APPRAISAL OF BIOLOGY TEACHERS' IN-SERVICE PROGRAMS AND CONTRIBUTIONS TO STUDENTS' ACHIEVEMENT FOR SUSTAINABLE DEVELOPMENT

AKINSOWON Akinwale J.
Department of Biology, EACOED, Oyo. Oyo State

Abstract

Sustainable development meets the needs and aspirations of every responsible citizen. Teachers' capacity building is of general concern for Nigeria's national growth and development. The need to appraise Biology teachers' in-service programs positive contributions to students' learning achievements for sustainable development. The study a-adopted descriptive research design and simple random sampling technique. It was used to select one hundred (100) Biology teachers from forty-three (43) Senior Secondary Schools in Oyo and Ogbomosho Local Government area of Oyo State. A self designed 'Teachers' Questionnaire' in modified Likert's scale type was validated and subjected to Cronbach to obtain the reliability co-efficiency of 0.82. One hundred (100) copies of this Teachers Questionnaire were administered, dully completed, collected and coded for analysis. The findings revealed biology teachers' average attendance in seminar, workshops, peer observation, mentoring and coaching with low attendance in local conferences and zero attendance in international conferences. The average, low and zero attendance could be attributed to little or no allowance for programs' attendance, busy school schedule and unwillingness of school principals to grant request to attend the programs. More so, findings revealed that, these refresher courses have greatly improved biology teachers' lesson organization and presentation, topic approaches, methodologies, class management skills, usage of illustrations, models and diagrams for teaching effectiveness. However, government should wake up to task and stop giving arm chair supports to teachers' capacity building. Government should not relax her supports on financial benefits accrued to study leave.

Key words: Appraisal, In-service, Programs, Training, Learning Achievement, Sustainable Development

Introduction

Human needs are unquantifiable as it is inclusive and insatiable. Sustainable development hopes to meet the immediate desire of human beings and open doors for human inclinations for a meaningful life. It promises an advanced world devoid of unsecured and unhealthy life for all (Ndubuisi-okolo, Anekwe and Attah, 2016). Environment, economy, socialization and politics are the main components of sustainable development in Nigeria and all these can be achieved through poverty alleviation, youth empowerment, entrepreneurship development, self-reliance and effective leadership (Ndubuisi-Okolo and Anekwe, 2018). Considering the geometric progression of Nigeria population from 139 million in the year 2005 to 189 million in 2016, there is need for sustainable economy as this will help to reduce poverty extremely, empowering the youths, support learn of skills acquisition (entrepreneurship education) for sustainability (Ogbo, Eneh, Agbaeze, Chukwu and Isijola, 2017). For this purpose, the global changes have put challenges to all the teachers in every field and in order not to be stagnated academically, there is need for refresher courses.

Significance of science cannot be undermined as science and technology for any nation, if given utmost priority, will accelerate national growth and development.

In this, teachers have central role to play. Teachers are saddled with the responsibilities of imparting knowledge, skills and attitude to students. Consequently, highly competent and qualified science teachers are mostly needed for the arduous tasks. Lamanauskas and Vilkoniene (2006), opined that 'acquiring appropriate competencies in high school, science teachers are guaranteed for successful lesson delivery but achieving competencies is not a final process as it last long'. The capacity and capability of teachers to employ the most suitable teaching method to teach and concretize specific concept which will directly help to develop problem solving skills in students is competency. The innate tendency of Biology teacher to understand students' strength and weaknesses of specific concepts, to breakdown the concepts to the level of assimilation and flexibility in the usage and application of the curriculum content qualifies him as being competent.

Biology is one of the science subjects that need qualified and competent hands with regard to those that will promote healthy competition, innovation and creativity. Intuitively, most Biology teachers perceived themselves as not being competent in improved teaching technologies and problem solving teaching skills (Atav and Altunoglu, 2010). The changes being experienced in the world of science and technologies are pioneered by teachers' mentoring and guidance. The need for teachers to at all time engage in creative thinking since the world is dynamic. It is her responsibility to make every factor available to facilitate and enhance effective teaching and learning. Suryawati *et al.* (2010) pointed out that problem solving, arranging group discussion, and provision of opportunities for learning from environment and daily life were essential teaching competencies for producing problem solving abilities in students. Vaselinovska *et al.* (2011) concluded that creating active classrooms and laboratories daily life experiences and safe class environment prepare students for future challenges.

The dynamism in the nature of education makes refresher courses priority for Biology teachers to meet global best practices in education. The quality and competence of Biology teachers lies in training and preparation for class tasks. In-service refresher courses are programs running on regular basis for teachers throughout professional life time. It is organized at any period between the time one joins active service and retirement (Omorogbe and Ewansiha, 2013). The exposure to recent trends in education from teaching innovations and methodologies, e-learning and adobe photoshop, the use of projectors, audio-visual aids etc will unleash teachers' potentials. Adequate acquisition of knowledge by teachers may strengthen the bond between teachers' qualities and academic achievement (Dahar, Dahar, Dahar and Faize, 2011). Noteworthy, the more the biology teachers attendance for every relevant in-service program, the more updated they are and more productive they become in the discharge of their duties and responsibilities to students for sustainable development. More so, most of the in-service programs organized by Federal and State Government have financial benefits and award of certificate for evidence. But financial benefits attached are not at all times paid to the beneficiaries of the programs. Some received the benefits immediately after the programs, other months or year(s) after while the rest were denied. All these injustice caused negative mindset for most teachers not to see the reason to actively engage in-service programs. Though, teachers need to see the programs beyond financial benefits attached but the avenue for self development and improvement.

Many factors determine teachers' recruitment such as nepotism, favouritism, ethnicity and regionalism resulting in square pegs in round holes. These have made those studied Electrical/Mechanical Engineering to be recruited to teach Physics and Mathematics and those who studied Physiology/Anatomy to teach Biology. These recruits are graduates in different fields but not grounded in

education to know teaching pedagogy. The interconnection of these factors might not work too well for students' sustainability, hence a perceived bigger threat for national growth and development.

Statement of the Problems

Thorough teaching happens when students acquire and accomplish considerable number of scientific goals and not repetition of scientific knowledge (Omoifo, 2012). The performance of Biology teachers should be a reflection of school products and which is not limited to classroom responses but how impactful are students in the society. Most science subjects are taught theoretically rather than engaging students in practical activities as many of these teachers have no understanding of subject matter and ability to teach effectively (Abdullahi, 2007; Ogbeba, 2010). May be science teachings are yet to be shaped, guided and students' focused (Omoifo, 2012). So for teaching effectiveness, teachers need to be updated and not outdated. There is need to appraise series of symposium, seminars, workshops and conferences for Biology teachers to meet global best practices .This is to revitalize and re-strengthen Biology teachers' teaching effectiveness.

Research Questions

1. Is there a significant relationship between Biology teachers' in-service training attendance and students' achievement?
2. Is there a significant relationship between Biology teachers' teaching effectiveness before and after participation in in-service programs?
3. Is there is a significant relationship between Biology teachers' in-service training and Biology students' achievement?
4. Is there a significant relationship between financial benefits and students achievement?
5. Is there a significant relationship between staff active participation and students' achievement?

Methodology

The study was conducted in Oyo and Ogbomosho, in Oyo State. Descriptive research design was used as it involved data collection. Simple random sampling technique was employed to obtain responses from one hundred (100) Biology teachers in the forty-three (43) Senior Secondary Schools visited in both Oyo and Ogbomosho. A self-designed Teachers' Questionnaire in a modified Likert's scale type was subjected to face, content and construct validity. A pilot test was conducted in some of the secondary schools in Afijio Local Government that were not part of the study within the period of two weeks. The result obtained was subjected to test and re-test method to obtain the reliability co-efficiency of 6.82. One hundred and twenty (120) copies of Teachers' Questionnaire were printed and administered but one hundred (100) copies of Teachers' Questionnaire (TQ) were dully completed, collected and coded. Simple percentage was used to answer the sample description while Chi-square was used in testing the hypotheses to show significant relationship.

Results

The results obtained from analyzed data are presented based on the sample description and research hypothesis.

Table 1:

Table Showing the Frequency Counts of Biology Teachers' Gender

Sex	Frequency	Percentage (%)
Male	43	43
Female	57	57
Total	**100**	**100**

Table 2:

Table Showing the Frequency Counts of Biology Teachers' Qualifications

Qualification	Frequency	Percentage (%)
NCE (Biology Options)	16	16
NCE (Int Sc and Others)	06	06
HND (Biology Related+PGDE)	11	11
B.Sc+PGDE	09	09
B.Sc (Others)	15	15
B.Sc (Ed) Biology	29	29
M.Ed (Others)	08	08
M.Ed (Biology Education)	02	02
M.Sc (Pure Sciences)	04	04
Total	**100**	**100**

Table 3:

Table Showing the Frequency Counts of Years in Service Spent by Biology Teachers

Years in Service	Frequency	Percentage (%)
5 years & below	07	7
6-10 years	02	2
11-15 years	49	49
16-20 years	03	3
20 years and above	39	39
Total	**100**	**100**

Table 4:

Table Showing the Frequency Counts of Types of In-Service Training Attended

In-service Programs	Frequency	Percentage (%)
Symposium	21	21
Seminar	25	25
Workshops	23	23
Peer Observation	16	16
Mentoring and Coaching	11	11
Local Conferences	04	4
International Conferences	-	-
Total	**100**	**100**

Table 5:

Table Showing Frequency Counts of Biology Teachers' In-service Training Allowances Received

In-service Programs	With Allowance		Without Allowance	
	Frequency	%	Percentage	%
Symposium	07	6	14	12
Seminar	14	14	11	11
Workshops	12	12	11	11
Peer Observation	-	-	16	16
Mentoring and Coaching	-	-	11	11
Local Conferences	01	1	03	4
International Conferences	-	-	-	-
Total	**34**	**33**	**66**	**66**

Table 6:

Table Showing x^2 Statistics between Biology Teachers' In-service Training Attendance and Teaching Effectiveness

S/N	Items	SA (%)	A (%)	D (%)	SD (%)	x^2Cal	DF	Sig	Remarks
1	In-service training helps improving your teaching methods	67	32	-	1	9.036	18	0.085	Accepted
2	In-service training helps to increase your knowledge on topics approach	49	50	1	-	8.076	18	0.078	Accepted
3	In-service training improves your understanding of perceived difficult topics in Biology using illustrations, models and diagrams	54	46	-	-	14.47	18	0.091	Accepted
4	In-service training increases your lesson preparation and teaching effectiveness	47	47	4	2	9.70	18	0.138	Accepted
5	In-service training helps in the absence of instructional materials to effectively teach theoretically.	47	46	5	2	56.19	18	0.002	Rejected
6	In-service training helps to deepen my understanding on topics that look abstraction.	26	68	6	-	10.49	18	0.33	Accepted
7	I see some Biology concepts challenging prior to training but not anymore.	13	40	26	21	12.41	18	0.34	Accepted

Significant level <0.05

Table 7:

Table Showing Relationship between Biology Teachers' Teaching Effectiveness before and after Participation in In-service Program

S/N	Items	SA (%)	A (%)	D (%)	SD (%)	x^2 Cal	DF	Sig	Remarks
1	In-service training helps me not to overlook diagrammatic topics again.	16	27	38	19	11.04	15	0.42	Accepted
2	I had like teaching Biology topics having diagrams before I participated in-service training	39	46	8	7	5.07	15	0.83	Accepted
3	I find it hard to face and teach Biology effectively prior to in-service training.	9	36	30	25	22.09	15	0.01	Rejected
4	I did not have problems in my practical class before I attended in-service training.	22	29	31	18	18.95	15	0.03	Rejected
5	My classroom management skills have greatly improved after in-service training.	48	46	4	2	8.84	15	0.45	Accepted
6	My methods of teaching have greatly improved as difficult topics now look easier and simpler.	42	54	2	2	8.04	15	0.45	Accepted
7	I have been more committed to teaching after I had attended in-service programs	33	58	6	3	18.83	15	0.53	Accepted
8	My lesson organization and presentation has greatly improved after I attended in-service training.	46	46	4	2	19.47	15	0.09	Accepted

Significant level <0.05

Table 8:

Table Showing Relationship between Biology Teachers' In-service Training and Learning Outcome of Biology Students

S/N	Items	SA (%)	A (%)	D (%)	SD (%)	x^2 Cal	DF	Sig	Remarks
1	The training I received has greatly helped to fix students' classroom problems.	18	37	29	16	17.83	12	0.02	Rejected
2	My students' performances have greatly improved in Biology class after the in-service training.	39	51	4	6	12.46	12	0.03	Rejected
3	My class teaching is challenging but encouraging with active students' participation due to new teaching methods adopted after in-service training.	27	56	12	5	22.03	12	0.41	Accepted
4	I easily discover students' strength and weaknesses which helps to avoid frustration of efforts in class.	28	64	6	2	11.48	12	0.08	Accepted
5	My students' readiness and eagerness to learn more even the perceived difficult topics is encouraging.	31	57	9	3	5.17	12	0.35	Accepted

Significant level <0.05

Table 9:

Table Showing Relationship between Staff Development Programs, Financial Benefits and Staff Active Participation in In-service Programs

S/N	Items	SA (%)	A (%)	D (%)	SD (%)	x^2 Cal	DF	Sig	Remarks
1	I have not been able to attend in-service training since I was given teaching appointment.	15	30	27	28	6.78	15	0.95	Accepted
2	I was not at times allowed by school principal due to school assignment to participate in in-service training.	8	9	45	38	41.50	15	0.00	Rejected
3	I was allowed but financially incapacitated to attend the program.	11	19	42	28	12.19	15	0.08	Accepted
4	I was not encouraged to attend the program since financial benefit is denied.	20	34	25	21	25.40	15	0.01	Rejected
5	I have no reason to attend the program since my promotion is not attached to it.	12	19	38	31	16.13	15	0.64	Accepted
6	Students classroom activities and other school assignments are responsible for low participation in in-service programs	13	33	35	19	22.79	15	0.01	Rejected

Significant level <0.05

Discussion of Findings

The need for in-service training for teachers teaching Science Education should be of general concern to us all. The staff development should be prioritized where refresher courses should play pivotal roles as the world is changing. The vast changes in education have thrown challenges to educators and stakeholders where serious innovations, creativity and rebranding are welcome on daily basis. However, if there is need to adapt to the tides of educational advancement and innovations, teachers should be tasked to be on toes for these challenges. More so, there is need to revitalize and prioritize refresher courses for Biology teachers to meet the global best practices.

From the findings, refresher courses had helped Biology teachers' improve on teaching methodology, approaches to topics and difficult concepts, effectiveness of lesson presentation and mastery of subject matter. Omorogbe and Ewansiha (2013) posited that, the qualities like teacher's academic qualifications and knowledge of subject matter, competencies and skills and teacher's commitment to be impactful on teaching-learning process. Competent science teachers should be well grounded in their subject matter, vast in teaching methodology and have ability to associate science concept to

real life experience (Okureme, 2003). The graduates of most teachers' training institutions are deficient as regarding subject matter and pedagogic skills (Odia and Omonfonmwan, 2007). The adequate and effective use of teaching methods enhances students' academic performance and adds to accumulation of teachers' experience which helps in preparation of students for both internal and external examinations (Akinfe, Olofinniyi and Fashiku, 2012).

Biology teachers' understanding of diagrammatic concepts has eased lesson presentation, students' active participation and reinforcement and improved classroom management style. Dahar, Dahar, Dahar and Faize (2011) emphasized the need for adequate training of teachers to encourage the casual relationship between teachers' qualities and academic achievement. In other way according to Atav and Altunoglu (2010) Biology teachers revealed their deficiencies in the use of teaching technologies and problem solving approach.

Refresher courses have made Biology teachers to be dynamic in the adoption of teaching strategies to facilitate students' readiness which made classroom to be democratic, challenging and motivating. Students' strength and weaknesses were discovered as well. The teachers' acquisition of knowledge and skills should be vast to adopt and implement the best practices for effectiveness (Mizell, 2010). Casteel and Ballantyne (2010) posited that the synergy between the professional development and measuring outcome should be reflection in students' performance, behavior and/or achievement.

Biology teachers did have challenges such as declination of request to attend in-service training, denial of financial benefits. More so, low attendance of in-service training since promotion did not attach to it. The need for staff skills' improvement necessitated for training and development for organizations to grow (Olaniyan and Ojo, 2008).

Following these findings, the onus is on Federal and State Governments as well as other education stakeholders to savage the situation by prioritizing in-service programs for all Biology teachers. Teachers are born and made but as the world witnesses changes, so the education. Teachers should be prepared to accommodate and face dynamism in education as lots of free online programs are readily available for admission. For programs that are not free on registration and admission, teachers' readiness should be financially supported by government.

Conclusion

The findings revealed that much priority has not been given to in-service training. Biology teachers are eagered to embrace in-service training but school assignments, financial incapability and denial of allowance as promised by government have made the attendance by biology teachers low and not encouraging. The need for in-service training for Biology teachers should be of utmost concern as there should be clarion calls for prioritization of these programs for Biology teachers. Likewise, any Biology teacher participating in the program should be remunerated without delay to encourage others to show positive attitude on in-service programs.

Recommendations

i. There should be financial provision for interested Biology teachers who are financially incapacitated to attend the programs.

ii. In-service training should be mandated among promotion criteria for secondary school teachers especially Biology teachers.

iii. There should be financial benefits attached to in-service training attendance for active participants.

vi. Refresher courses like seminar, national conference, etc should be bi-annual program for Biology teachers.

v. Free online courses related to teachers'

discipline should be mandated with admission letter and certificate as reference for promotion.

vi. Government supports should be inclusive to accommodate financial benefits for study leave.

vii. There should be value orientation on the need for capacity building by engaging in refresher courses in line with current trends of innovations and creativities in education sector.

Reference

Abdullahi, A. (2007). Functional Science, Technology and Mathematics Education for National Economic Empowerment and Development. A Speech Delivered at the 2007 School of Science, *National Conference held at Federal College of Education, Zaria*, April 2-5

Akinfe, E., Olofinniyi, O. E. & Fashiku, C. O. (2012). Teachers' Quality as Correlates of Students Academic Performance in Biology in Senior Secondary Schools of Ondo State, Nigeria. *Online Journal of Education Research*, 1(6), 108-114. Retrieved December 27, 2012, fromhttp://www.onlineresearchjournals.org/IJER.

Atav, E. & Altunoglu, B. D. (2010). Teachers' views about their competencies in biology applications. Available from http://www.tused.org [Accessed 15 October, 2011].

Casteel, C. J. & Ballantyne, K. G. (2010). Professional Development in Action: Improving Teaching for English Learners. Washington, DC: National Clearinghouse for English Language Acquisition. Retrieved December 28, 2012, from http://www.ncela.gwu.edu/files/uploads/3/PD_in_Action.pdf

Dahor, M. A., Dahar R. A., Dahar R. T. & Faize F. A. (2011). Impact of Teacher Quality on Academic Achievement of Students at Secondary Stage in Punjab (Pakistan). *European Journal of Social Sciences*. 19:1.

Lamanauskas, V. & Vilkoniene, M. (2006). Competencies of science teachers comparative assessment. Available from www.iqst.Upol.Cz/projects/competenciesanalysis [Accessed 10 May, 2009.

Ndubuisi-Okolo, P., Anekwe. I. E. & Attah, E. (2016). Waste Management and Sustainable Development in Nigeria: A Study of Anambra State Waste Management Agency, *European Journal of Management*: 8(17), 132-142

Ndubuisi-Okolo, Purity U. & Anekwe, Rita I. (2018). Strategies for Achieving Sustainable Development in Nigeria: The Nexus. *International Journal of Academic Research in Business and Social Sciences*: 8 (6).

Mizell, H. (2010). Why Professional Development Matters. United States of America: Learning. Retrieved January 12, 2012 form. www.learningforward.org/advancing/why pdmatters.cfm.

Odia, L. O. & Omofonmwan, S. I. (2007). Educational System in Nigeria Problems and Prospects. *Journal of Social Science*: 14.1(81-86).

Ogbo, A. I., Eneh, Nnajiofor, C. J. Agbaeze, E. K., Chukwu, B. I. & Isijola, D. O. (2017). Strategies for Achieving Sustainable Economy in Nigeria taking into Consideration the Acceptable Stakeholders. *African Journal of Business Management*. Vol 11 (19), 582-589.

Olaniyan, D. A. & Ojo, L. B. (2008). Staff Training and Development: A Vital Tool for Organisational Effectiveness. *European Journal of Scientific Research*: 24(3), pp.326-331. Retrieved December 20, 2012, from http://www.eurojournals.com/ejsr.htm

Okureme, E. A. (2003). *Modern Approach in Mathematics Teaching*. Warri: COEWA Publishers

Omoifo, C. N. (2012). Dance of the Limits, Reversing the Trends in Science Education in Nigeria, Inaugural Lecture, University of Benin, Benin City.

Omorogbe, E. and Ewansiha, J. Celestine (2013). The Challenge of Effective Science Teaching in Nigerian Secondary Schools. *Academic Journal of Interdisciplinary Studies*: (2) 7.

Suryawati, E., Osman K. & Meerah, T. (2010). The effectiveness of contextual teaching and learning on students‟ problem solving skills and scientific attitude. Available from www.sciencedirect.com [Accessed 22 September, 2011].

Vaselinovska, S., Gudeva L. G. & Djokie, M. (2011). The effect of teaching methods on cognitive achievement in biology studying. Available from www.sciencedirect.com [Accessed 2 October 2011].