IMPACT OF IN-SERVICE TRAINING ON SCIENCE TEACHERS' PERFORMANCE IN RIVERS STATE

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Abstract

The study examined impact of in-service training on science teachers' performance in Rivers State. Specifically the study sought to identify the types of in-service training made available for service teachers; determine major factors that necessitate in-service training; ascertain the benefit of in-service training on science teachers' performance; determine the challenges that military against science teachers' in-service training. The sample size for the study was 90 science teachers selected from the three senatorial districts in Rivers state. Structured questionnaire was used to collect data from respondents. Data were analyzed using percentage, mean and standard deviation. Findings from the study revealed that language proficiency, workshops, seminar, conferences, refresher courses, radio broadcast among others are in-service training made available for science teachers. The study also revealed that emergency of new resources for teaching and learning process, update and keeping current in science education, changing nature of the learners, knowledge, professionalism, experience sharing among peers; promotion in employment, change in science curriculum among others are the factors that necessitate in-service training among science teachers. Moreover, majority of the respondents agreed that improvement in science teachers' teaching skills, dynamism and responses to changing environment, knowledge increment in the subject area, and improvement in teachers' productive capacity among others are the benefits science teachers derive from in-service training. Finally, the study showed that lack of fund, inappropriate information, unsuitable time, distance, duration, lack of study leave, and lack of incentives are the factors that militate against science teachers' participation in in-service training. Therefore, the study recommended that teachers should be constantly updated in their knowledge and teaching skills by participating in in-service training at least twice a year. Government should include study allowances for science teachers in order to motivate them for in-service training.

Keywords: In-service, science, knowledge, training.

Introduction

The advancement of the society has being based on the emerging innovation and creativity that arises from science over the years. The human race has used science to meet the diverse trending needs of man through invention of various technologies. Alleviating human needs became easier since the consistent development in science created a new way of doing things stress less. The knowledge of science has indeed served as bedrock of creativity as it deals with the understanding of natural environment. For instance, the advent of various technologies which has impacted the globe with the touch transformation utilized scientific knowledge. According to Eboh (2012), science is the systematic study of nature and behavior of the material and physical universe based on observation, experiment, measurement and the formulation of laws to describe these facts. In general term science undergoes critical study of materials and cause and effect of things so as to draw general conclusion of the object under study.

However, attaining scientific knowledge is not only beneficial to the individual but also the society in which he lives. This is because scientific knowledge tends to provide an attempt to understand the world through observation, analysis, and deduction. It enables integrative reasoning and empirically based evidence. UNESCO (1999) has it that scientific knowledge has led to remarkable innovation that has been a great benefit to mankind. It further noted that through scientific knowledge, life expectancy has strikingly increased, cure for many diseases discovered and agriculture has significantly increased in productivity to meet the needs of growing population. It is in this view that federal ministry of science and technology in Nigeria (2012) recognized the impact of science to the economy and societal development and mandated interaction with all relevant agencies and organization, synergizing and promoting application of scientific and technology in all sectors of the economy. However as new ideas emerge from science to create new products there is a need to develop human resources that is instrumental in the transfer of this knowledge to younger generation.

Science teachers are those who bear the responsibility of transferring scientific knowledge to learners. They educate future generations through teaching of wide varieties of topics such as earth science, chemistry, physics and others. The teaching of the foundation of scientific methods to younger generation is inspired by them towards scientific thinking and innovation. According to Essel et al (2009), every educational process must possess qualified teachers as a fraction of the ingredients essential for the goals of the process to be measured and achieved. The teachers responsible for the process must be equally be accorded a very high priority. It is therefore pertinent for science teachers to engage in re-training service so as to constantly update their professionalism which in turn result to effective teaching process.

Science teachers are lifelong learners because of their association with scientific knowledge which keeps growing and so opportunities has to be afforded to ensure he keeps growing in his professional life. In-service training is therefore pertinent in feeling these discrepancies between science teachers and improvement in their professionalism. In-service training is special training given to teachers to improve their skills and learn about new developments in

their profession. Collins dictionary (2017) defined in-service training as the training of teachers in special courses, workshop, or training given to employees in connection with their work to help them develop skills. It is a professional training programme where teachers are equipped with modern skills and discuss with in their peer group. In the view of Eduwen (2016) in-service training is designed for manpower development of social school system and the educational enterprise as a whole. Human resources in school system are required to possess adequate knowledge of their field of study and improve in the transfer of this knowledge to learners.

Apparently, diverse transition which has occurred over the years in science education has its traces to teachers' in-service training programmes. In-service training enables absolute relation of ideas and current trends in science among peers of related professional fields. The National Policy on Education (2014) stated the consequence of in-service training to teachers; so that education can be advantageously employed to fulfill national philosophy. It thus stated that teacher education will continue to take cognizance of changes in methodologies and in the curriculum. In other words teachers would be consistently exposed to innovation and reviews in the curriculum and methodology. Teachers re-training foster on the growth and development of the teachers and give them a sense of self direction, accomplishment and even self actualization. In-service training bridges the gap of misunderstanding of procedures and inadequacies among teachers.

Furthermore, needs arises in the developing society that demands for re-orientation and responsibility to the new situation. In the trend of rapid developing nation, change is highly expected, educational system also has to adapt to the change so as to produce cadre that will contributive to the societal development. There are factors that thus necessitate science teachers participation in in-service training. Dike (1999) noted that knowledge and population explosion, changing nature of the learners and emergence of new resources for teaching are the major factors that call for the need of in-service training. Cheomar (2014) asserted that in-service training is the driving force behind much change that has occurred in the area of teaching and learning. He further stated that new challenges and changes in the education world necessitate in-service training among teachers.. In the trend of rapid developing nation change is highly expected, educational system also has to adapt to the change so as to produce cadre that will contributive to the societal development.

Many teachers are willing and enthused to participate in professional improvement courses and programmes nevertheless certain factors that cannot be overlooked counteract their enthusiasm. In spite of the need for in-service training in the teaching of sciences, there exist inhibiting factors against teachers' participation. In Accordance to Grace and Reneau (1988) documentation, it was observed that lack of funds from schools, lack of interest, teacher preoccupied, improper arrangement, distance are the factors militating against teachers participation in in-service training. These factors may results to lack of interest in the training regardless of it essential needs. Also, Cheomar (2014) observed that time factor, unsuitable time, and prolonged training sessions are factors that discourage teachers from active participation in in-service training.

Purpose of the Study

The major purpose of the study was to determine the impact of in-service training on science teachers' performance in Rivers State. Specifically the study sought to;

1. Identify the types of in-service training made available for science teachers.
2. Determine major factors that necessitate in-service training.
3. Ascertain the benefit of in-service training on science teachers' performance.
4. Determine the challenges that military against science teachers' in-service training.

Research Question

1. What are the types of in-service training made available for science teachers in Rivers State?
2. What are the major factors that necessitate in-service training among science teachers?
3. What are the benefits of in-service training on science teachers' performance?
4. What are the challenges that militate against science teachers' in-service training?

Hypotheses

The following hypotheses were tested at 0.05 level of significance.

H_{o1}: There is no significant statistical difference between the mean responses of male and female science teachers on the factors that necessitate in-service training among teachers.

H_{o2}: There is no significant statistical difference between the mean responses of male and female science teachers on the benefits of in-service training on science teachers' performance**.**

H_{o3}: There is no significant statistical difference between the mean responses of male and female science teachers on the challenges that militate against science teachers' participation in in-service training.

Methodology

The study adopted a survey research design. The population of the study composed all the Rivers State science teachers. The study also adopted stratified random sampling. Rivers State was stratified into three senatorial districts which were Rivers East, Rivers South-east, and Rivers west senatorial districts. Ten (10) science teaching secondary schools were randomly selected from each of the senatorial districts. Simple random sampling was used to select five (5) male and five (5) female science teachers from each of the secondary schools, making a total sample size of three hundred (300) science teachers. The instrument used in the study was a survey questionnaire tagged "In-service Training and Teachers Performance" (ITATP). The instrument was partitioned into three sections that were structured in four-point rating scale. It was faced and content validated by two experts in the department of Science Education in Rivers State University, Port-Harcourt. To ascertain the reliability of the

instrument, Cronbach Alpha reliability co-efficient method was used to measure the internal consistency of the instrument. The reliability co-efficient was 0.77. Copies of the instrument were administered and retrieved by the researchers. Frequency, percentage, mean and standard deviation were used to answer the research questions. Mean scores < 2.50 were rejected and mean scores ≥ 2.50 were accepted. Hypotheses were tested at 0.05 level of significance.

Results and Discussion

Research question 1: What are the types of in-service training made available to science teachers.

Table 1: Availability of in-service training among science teachers in Rivers State.

S/N	ITEMS	YES	NO
1.	Language proficiency	173(57.7)	127(42.3)
2.	Refresher courses	196(65.3)	104(34.7)
3.	Workshops	208(69.3)	92(30.7)
4.	Conference	167(55.7)	133(44.3)
5.	Study groups	178(59.3)	122(40.7)
6.	Educational tours	63(21.0)	237(79.0)
7.	Radio broadcast	174(58.0)	126(42.0)
8.	Television broadcast	159(53.0)	141(47.0)
9.	Extension lectures for teachers	186(62.0)	114(38.0)

Multiple response

Table 1 presents the percentage responses of science teachers on the in-service training made available to them. The collected data revealed that Language proficiency (57.7), Refresher courses (65.3%), workshops (69.3%), conference (55.7%), study groups (59.3%), radio broadcast (58.0%), television broadcast (53.0%) and extension lectures for teachers (62.0%) were types of in-service training made available for science teacher whereas 79% indicated that educational tours are not available. According to Amadi (2008), a good in-service training should, via workshop, conference and study groups improve the quality of programming for the development of teachers in service.

Research Question 2: What are the major factors that necessitate in-service training for science teachers' performance?

Table 2. Major Factors That Necessitate In-Service Training.

		Male Teachers (n=150)			Female Teachers (n=150)		
S/N	**ITEMS**	$\bar{x}$	**S.D**	**DECISION**	$\bar{x}$	**S.D**	**DECISION**
1.	Emergency of new resources for teaching & learning process	3.14	0.87	Agreed	3.02	0.75	Agreed
2.	Update and keeping current in science education.	3.09	0.73	Agreed	3.08	0.68	Agreed
3.	Changing nature of the learner	2.74	0.89	Agreed	3.12	0.92	Agreed
4.	Knowledge	3.19	1.04	Agreed	3.12	0.94	Agreed
5.	Professionalism	3.05	1.02	Agreed	3.21	0.86	Agreed
6.	Experience sharing among peers	2.93	0.92	Agreed	2.86	0.99	Agreed
7.	Promotion / employment retention	3.24	0.81	Agreed	3.11	1.08	Agreed
8.	Change in science curriculum	3.08	0.94	Agreed	2.75	1.02	Agreed
9.	Democracy	2.66	1.11	Agreed	2.54	1.02	Agreed
10.	Population explosion competition	2.87	1.00	Agreed	2.90	0.99	Agreed
	Grand Mean & S.D	**3.00**	**0.93**		**2.97**	**0.93**	

$\bar{x}$ = mean, S.D = standard deviation, < 2.50 = Disagreed, ≥ 2.50 = Agreed

Table 2 presents mean responses of the male and female respondents on factors that necessitate in-service training among science teachers. The collected data revealed that emergence of new resources for teaching & learning process (3.14 & 3.02), update and keeping current in science education (3.09 & 3.08), changing nature of the learner (2.74 & 3.12), knowledge (3.19 & 3.12), professionalism (3.05 & 3.21), experience sharing among peers (2.93 & 2.86), promotion/ employment retention (3.24 & 3.11), change in science curriculum (3.08 & 2.75), democracy (2.66 & 2.55), and population explosion competition (2.87 & 2.90) are factors that necessitate in-service training among science teacher. The findings were in conformity with Dike (1999) who asserted that knowledge and population explosion; changing nature of the learners; and emergence of new resources for teaching and learning process are the three major factors that necessitate retraining of teachers because the traditional role of a teacher is fast disappearing.

Research question 3: What are the benefits of in-service training on science teachers' performance?

Table 3: Benefits of in-service training on science teachers' performance.

		Male Teachers (n=150)			Female Teachers (n=150)		
S/N	**ITEMS**	$\bar{x}$	**S.D**	**DECISION**	$\bar{x}$	**S.D**	**DECISION**
1.	In-service increases science teachers' knowledge in the subject area.	3.21	0.77	Agreed	3.05	0.71	Agreed
2.	It improves teachers' skills in the teaching of science to learners.	3.14	0.97	Agreed	3.17	0.85	Agreed
3.	In-service training enables the teachers to be dynamic and responsive to changing environment.	3.11	0.71	Agreed	3.32	0.69	Agreed
4.	In-service training enables the teachers to effectively transfer scientific knowledge to learners through modern methods.	3.27	0.69	Agreed	2.98	0.95	Agreed
5.	In-service training update science teacher with curriculum review.	3.45	0.62	Agreed	3.16	0.73	Agreed
6.	It governs the teacher's teaching process towards the objectives of educational bodies.	3.31	0.70	Agreed	2.94	0.90	Agreed
7.	It equips the teachers with updated skills in teaching and learning process.	3.09	0.87	Agreed	3.11	0.77	Agreed
8.	It improves science teachers' productive capacity.	3.10	0.99	Agreed	3.27	0.87	Agreed
	Grand Mean & S.D	**3.21**	**0.79**		**3.13**	**0.81**	

$\bar{x}$ = mean, S.D = standard deviation, < 2.50 = Disagreed, ≥2.50 = Agreed

Table 3 above shows the male and female mean responses of science teachers on the effect of in-service training on their performance. The collected data interpreted on mean scales

revealed that in-service increases science teachers knowledge in the subject area (3.41 & 3.05), it improves teachers skills in the teaching of science to learners (3.14 & 3.17), in-service training enables the teachers to be dynamic and responsive to changing environment (3.49 & 3.32). Also in-service training enables the teachers to effectively transfer scientific knowledge to learners through modern methods (3.47 & 2.98). In-service training update science teacher with curriculum review (3.55 & 3.16). It governs the teacher's teaching process towards the objectives of educational bodies (3.31 & 2.94), it equips the teachers with updated skills in teaching and learning process (3.23 & 3.11), it improves science teachers' productive capacity (3.10 & 3.27). The result is in line with Ibrahim (2015) who maintains that in-service tends to increase the participants learning or change their attitudes; elicits positive participants' reaction to their professional training; introduce an innovation for general awareness; and also improves skills on instructional techniques.

Research question 4: What are the challenges that militate against teachers' participation in in-service training?

Table 4: Challenges that militate against science teachers' participation in-service training.

		Male Teachers (n=150)			**Female Teachers (n=150)**		
S/N	**ITEMS**	$\bar{x}$	**S.D**	**DECISION**	$\bar{x}$	**S.D**	**DECISION**
1.	Lack of funds	3.37	0.60	Agreed	3.32	0.78	Agreed
2.	Apathy	2.04	0.93	Disagreed	2.39	0.85	Disagreed
3.	Lack of appropriate information	3.08	0.77	Agreed	3.19	0.93	Agreed
4.	Unsuitable time	3.02	0.83	Agreed	3.17	0.73	Agreed
5.	Distance	2.73	0.99	Agreed	3.05	0.97	Agreed
6.	Duration	3.09	0.89	Agreed	2.71	0.78	Agreed
7	Lack of support from schools administrators	3.22	0.71	Agreed	3.23	0.68	Agreed
8	Lack of study leave	3.11	0.61	Agreed	3.15	0.73	Agreed
	Grand Mean & S.D	**2.96**	**0.79**		**3.03**	**0.92**	

$\bar{x}$=mean, S.D=standard deviation,< 2.50=Disagreed,≥2.50= Agreed

Table 4 presents male and female science teachers' mean responses on the challenges that militate against their participation in in-service training. Respectively, the collected data interpreted in mean rating scale showed that lack of fund (3.37 & 3.32), lack of appropriate information (3.08 & 3.19), unsuitable time (3.02 & 3.17), distance (2.73 & 3.05), duration (3.09 & 2.71), Lack of support from schools administrators (3.22 & 3.23), and lack of study leave (3.11 & 3.15) are the challenges that militates against science teachers' participation on in-service training. On the contrary, the respondents disagreed that Apathy is not a challenge

that militates against their participation in in-service training programmes. This is affirmed by the mean values of 2.04 & 2.39. This findings is in conformity with Njau (2015) who observed that lack of funds, time, poor management and coordination are the constraint to teachers' participation in in-service training. Ibrahim (2015) also stated that poor organization and inappropriate content selection, wrong timing, attitude of the school authority and duration are the problems educators observed in some in-service trainings.

Hypotheses

H_{o1}: There is no significant statistical difference between the mean responses of Male and female science teachers on the factors that necessitate in-service training among teachers.

Table 5: z-test analysis on the mean responses of the factors that necessitate in-service training among science teachers

Categories	X	SD	N	lev. of sig	z-cal	z-crit	decision
Male	3.00	0.93	150				
				0.05	0.28	1.96	Accepted
Female	2.97	0.93	150				

The result in Table 5 shows that Male teachers have mean and standard deviation scores of 3.00 and 0.93, while female teachers have mean and standard deviation scores of 2.97 and 0.93 at 0.05 level of significance, z-cal value of 0.28 and z-crit value of 1.96. The result shows that the z-cal value is less than z-crit value. Since the z-cal value of 0.28 is less than the z-crit value of 1.96, the null hypothesis is thus accepted. This implies that there is no significant difference in the mean response of male and female science teachers on the factors that necessitate in-service training.

H_{o2}: There is no significant statistical difference between the mean responses of male and female science teachers on the benefits of in-service training on science teachers' performance**.**

Table 6: z-test analysis on the mean responses of male and female science teachers on Benefits of in-service training on science teachers' performance

Categories	X	SD	N	lev. of sig	z-cal	z-crit	decision
Male	3.34	0.72	150				
				0.05	0.87	1.96	Accepted
Female	3.13	0.81	150				

The result in Table 5 shows that Male teachers have mean and standard deviation scores of 3.34 and 0.72, while female teachers have mean and standard deviation scores of 3.13and 0.81 at 0.05 level of significance, z-cal value of 0.87 and z-crit value of 1.96. The result shows that the z-cal value is less than z-crit value. Since the z-cal value of 0.87 is less than

the z-crit value of 1.96, the null hypothesis is thus accepted. This implies that there is no significant difference in the mean response of male and female science teachers on benefits of in-service training on science teachers' performance.

H_{o3}: There is no significant statistical difference between the mean responses of Male and female science teachers on the challenges that militate against teachers' participation in in-service training.

Table 7: z-test analysis on the mean responses of male and female science teachers on the challenges that militate against teachers' participation in in-service training

Categories	X	SD	N	lev.of sig	z-cal	z-crit	decision
Male	2.96	0.79	150				
				0.05	0.71	1.96	Accepted
Female	3.03	0.92	150				

The result in Table 5 shows that Male teachers have mean and standard deviation scores of 2.96 and 0.79, while female teachers have mean and standard deviation scores of 3.03 and 0.92 at 0.05 level of significance, z-cal value of 0.71 and z-crit value of 1.96. The result shows that the z-cal value is less than z-crit value. Since the z-cal value of 0.71 is less than the z-crit value of 1.96, the null hypothesis is thus accepted. This implies that there is no significant difference in the mean response of male and female science teachers on the challenges that militate against teachers' participation in in-service training.

Conclusion

Based on the findings of the study, it was deduced that language proficiency, workshops, conference, study groups, ratio broadcast, television broadcast and extension lectures for teachers are the types of in-service training made available for science teachers. Whereas there is low percentage response on the availability of education tours for science teachers.

Moreover, the study revealed the factors that necessitate in-service training among science teachers. It was concluded that emergence of new resources for teaching and learning process, update and keeping current in science education, changing nature of the learners' knowledge, professionalism, experience sharing among peers; promotion in employment, change in science curriculum, democracy and population explosion are the factors that necessitate in-service training among science teachers.

More so, improvement in science teachers teaching skills, dynamism and responsibility to changing of environment, increase knowledge in the subject area, improvement in teachers' productive capacity and among others are the benefits science teachers derive from in-service training.

Finally, it was deduced that lack of fund, lack of interest, inappropriate information, unsuitable time, distance, duration, lack of study leave, and lack of incentives are the factors that militates against science teachers participation in in-service training.

Recommendation

Based on the findings the following recommendations were made;

- Due to the relevance of scientific knowledge to our society, it is therefore pertinent for teachers to be constantly updated in their knowledge and teaching skills. Science teachers should participate at least twice a year.
- School administrator and government, Science Teachers Association of Nigeria should make in-service training available for science teachers at affordable fees so as to address deficiencies among teachers.
- Government should include study allowances for science teachers in order to motivate them for in-service training and this will in turn yield a better science and technological society as teachers transfer the knowledge to the learners.

References

Amadi, M. N. (2008). In-service training and professional development of teachers in Nigeria: Through open and distance education. Pre-service and in-service teacher training & learning and teaching styles.

Cheomar, C. Z. (2014). The need for in-service training for teachers and its effectiveness in school. *International Journal of Innovation Education vol.2-11 pg.1-8*

Dike, H. I. (1999). Educational technology. CAPIIC publishers, Port-Harcourt.

Eboh (2012).History and Philosophy Science and Technology: Polegonmental Review. Pearl publisher Portharcourt.

Eduwen, F. O. (2016). In-service education for teachers: Overview, problems and the way forward. *Journal of Education and Practice. Vol. 7, pg. 83-87*

Essel, R., Badu, E., Owusu, W. and Albert, A. S. (2009). In-service Training; An essential element in the professional development of teachers. *Malaysia Journal of Distance Education 11(2); 55-64*

Federal ministry of science and technology in Nigeria (2012). Presidential statement on the new National policy on science; technology and innovation.

Ibrahim, A. I. (2015) "In-service Staff training programme for effective science teaching". *American Journal of Educational Research 3.2 (2015):185-190.*

National policy on education (2014). Federal republic of Nigeria. Revised edition .NERC Press Lagos.

Njau, S. T. (2015). An investigation into the challenges facing in-service training of secondary school teachers in Nairobi province. University of Nairobi Research archive.

UNESCO (1999). Declaration of science and the use of scientific knowledge. Science for the twenty-first century. *World conference on science*, Budapest Hungary.