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IMPACT OF TEACHERS' PARTICIPATION IN TRAINING SCHEME, TEACHERS' DISPOSITION AND YEARS OF TEACHING EXPERIENCE ON TEACHERS' COMPETENCE IN THE TEACHING OF MATHEMATICS IN PUBLIC PRIMARY SCHOOLS IN ODEDA LGA, OGUN STATE

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Abstract
This study empirically quantified the impact of teachers' participation in training programmes, teachers' disposition and years of teaching experience on teachers' competence in some public schools in Odeda Local Government Area, Ogun State. Twenty-four teachers in seven public primary schools participated in a 3-day training scheme as experimental group while six teachers of same class group served as control. Teachers competence level was measured using the Teachers' Observational Rating Scale. Results showed the mean competence score of teachers in the training scheme (47.55) as significantly higher ($p \leq 0.05$) than those in the control group (39.31), implying that the training scheme significantly and positively impacted on the teachers' competence ($F_{(1, 24)} = 10.367$, $p < 0.05$). The teachers' disposition ($F_{(1, 24)} = 0.718$, $P = 0.405$) and the teachers' years of teaching experience ($F_{(1,24)} = 1.511$, $P=0.241$) had no significant effect on the teachers' competence. The Partial Eta Square (^{2}) of 0.302 implied that 30.2% of the variance experienced in competence in the teaching of mathematics was accounted for by the training scheme. The study identified the training scheme as a major determinant of competence among mathematics teachers in lower primary schools in Odeda Local Government Area.

Keywords: Teachers' Training, Disposition, Years of Teaching Experience, Teachers' Competence, Mathematics, Lower Primary Schools, Odeda LGA, Ogun State, Nigeria.

Introduction
In-service teacher training programmes refer to activities aimed at providing teachers with the knowledge and skills necessary to discharge their students with more competence and confidence (Reeves, 2018). Many studies showed that students learn more from teachers with strong academic competence than they do from teachers with weak academic skills (Tichovolsky *et al*., 2015). The findings are so consistent that there is a broad agreement that teachers' academic competence is linked to students learning and confidence (Blazar and Kraft, 2017). Other attributes of teachers that enhance pupils' confidence and achievement are the teachers' disposition and the years of teaching the subject-matter.

Teachers' disposition includes the necessary values, commitments and professional ethics that influence teachers' behaviours. Disposition is guided by beliefs and attitudes related to values such as caring, fairness, honesty, responsibility, and social justice. Disposition is a psychological tendency that is expressed by evaluating a particular entity with some degree of favour or disfavour (Eagly and Chaiken, 1993). It is a predisposition or a tendency to respond positively or negatively towards a certain idea, object, person, or situation or an attitude object. Disposition influences an individual's choice of action, and responses to challenges, incentives, and rewards (Business Dictionary). Zelley, Marianne and Elaine (2005) postulate that disposition

are generally positive or negative views about a person, place, thing or event which are often referred to as the disposition object.

Another factor important to this study is teachers' experience. Many occupations recognise employees' years of experience as a relevant factor in human resource policies, including compensation systems, benefits packages, and promotion decisions. The idea is that experience gained over time enhances the knowledge, skills and productivity of workers (Harris and Sass, 2007). In education, teachers' experience is probably the key factor in personnel policies that affect current employees; it is a cornerstone of traditional single-salary schedules. It drives teacher transfer policies that prioritise seniority; and is a major source of inequity across schools and, therefore, a target for redistribution. The underlying assumption is that experience promotes effectiveness. The impact of early years of experience is strongest in mathematics and more consistent at the elementary and middle school levels than at the high school level (Harris and Sass, 2007).

This paper reports the effects of teachers' re-training programme, teachers' disposition and years of experience in the teaching of mathematics on the teachers' competence in the teaching of mathematics at the primary school level.

Objective of The Study

To determine the impact of teachers' participation in a training programme, the teachers' disposition and years of teaching experience on the teachers' competence in the teaching of mathematics in selected public primary schools in Odeda Local Government Area of Ogun State.

Research Questions

The project addressed the following research question:

Is there any significant effect of Teachers' Participatory Training Scheme, teachers' disposition and years of teaching experience on teachers' competence in the teaching of mathematics topics at lower primary classes (One to Three) in selected public schools in Odeda LGA, Ogun State?

Methodology

Variables in the Study

The following variables were used in the study:

Independent Variables:

i. Teachers' Participatory Training Scheme, TPTS
ii. Control Group with No Training Scheme, CGNT.

Moderator Variables:

i. Teachers' Teaching Experience (10 yrs and below, 11-20 yrs, 21 yrs and above)
ii. Teachers' disposition (positive, negative)

Dependent Variables:

i. Teachers' Competence Assessment

Population

The target population comprised all the classroom teachers in Primary One to Three in all the Public Primary Schools in Odeda Local Government Area, Ogun State.

Sampling Procedure and Sample

Simple random sampling technique was used to select nine schools, seven of which were randomly assigned to treatment and two to control groups. All the classroom teachers and their pupils in the nine schools were part of the study.

Instrumentation

The following instruments were used to generate data for this study:

i. Teachers' Disposition to Teaching of Mathematics, TDTM.
ii. Teachers' Observational Rating Scale, TORS.

Validation and Reliability of the Research Instrument

Face and content validity were carried out. The researchers administered the trial test and the scores used to determine the internal consistency (i.e. the reliability) using Kuder-Richardson (KR-20) Formula.

Training Scheme Procedure

The teachers were assembled in the Federal College of Education, Osiele, for pre-training selection test. The selection test covered two main topics in the Federal Ministry of Education's 9-year Basic Education Curriculum – Mathematics for Primaries 1-3. The two topics were: 1) Measurement (money, length, breadth, capacity, area), and 2) Practical and descriptive geometry (Two-dimensional, three-dimensional shapes, symmetry and curves). The selection test was aimed at identifying teachers with good understanding of the topics to be designated as Master of the Topic. The Masters of the Topics participated in the Training Sessions that followed.

The teachers commenced a 3-day training programme, Tuesday to Thursday. The training featured the best teaching methods in the selected topics, delivered by a group of veteran teachers in the field of primary school mathematics education.

The teachers were expected to take the newly-learned techniques to their pupils after the training. The teachers' competence was evaluated at the experimental and control schools using the Teachers' Observational Rating Scale, TORS.

Data analysis

The data obtained were subjected to Analysis of Covariance (ANCOVA). The main effects observed to be significant were subjected to Multiple Classification Analysis (MCA) to determine the magnitude and direction of the effect and to ascertain the amount of variation due to each dependent variable. For significant interaction effects, a separate examination of the differences among categories of one variable at the different level of other variables involved in the interaction were conducted. Where treatment effect was significant, then post-HOC Scheffee were conducted.

Results

Results (Table 1) showed a significant difference between the mean scores of teachers' competence of those that participated in teachers' participatory training scheme and those who did not.

Table 1: Effects of Teachers' Participatory Training Scheme on teachers' competence in the teaching of mathematics

Treatment Group	Pre-Comp		Post-Comp		Mean Difference
	x	SD	x	SD	
Teachers' Participatory Training Scheme	35.63	8.710	47.55	5.878	8.24
Control Group	31.69	7.454	39.31	7.181	

The mean competence scores of teachers in the participatory scheme and those in the control group at post-test were 47.55 and 39.31 respectively. The variation in the mean performance was 8.24, a difference significant at $p \leq 0.05$. This implies that there was a difference in the teachers' competence in the teaching of mathematics performance based on the participatory training scheme (experimental group) and that of control group at posttest.

Table 2 presents the marginal mean estimates for different levels of teachers' disposition. The result reveals that mean competence of teachers with positive disposition level (44.301) is higher than those with negative disposition level (42.640). However, the mean competence of teachers with positive disposition level is not significantly greater than those with negative disposition ($F_{(1, 24)} = 0.718$, $P = 0.405$).

Table 2: Marginal Mean Estimation of Teaching Disposition Level on Teachers' Competence

Disposition level	Mean Competence Score	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Positive Disposition	44.301[a]	1.909	40.362	48.240
Negative Disposition	42.640[a]	1.829	38.866	46.415

a. Covariates appearing in the model are evaluated at the following values: Pre Competence = 34.17.

Table 3 presents the marginal mean estimates for different teachers' teaching experience. The result reveals that mean competence of teachers with teaching experience between 11-20 years (44.373) is highest, followed by teachers with 21 years and above with mean value of 44.257 while teachers with 1-10 years' experience had mean post-confidence score of 41.481. There is, therefore, no significant effect of teachers' years of teaching experience on teachers' post-training competence score ($F_{1,24} = 1.511$, $P=0.241$).

Table 3: Marginal Mean Estimation of Teaching Experience on Teachers' Competence

Teaching experience	Mean post-Competence Score	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1-10yrs	41.481[a,b]	2.376	36.578	46.384
11-20yrs	44.373[a]	1.807	40.645	48.102
21yrs & Above	44.257[a,b]	2.760	38.561	49.953

a. Covariates appearing in the model are evaluated at the following values: Pre Competence = 34.17. Based on modified population marginal mean

The results pointed to the effectiveness of the training conducted. The average pre-competence score (34.17) was significantly lower the least post-competence score (41.481). What would have been the effect of years of teaching experience had been obliterated by the training given to the experimental group that participated in the training scheme.

Table 4 is a summary of Analysis of Covariance (ANCOVA) of teachers' post – competence scores in the teaching of mathematics by treatment (Teachers' Participatory Training Scheme, disposition and teaching experience).

Table 4: Analysis of Covariance (ANCOVA) of teachers' competence in the teaching of mathematics as affected by the treatments - Teachers' Participatory Training Scheme, Disposition and Teaching Experience

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	958.931[a]	10	95.893	2.449	.035	.505
Intercept	2083.573	1	2083.573	53.208	.000	.689
Pre competence	153.902	1	153.902	3.930	.059	.141
Training	405.973	1	405.973	**10.367**	.004	.302
Teaching Experience	118.376	2	59.188	1.511	.241	.112
Disposition Level	28.119	1	28.119	.718	.405	.029
Training * T. Experience	16.968	2	8.484	.217	.807	.018
Training * Disposition Level	.506	1	.506	.013	.910	.001
T. Experience * Disposition Level	6.061	2	3.031	.077	.926	.006
Training * T. Exp. * Disposition Level	.000	0	.	.	.	.000
Error	939.812	24	39.159			
Total	71163.000	35				
Corrected Total	1898.743	34				

a. R Squared = 0.505 (Adjusted R Squared = 0.299)

The table reveals that after adjusting for the covariance (i.e. the pre-competence score in teaching of Mathematics), the effect of training on teachers' competence in the teaching of mathematics was statistically significant ($F_{(1, 24)} = 10.367$, $p < 0.05$). Consequently, the null Hypothesis which stated that there was no significant main effect of treatment (Teachers' Participatory Training Scheme) on competence in the teaching of mathematics was therefore rejected. The table further showed that the Partial Eta Square (^{2}) was 0.302, which was considered to be medium effect size according to Cohen (1988). The implication of this is that 30.2% of the variance experienced in competence in the teaching of mathematics was accounted for by the training scheme.

In order to determine which group differs significantly among the two treatment groups, Sidak Post-hoc analysis was conducted. The results are presented in Tables 5 and 6.

Table 5: Estimated Marginal Means of Teachers' Competence in the teaching of mathematics as affected by the training scheme

Groups	Mean post-competence score	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Experimental Group with Training scheme	48.033[a,b]	1.754	44.412	51.653
Control Group	38.909[a,b]	1.995	34.791	43.026

a. Covariates appearing in the model are evaluated at the following values: Pre Competence = 34.17.

Table 5 further revealed that Experimental group (Teachers' Participatory Training Scheme) has the higher mean competence score ($X\bar{x}$ = 48.033) while the control group has the lower mean competence score (X= 38.909).

Moreover, the sources of significant difference obtained in were traced using Sidak post hoc test of multiple comparisons

Table 6: Pairwise comparison of teachers' post-competence score of teachers

(I) Experimental Group	(J) Experimental Group	Mean Difference (I-J)	Std. Error	Sig.[d]	95% Confidence Interval for Difference[d]	
					Lower Bound	Upper Bound
Treatment	Control	9.124*[,b,]	2.693	.002	3.567	14.681
Control	Treatment	-9.124*[,b]	2.693	.002	-14.681	-3.567

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

The result from post-hoc analysis in Table 6 reveals that the difference in the mean score of teachers' competence as a result of Teachers' Participatory Training Scheme. The result confirmed that the difference (9.124) between the Experimental groups (Teachers' Participatory Training Scheme) and the Control Group was statistically significant at 0.05% level.

Discussion

Workers have always linked improved teachers' competence to the training opportunities received by the teachers. Popoola and Adeleke (2019) developed a professional learning scheme that led to marked improvement of teachers' competence. The scheme had also brought about a sustainable skill improvement among the participating teachers over the past years.

Crick (2008) described competence as the ability to perform complex acts with ease, precision and adaptability. Shabani *et al*. (2010) explained the concept of competence, in teaching, as one that encompassed tacit and explicit knowledge, cognitive and practical skills, as well as dispositions. Dispositions, therefore, are often linked to competence. The lack of significance in the relationship between disposition and competence in this study points to the possible multi-faceted constituents of disposition. Clarke, Thomas and Vidakovic (2009) postulate that disposition and practices of teaching Mathematics are complexly affected by beliefs, emotions, social context and content knowledge. Where the content knowledge is improved upon,

disposition as a complex combination of many situations may not impact so directly teachers' competence.

OECD (2023) viewed teachers' experience as a continuum concept that started with the initial teacher training, carrying on through the teaching practice phase and continuing throughout the rest of the career. Certainly, an intervention along the line can distort what would have been the impact of such concept on the teachers' competence. The provision of a training scheme is such an intervention. It should then not be a surprise that the competence scores post-intervention did not follow the expected pattern of teachers' years of teaching experience.

Participatory training schemes often focus on enhancing teachers' pedagogical skills, such as lesson planning, classroom management, and instructional strategies. Research by Akpochafo (2021) found that teachers who participated in such schemes showed improved classroom practices and student engagement. Training programs that encourage participation can also lead to a deeper understanding of subject matter content. A study by Osei-Nyame (2020) highlighted that teachers who were actively involved in training workshops demonstrated increased subject knowledge and were better able to explain concepts to their students. Participatory training empowers teachers and boosts their confidence in their abilities. According to a study by Adeyemi and Adeleke (2022), teachers who engaged in collaborative and interactive training felt more confident in implementing innovative teaching methods and addressing challenges in the classroom.

Participatory training schemes contribute to teachers' professional development by providing opportunities for networking, sharing best practices, and receiving feedback. This was supported by the findings of a study by Adesope and Ilonzo (2021), which emphasized the importance of collaborative learning environments in enhancing teachers' competence. Ultimately, the improved competence of teachers resulting from participatory training schemes can lead to better student outcomes. A meta-analysis by Hattie (2021) highlighted that teacher professional development programs focusing on active engagement and reflection positively influence student achievement.

Conclusion

The findings from these studies suggest that investing in teachers' professional development through participatory training programs can have a positive impact on teachers' competence in the teaching of mathematics at primary school lower classes. This highlights the importance of ongoing training and support for educators to create a supportive and conducive learning environment for students.

The training of teachers had always been linked with improved competence. A well-trained teacher is the one who can communicate confidently with the pupils thereby impacting the much desired skills on the pupils. It is therefore of utmost importance that teachers in primary school receive regular training for observable improvement in competence for effective teaching of the subject to the pupils of lower primary classes in the public primary schools in Odeda Local Government of Ogun State.

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