were analyzed using mean and standard deviation.

Results

Table 1: Extent of Biology Teachers' Understanding of the Content of Evolution Topics

S/N	Item	SA	A	D	SD	Mean	Std. Dev.	Remark
1.	Evolution is central to all fields of science	8	13	7	2	2.90	0.89	Accepted
2.	Evolution is the only scientific explanation for the diversity of life	6	17	6	1	2.93	0.74	Accepted
3.	Understanding Evolution is critical for understanding Biology	7	19	3	1	3.07	3.50	Accepted
4.	Evolution helps our understanding of how organisms that exist today and those that lived in the past are interrelated	17	12	0	1	3.50	0.68	Accepted
5.	Evolution helps our understanding of why organisms appear the way they do and act the way they do	12	14	3	1	3.23	0.77	Accepted

Where Average Mean = 3.13; Decision Mean = 2.50; and Std. Dev. = Standard Deviation.

Table 1 shows that Biology teachers understanding of the content of Evolution topics in some selected secondary schools in Minna. It was observed that the respondents were in agreement that Biology teachers have understanding of the content of Evolution topics; this is because the average mean 3.13 is greater than the decision mean 2.50

Table 2: Obstacles Perceived as Barriers to the Evolution Instruction

S/N	Item	SA	A	D	SD	Mean	Std. Dev.	Remark
1.	There exist barriers in the teaching of Evolution	13	9	5	5	3.07	1.02	Accepted
2.	Lack of instructional material has hindered the effectiveness of teaching Evolution	13	12	3	2	3.20	0.89	Accepted
3.	Field trips can be used as a means of arousing students interest towards Evolutionary topics	19	8	3	0	3.53	0.68	Accepted
4.	Religious belief hinders the understanding of Evolution	13	11	6	0	3.23	0.77	Accepted
5.	Lack the requisite knowledge for effective teaching of Evolution	4	14	8	4	2.60	0.89	Accepted

Where Average Mean = 3.13; Decision Mean = 2.50; and Std. Dev. = Standard Deviation.

Table 2 shows the obstacles perceived as barriers to Evolution instruction in senior secondary schools. It was observed that the respondents were in agreement that there were obstacles perceived as barriers to Evolution instruction in senior secondary schools, this is because the average mean 3.13 is greater than the decision mean 2.50.

Table 3: Extent to which Educational Qualification Influences the Biology Teachers' Need for Professional Development

S/N	Item	SA	A	D	SD	Mean	Std. Dev.	Remark
1.	Teachers understanding of certain topics of Evolution has encouraged those topics to be taught more accurately	11	16	2	1	3.23	0.73	Accepted
2.	Teachers lack of understanding of certain topics of Evolution puts pressure on them to either deemphasize or omit Evolution from their curriculum	6	16	6	2	2.87	0.82	Accepted
3.	There are little or no available Evolution education resources and those available are difficult to access	12	10	6	2	3.07	0.94	Accepted
4.	There exist some misunderstanding of the concept of Evolution	12	17	0	1	3.33	0.66	Accepted
5.	The process of Evolution is very slow and as such, it cannot be observed as it occurs; only evidence are used to ascertain its reality	9	18	1	2	3.13	0.78	Accepted

Where Average Mean = 5.21; Decision Mean = 2.50; and Std. Dev. = Standard Deviation.

Table 3 shows the extent to which Education background influence the need for professional development. It was observed that the respondents were in agreement that Educational background does not influence the need for professional development by Biology teachers; this is because the average mean 5.21 is greater than the decision mean 2.50.

Table 4: Extent of Need for Biology Teachers to Undergo Professional Development Programs in teaching Evolution

S/N	Item	SA	A	D	SD	Mean	Std. Dev.	Remark
1.	Professional development is a means for teachers to gain knowledge of how students learn, what impedes students learning and how the teachers instruction can increase the students' learning of Evolutionary concepts	14	15	0	1	3.40	0.68	Accepted
2.	Students learning is often attributed to teaching quality, as such, professional development enables teachers to acquire the knowledge and skills necessary to enhance students' learning	14	14	1	1	3.37	0.72	Accepted

S/N	Item	SA	A	D	SD	Mean	Std. Dev.	Remark
3.	Individual and self-directed responsibility for knowledge and competence is not enough but there exist a need for collective professional development	7	21	1	1	3.13	0.63	Accepted
4.	Professional development is a gradual process and like any process requires time, professional development should be a continuous event	18	9	2	1	3.47	0.78	Accepted
5.	Evolution is a process that occurs over time and as such new discoveries are being made daily, so therefore, professional development has to be consistent so that Biology teachers are aware of the new development in Evolution and are not left uninformed	17	10	2	1	3.43	0.77	Accepted

Where Average Mean = 3.36; Decision Mean = 2.50; and Std. Dev. = Standard Deviation.

Table 4 presents the need for Biology teachers to undergo professional development programs in teaching Evolution. It was observed that the respondents were in agreement that there's need for Biology teachers to undergo professional development programs in teaching evolution irrespective of gender, this is because the average mean 3.36 is greater than the decision mean 2.50.

Findings and Discussion

The primary aim of this study was to examine the need for professional development of Biology teachers in teaching Evolution in senior secondary school in Minna Metropolis. Research question one revealed that Biology teachers have understanding of Evolution topics. This study supports the finding of Friedrichsen, Linke and Barnett (2016) who observed that Seventy-five percent of teachers in Missouri have an adequate understanding of evolution topics.

Research question two revealed that there are obstacles perceived as barriers in the teaching of Evolution and effect Evolution instruction in senior secondary school. These barriers hinder the effectiveness of Evolution instruction. They include, lack of instructional materials, students/ teachers religious belief, inadequate knowledge in teaching Evolution on the part of the Biology teachers. This study supports the findings of Borgerding, Klein, Ghosh, Eibel and Albert (2015) who observed that Evolution teachers face several challenges including limited content knowledge, personal conflicts with evolution, expectations of resistance, concerns about students' conflicts with religion, and curricular constraints.

Research question three revealed that educational qualification of teachers did not elude them from the need of professional development. This study supports the findings of Jacob, (2002) who discovered that even experienced teachers confront great challenges each year, including changes in subject content, new instructional methods, advances in technology, changed laws and procedures, and student learning needs. Research question four revealed that undergoing professional development programs in teaching Evolution is not dependent on gender.

Conclusion

Based on the finding of the study, Biology teachers have understanding of Evolution topics but professional development is essential for Biology teachers to teach Evolution effectively. There are barriers in the teaching of Evolution which include lack of instructional materials, students and teachers' religious belief and teachers lacking the adequate knowledge required in effective teaching of Evolution topics. Education background of Biology teachers does not influence their need for professional development. The gender of Biology teachers does not have any positive influence to their knowledge of Evolution, as such; professional development in Evolution instruction is not dependent on gender.

Recommendations

1. Every Biology teacher should have undergone professional development in Evolution topics before teaching Evolution. This could be achieved by personal reading by the teacher, searching a website, research or inquiry in the classroom, attending conferences or seminar et cetera.
2. Instructional material for the effective teaching of evolution should be made readily available in all senior secondary school.
3. Field trips to evolution resource centers such as museum, herbarium et cetera should be made.

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