

Evaluation of Sustainable Development Goal 4 on Gender and Basic Science Teachers' Attitude in Sokoto State, Nigeria

Abdullahi Adamu

*Department of Quality Assurance
Sokoto State Universal Basic Education Board*

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Abstract

This study is on evaluation of sustainable development goal 4 on gender and Basic Science teachers' attitude in Sokoto State, Nigeria. It is a descriptive study in which a survey research design is employed. The population for this study is made up of 241 Basic Science teachers. The sample used was 51 SDG trained teachers (41 males and 10 female) and 56 non-SDG trained teachers (45 male and 11 females). One research question and one null hypothesis each was stated and analyzed. Basic Science Teachers Attitude Questionnaire (BSTAQ) was the instrument used for data collection. The finding revealed no significant difference between the mean Basic Science teachers' attitude scores of male and female teachers trained under SDG and those not trained under SDG in Sokoto State. It was therefore recommended that teachers' professional development should be done by the government without gender bias.

Keywords: *Sustainable Development Goal, Gender, Teachers' Attitude*

Corresponding Author: **Abdullahi Adamu**

Background to the Study

The Sustainable Development Goals (SDGs) officially known as Transforming our Worlds is a set of seventeen aspirational global goals with 169 targets. It is a post MDGs agenda, which leverages on the achievements of the MDGs. The goals address poverty reduction, quality education, good health and wellbeing, gender equality, clean energy, decent work and economic growth among others (Dernbach, 2008). This is exciting era of the full implementation of the 2030 Agenda for Sustainable Development. The agenda comes together with a follow-up and review mechanism to ensure the Sustainable Development Goals (SDGs) are systematically monitored and reviewed to help countries implementing the 2030 Agenda to ensure “No one is left behind” (Ogbonna, 2016). The UN General Assembly underlined the importance of evaluation within the transformative 2030 Agenda calling for the review and follow-up mechanisms to be informed by country-led evaluations, and capacity-building support for developing countries including strengthening of national data systems and evaluation. This means evaluation should play a crucial role to support effective and efficient SDG implementation (United Nations, 2015). Evaluation will offer evidence-based learning on how policies and programmes delivered results and what needs to be done differently. The follow-up and review mechanisms also call for inclusiveness, participation and ownership. This is why equity- focused and gender-responsive evaluation is needed. In order to meet the target, set for the SDG 4, the government in conjunction with NGOs organized capacity building programme for basic school teachers in Sokoto State. Evaluating the attitude of basic science teachers that were trained under this programme is of paramount importance (National Teachers Institute, 2018).

Evaluation is inherently a theoretically informed approach (whether explicitly or not), and consequently any particular definition of evaluation would have been tailored to its context – the theory, needs, purpose, and methodology of the evaluation process itself. Evaluation is a concept that has emerged as a prominent process of assessing, testing and measuring. Its main objective is qualitative improvement. Evaluation is a process of making value judgements over a level of performance or achievement. Making value judgments in evaluation process presupposes the set of objectives. Evaluation implies a critical assessment of educative process and its outcome in the light of the objectives (Mulholland and Wallace, 2006).

Basic science teachers that were trained under SDG 4 programme have their peculiar attitude. Attitude refers to predisposition to classify objects and events, to react to them with evaluative consistency (Orunaboka, 2011). A person who shows a certain attitude towards something is reacting to his conception of that thing rather than to its actual state. Attitude are formed by people as a result of some kinds of learning experience, if the experience is favourable a positive attitude is found and vice versa (Orunaboka, 2011). The attitude people hold can frequently influence the way they act in person and larger situation. For this reason, administrators, psychologists and sociologists are concerned with attitude development, how they affect behaviour and how they can be changed (Olasheinde and Olatoye, 2014).

Teachers' attitude and basic science has received considerable attention in recent decades. Various studies (Palmer, 2004) have shown a generally low level of scientific and technological literacy among pre-service and in-service primary school teachers, and these teachers generally tend to have negative attitudes toward science. The negative attitudes often originate from negative experiences that teachers had during their own primary and secondary education, and these attitudes persist during their pre-service teacher training (Tosun, 2000; Palmer, 2004).

Studies investigating the attitudes of primary teachers toward basic science have indicated that teachers with less positive attitudes share a number of characteristics. They have lower confidence and self-efficacy beliefs about teaching basic science (Tosun, 2000; Skamp, 2004), they spend less time discussing and teaching these topics in their classrooms (Goodrum, Hackling, and Rennie, 2001), they rely more on standardized methods and top-down instruction. They are less able to stimulate the attitudes of their pupils (Jarvis and Pell, 2004). On the positive side, research has shown that when teachers gain greater confidence and self-efficacy and a more positive attitude through continuing education efforts, they subsequently teach basic science in a better manner and are able to improve the attitudes of their pupils in this area (Osborne and Dillon, 2008). The literature provided that explicit attention to improving the attitudes of primary school teachers toward basic science is of fundamental importance to the professionalization of teachers within the domain of basic science (Johnston and Ahtee, 2006).

Although such attitudes have been investigated in a range of scientific studies in many countries, scientific progress in this field has been slow due to several major theoretical and methodological issues (Porter and Van Der Linde, (2005). Most importantly, the concept of teachers' attitude toward basic science is often poorly articulated, both in research and in educational change projects (Cooper and Vargas, 2004; Porter and Van Der Linde, (2005). Many studies provide incomplete definitions (or no definition at all) for the construct of attitude, fail to explicate the components of attitude that they measured, or do not distinguish between attitudes toward basic science and other related concepts (for example, opinions or motivation).

Furthermore, most researchers fail to justify their choices to measure certain dimensions or objects of attitude. These choices often seem to be based on pragmatic or convenience arguments. Because of the poor articulation of the construct of teachers' attitude toward basic science, at least two profound ambiguities are present in scientific research on this topic to date. The first ambiguity concerns the difference between teachers' attitudes toward basic science and scientific attitudes, a distinction that has also been described elsewhere (Gardner, 2005). Many projects and studies that claim to improve or measure teachers' attitude actually focus primarily on improving or measuring scientific attitudes. These attitudes consist of features that characterize scientific thinking, such as curiosity, being critical about all statements, a demand for verification, or a respect for logic (Shrigley, 2008). Although such scientific attitudes are very important to the advancement of science in primary school, they do not constitute what should be

considered as attitudes toward science. The latter type of teachers' attitudes indicates a variety of thoughts, values, feelings, and behaviors concerning such matters as an individual's thoughts about the level of difficulty characteristic of the basic sciences, the value attached to basic science for society, feelings of pleasure or interest with regard to basic science, and the desire or intention to learn more about basic science (Peter, 2004).

The second important ambiguity that we would like to address concerns the difference between the personal attitudes of teachers toward science and their professional attitudes toward the teaching of science. Personal attitude toward science refers to the attitude of a person as a citizen, independent of profession (in this case, teaching at primary school level). Examples of personal attitude include beliefs about the historical or economic relevance of basic science for society or daily life and the general interest in or affect toward staying informed about basic science through various media. In contrast, teachers' professional attitudes toward teaching basic science in primary school involve the beliefs and feelings that they may have with respect to teaching these topics within the school context. Examples include beliefs about the appropriateness and importance of basic science for children at the primary school level or feelings of joy or anxiety with regard to teaching these topics (Greenwald, 2011).

In addition to (and probably also because of) the poor theoretical definition of what constitutes primary teachers' attitudes toward basic science, many researchers have used poorly designed measurement instruments or inadequate methods of analysis (for a review of these issues (Gardner, 2005; Reid, 2006). In addition, most researchers failed to conduct pilot testing, validation, and evaluation of their measurement instrument according to current psychometric standards (Gardner, 2005; Reid, 2006). These methodological problems have at least two important consequences. First, the results of these studies are difficult to interpret, as it is not clear what was actually measured. Second, it is difficult or impossible to compare or replicate the results of different studies on attitudes toward science when the various dimensions of attitude that were the objective of the intervention were not explicated (Porter and Van Der Linde, 2009). Since attitude is one of the important variables expected in SDG on teachers' capacity, there is the need to evaluate attitude of both male and female Basic Science teachers trained under the SDGs programme.

Statement of the Problem

Despite the fact that professional teachers have undergone NCE and undergraduate programme in education to enable them adequately prepare for the teaching of basic science, still there is persistent failure in Basic Education Certificate Examination (BECE), MOE Sokoto (2017). Studies conducted by various researchers such as Akbani and Allvar (2010), Jekayinfa (2007), Usman (2007 and 2010) and that of Igboegwu (2012) indicated that the problem of teaching and learning Basic Science particularly at Junior Secondary School level persist despite various strategies employed to address the challenges. One of the mechanisms put in place is the training and re-training of teachers under SDG programme aimed at improving teachers' skills and capacity to effectively deliver in classroom teaching situations. Therefore, this study evaluated Sustainable Development Goal 4 on male and female basic science teachers' attitude in Sokoto State, Nigeria.

Objective of the Study

The objective of the study is to:

Determine the attitude of Basic Science teachers trained under Sustainable Development Goals (SDG) 4 with respect to gender.

Research Question

The research question raised to guide the study is:

To what extent is the attitude of male and female Basic Science teachers exposed to Sustainable Development Goals (SDG) 4 training and those not trained under SDG 4 in Sokoto State?

Research Hypothesis

The research hypothesis formulate is:

There is no significant difference between male and female teachers trained and untrained under SDG (4) with regards to their mean attitude scores towards Basic Science in Sokoto State.

Methodology

Research Design

This study is set to evaluate the Sustainable Development Goal (SDG) 4 on male and female basic science teachers' attitude in Sokoto State, Nigeria. The study employs survey research method in which treatment by subject design was employed. This enabled the researcher to obtain and assess the attitudes of teachers in Basic Science. The researcher selected the basic schools whose Basic Science teachers had SDG training and no SDG training. The Basic Science teachers selected to participate in the study were given the instruments to fill in. The researcher visited the selected schools personally to collect the data within four weeks using one week to collect the data from each of the zonal offices.

Population of the Study

The population for this study made up of all the Basic Science teachers in Upper Basic level in Sokoto State. According to SUBEB (2018), there were 241 Basic Science teachers in Sokoto State.

Sample and Sampling Techniques

The sample used for the study was 107 Basic Science teachers (51 SDG trained teachers containing 41 males and 10 female, and 56 non-SDG trained teachers containing 45 male and 11 females). The 56 non-SDG teachers that participated in the study were selected using simple random sampling technique. The selection of the sample teachers was based on Central Limit Theorem which according to Sambo (2008), a sample as big as 30 is enough to produce a normal result and represent a given population. In order to have basis for fair analysis of the data to be collected, purposive sampling technique was used to select two schools each from the four Education Zones. In each zone, one of the schools selected have a male teacher and the other one a female teacher who either receives SDG training or otherwise.

Instrumentation

The instrument used to collect data for the study was Basic Science Teacher Attitudes Questionnaire (BSTAQ). The instrument is a 5-likert type with options such as SA=Strongly Agree, A=Agree, U=Undecided, D= Disagree, SD=Strongly Disagree contain 29 item. It contains two sections, Section A deals with the participants profile while Section B asks question about Basic Science Teacher Attitudes towards teaching of Basic Science.

Validation of the Instrument

The instrument BSTAQ was given to some experts in the academia for both qualitative and quantitative measure. The initial draft of the instrument consisting of 33 items was modified and reduces to 29 after which the expert adjudged the instrument to have face and content validity.

Reliability of the Instrument

The instrument was administered once to 10 teachers who are not part of the study sample using split-half method. The result of the data collected was subjected analyzed using Cronbach alpha statistical tool to compute the internal consistency of the items which yielded reliability coefficient of 0.87, which signified that the instrument was reliable.

Data Analysis

The research question was answered using means and standard deviations while the hypothesis was tested using ANOVA at $p \leq 0.05$ level of significance.

Results

Data from Attitude by Gender

Table 1: Mean Attitude Scores of Male and Female Basic Science Teachers Trained Under SDG and Those not Trained Under SDG

Training	Gender	N	Mean Rank	Sum Mean Rank	Mean Difference
Trained	Male	44	80.1818	18.60267	7.5818
	Female	5	72.6000	26.90353	
Untrained	Male	41	76.2195	15.26026	2.6195
	Female	15	73.6000	16.32176	

Table 1 show the mean ranks attitude scores of male and female Basic Science teachers exposed to training under SDG and those not trained under SDG. The mean rank attitude score of male Basic Science teachers exposed to training under SDG of 80.1818 is higher than that of female Basic Science teachers which are (72.6000). The mean rank attitude score of male Basic Science teachers not exposed to training under SDG of (76.2195) was higher than that of female Basic Science teachers (73.6000). The total mean rank attitude score of male and female Basic Science teachers exposed to training under SDG of (79.4082) was higher than that of male and female Basic Science teachers that did not receive any SDG training (75.5179). The total mean rank attitude score of male Basic

Science teachers exposed and not exposed to training under SDG of (78.2706) was higher than that of female Basic Science teachers (77.3333). This implies that male Basic Science teachers exposed to training under SDG shows more positive attitude towards teaching of Basic Science than female teachers not exposed to SDG training.

Research Hypothesis

There is no significant difference between the mean Basic Science teachers' attitude scores of male and female teachers trained under SDG and those not trained under SDG in Sokoto State.

Table 2: Summary of ANOVA II Test on Attitude Scores of Male and Female Basic Science Teachers' Trained and Not Trained Under SDG

Source	Type III Sum of Squares	Df	Mean Square	F	P	Remark
Corrected Model	728.963 ^a	3	242.988	.796	.499	NS
Intercept	291817.020	1	291817.020	956.300	.000	S
Training	27.966	1	27.966	.092	.763	NS
Gender	331.652	1	331.652	1.087	.300	NS
training * Gender	78.476	1	78.476	.257	.613	NS

a. R Squared = .023 (Adjusted R Squared = -.006)

Table 2 presents summary of Multivariate Analysis of Variance on attitude scores of male and female Basic Science teachers' trained and not trained under SDG. The attitude scores for the type of training showed that $F(1,101)=0.092$, $p=0.763$; the hypothesis that states no significant difference is retained. The attitude scores for gender was $F(1,101)=1.087$, $p=0.300$; the hypothesis that states no significant difference is rejected. When the interaction of the training and gender were considered together, $F(1,101)=0.257$, $p=0.613$; the hypothesis which states no significant difference is retained. Therefore, there is no significant difference between the mean Basic Science teachers' attitude scores of male and female teachers trained under SDG and those not trained under SDG in Sokoto State.

Discussion

The result of the hypothesis tested reveals that, there is no significant difference between male and female teachers' attitude towards Basic Science teaching in Sokoto State. This is because the p-value of 0.300 is greater than alpha value of 0.05. This suggests that SDG training has no effect on male and female teachers' attitude in Basic Science teaching in Sokoto State. However, the outcome is contrary to that of the studies conducted by Osborne and Collins (2000) and Asogwa, Igbokwe and Offor, (2011) which show that the teachers who have more positive attitude towards teaching Basic Science would have more successful pupils in science classrooms. Teachers also have different attitude towards different concepts in Basic Science (Osborne and Collins, 2000). This is because teachers that have positive attitude tend to be more dedicated and at the end of the day tend to influence the learning and even achievement of their pupils positively.

However, Palmer (2004) study show a generally low level of scientific and technological literacy among pre-service and in-service primary school teachers, and these teachers generally tend to have negative attitudes toward science. The negative attitudes often originate from negative experiences that teachers had during their own primary and secondary education, and these attitudes persist during their pre-service teacher training (Tosun, 2000; Palmer, 2004). Studies investigating the attitudes of primary teachers toward basic science have indicated that they have lower confidence and self-efficacy beliefs about teaching basic science (Tosun, 2000; Skamp, 2004). They are less able to stimulate the attitudes of their pupils (Jarvis and Pell, 2004). On the positive side, research has shown that when teachers gain greater confidence and self-efficacy and a more positive attitude through continuing education efforts, they subsequently teach basic science in a better manner and are able to improve the attitudes of their pupils in this area (Osborne and Dillon, 2008).

Conclusion

Based on the findings of the study, it could be concluded that the attitude of male and female Basic science teachers towards teaching of Basic Science does not differ, whether they receive SDG training or not. Nonetheless, the SDGs teachers retraining programme should be continue periodically as it is an important exercise for teacher professional development.

Recommendation

It is recommended that the selection of participants for SDGs retraining programme should be gender sensitive.

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