EXPLORING THE GENDER INFLUENCE ON JUNIOR SECONDARY SCHOOL STEM TEACHERS' PERCEPTIONS OF IN-SERVICE PROFESSIONAL DEVELOPMENT PROGRAM

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Abstract
The paper evaluated the gender influence on junior secondary school STEM teachers' perceptions of in-service professional development programs. A survey approach was employed for the study; three research questions were raised and answered in the course of the study. The population of the study comprised all STEM teachers in the Oyo metropolis, consisting of four (4) local Governments with one hundred and seventy-two (172) STEM teachers. From this population, only one hundred and forty-seven (147) turned up and participated in the in-service training organized by the researchers served as a sample for the study. A self-developed closed-ended questionnaire named STEM Teachers' Perceptions of In-Service Professional Development Program (STPISPDP) was used as the instrument to collect data. The collected data were analyzed using descriptive statistics of mean, standard deviation, t-test, and one-way ANOVA. The findings reveal that the perception of STEM teachers regarding in-service professional development training is generally positive; gender differences show no significant effect on STEM teachers' perceptions of in-service professional development training, and finally, teaching experience on perceptions of in-service professional development training reveals no significant differences among different experience levels. It was therefore suggested, among others, that a longer time/duration be allotted for in-service training, and all staff, irrespective of gender or experience level, should be mandated to attend the in-service development training.

Keywords: Gender Influence, STEM Teachers, Perception, In-Service Training Program.

Introduction

Science, Technology, Engineering, and Mathematics (STEM) has been widely acknowledged to equip students with the critical thinking and problem-solving abilities needed to succeed in this 21st century. The subject must be handled by a capable hand. Teacher competencies as proposed by the Turkish Ministry of National Education include knowledge, skills, and attitudes that ought to be gained by teachers who accomplish the curricula developed for effective teaching and learning and prepare students for the 21st century (MNE, 2017). It is therefore imperative that teachers of the 21st century acquire high-level thinking

skills, become digitally literate, and ensure that students develop their creativity by providing opportunities for material preparation and development, as well as applying scientific research methods and techniques. However, there is still a dearth of certified STEM educators, especially in secondary education. In order to solve this problem, schools are increasingly using in-service professional development programs to help current STEM instructors become more knowledgeable and proficient.

Despite the significance of in-service professional development programs to improve STEM educators, which subsequently increases students' thinking skills, many circumstances cause hindrances towards improving STEM education through in-service development programs. There are many factors, but the focus of this study is the gender influence on the perception of STEM teachers on in-service professional development programs. Teachers are often blamed for the fallen standard of education, yet not many people want to find out some of the remote causes of these poor performance of teachers, thus each academic staff member is required to prove his/her credibility based on strengths and magnitude of his/her research activities, teaching and consultancy services among others. The major challenge in the view of the writers is how to foster a good perception of STEM teachers towards in-service development programmes to improve their productivity and engagement.

Literature Review

In-service training is an ongoing collaborative effort to improve teacher professional development, usually organized by the school administrator, government, agencies, organizations, and Institutions.. According to Osamwonyi and Akpata (2016), In-service education is designed for manpower development of the school system and the educational enterprise as a whole. If teachers are to perform their functions effectively and efficiently, it becomes imperative for them to receive training in new skills and modern methodology. The DfES defines it as "any activity that increases a teacher's knowledge and understanding and their effectiveness in schools and can help raise children's standards and improve teachers' job satisfaction". The Teacher Training Agency (TTA) defines it as "a planned and sustained series of activities, designed to improve a teacher's knowledge and skills" (Bell, 2005). Staff development programmes by the National Commission for Colleges of Education (NCCE, 2008) refer to opportunities provided for staff to increase their knowledge, skills, experiences, and understanding, thereby improving their job performance. These opportunities include educational programmes such as Bachelor in Education (B.Ed), Post Graduate Diploma in Education (PGDE), Master of Education (M.Ed), Doctor of Philosophy (Ph. D), and others, which include short training courses such as Conferences, Seminars, and Workshops. Unfortunately, the practice seems to be lopsided and epileptic, hence it has not produced the desired and required results on the side of the teachers, as many of them have different perceptions towards the development programmes. Eduwen & Tayo (2016) defined in-service education as the relevant courses and activities in which a serving teacher may participate to upgrade their professional

knowledge, skills, and competence in the teaching profession. Therefore, it encompasses all forms of education and training given to a teacher who is already on the job of teaching and learning.

Appraising the importance of in-service professional development programmes, it is obvious that every single STEM teacher, both male and female, needs these development programmes, as they would afford them the opportunity to increase their knowledge and skills required for teaching and learning. Supporting this claim, Bulut (2022) researched the Perceptions of Teachers towards In-Service Training Activities; from his findings, a significant portion of teachers stated that participation in in-service training-related activities should be compulsory. The reason is that their participation in in-service training activities would contribute to their professional development. This has shown that their participation in the in-service training has changed their perception positively. In-service training helps teachers create an environment that facilitates quality learning in schools and enables teachers to develop the competencies they need to pursue in their career options, also helps teachers and other staff maintain their motivation and excitement (Sathyanesan, 2001). In-service training aims to carry out discoveries in education, increase the quality of teaching, and improve teaching methods (Veeman, Tulder, & Voeten, 1994). According to Patel (2007), thanks to in-service training, a teacher desires to be a learner at every moment of his professional life, thus freeing himself from obsolescence, fossilization, and indifference of knowledge. Also, recognizing the importance of in-service training, Patel (2007) appreciated the impact of in-service training as it motivates teachers the desires to be learners at every moment of their professional life, thus freeing themselves from obsolescence, fossilization, and indifference to knowledge.

Nevertheless, there is controversy on whether gender and years of teaching experience play a pivotal role in the perception of STEM Teachers towards participating in in-service professional development training. Some studies indicate that female teachers may report a higher perceived need for professional development compared to male teachers, potentially due to societal expectations regarding their teaching abilities or the subjects they often teach. There are comparatively few studies of gender stereotypes from Africa, particularly from Nigeria, on the junior secondary school STEM teachers' perceptions of in-service professional development programs. The available research focuses on the investigation of the contents of the curricular and textbook materials at the schools and gender differences in the scientific and mathematical fields (Anokye-Poku, 2020). Supporting this view, Tette, Wilmot, & Ashong (2018) stressed that little or no previously published research has studied the view of gender stereotypes by pre-service teachers. Research on the perception of gender stereotypes by teachers before service in Nigeria is deficient and is worth exploring. STEM teachers must be conscious of gender influence on junior secondary school STEM teachers' perceptions of in-service professional development programs. Taşdemir (2014) carried out a study on analyzing the attitudes of teachers towards in-service training according to various variables.

In his findings, it was determined that the attitudes of teachers towards in-service training differed significantly according to gender when evaluated using a t-test. The attitude of female teachers towards in-service training was more favorable than the attitude of male teachers.

Years of teaching experience, on the other hand, is a factor worthy of exploration to know whether its effect can significantly influence the perception of STEM teachers towards in-service professional development training. Exploring this, Taşdemir (2014) confirmed from his study that the teachers' attitudes towards in-service training activities differed significantly according to their professional seniority. According to his findings, the attitude of teachers with 6 to 10 years of professional experience was more favorable towards in-service training activities than the attitude of teachers with 11 to 15 years of professional experience.

The purpose of this study is, therefore, to address this gap by assessing the gender influence on junior secondary school STEM teachers' perceptions of in-service professional development programs. The study also examines the influence of professional years of experience on junior secondary school STEM teachers' perceptions of in-service professional development programs.

Statement of the Problem

As important as the in-service professional development is to teachers, most especially the STEM teachers, there are numerous hindrances to its organization at the grassroots level of education such as the attitude of teachers, lack of funds, and political influence, but there appears to be minimal or no focus on the role gender plays in shaping teachers' perceptions of the in-service professional development programs. There is limited empirical evidence on how male and female STEM teachers perceive the relevance, accessibility, and impact of professional development programs. Recognizing this gap, this particular research has identified a gender influence as a significant factor meriting thorough exploration. This study, therefore, delves into understanding how gender influences the junior secondary school STEM teachers' perceptions of in-service professional development programs. Research on the perception of gender stereotypes by teachers in-service in Nigeria is deficient and is worth exploring.

Research Question

The study was guided by the following research questions:

1. What is the perception of STEM teachers of the in-service professional development training program?
2. Does gender influence the perception of STEM teachers on in-service professional development training?
3. Does teaching experience influence the perception of STEM teachers on in-service professional development training?

Methodology

A survey was undertaken to explore the gender influence on junior secondary school STEM teachers' perceptions of in-service professional development programmes. A close-ended questionnaire titled "STEM Teachers' Perceptions of In-Service Professional Development Program (STPISPDP)" was

designed for this purpose, which solicited responses on the gender influence on junior secondary school STEM teachers' perceptions of in-service professional development programmes. The questionnaire was divided into two sections, section A and section B. Section A sought demographic information of the respondent, such as gender, school, and years of teaching experience, while section B comprises question items from numbers 1 to 15. The research is a descriptive survey design, particularly the cross-sectional survey design. This design involves gathering data about a target population from a sample and generalizing the findings obtained from the analysis of the sample to the entire population. The design is used to describe the attitude, beliefs, opinions, behaviours, or characteristics of a population based on data collected from a sample or population (Kenneth and Abbott, 2002). This design is therefore found appropriate because the study sought to find out the influence of gender on junior secondary school STEM teachers' perceptions of in-service professional development programmes.

This instrument, after thorough scrutiny, was administered to the participants in in-service professional development training for STEM teachers organized by the researcher in the four local government areas in Oyo metropolis. The questionnaires were administered with the help of facilitators in each of the centers across the four local governments within Oyo metropolis. After completion by each of the respondents, the questionnaires were collected and analyzed using descriptive statistics of mean, standard deviation, t-test, and one-way ANOVA.

Population

The population of this study comprises all Junior Secondary School Two (JSSII) STEM teachers in four (4) local government areas in Oyo metropolis. The total number of STEM teachers as of the time of conducting this research stands at one hundred and seventy-two (172)

Sampling

A purposive sampling technique was employed. This technique was used in the sampling process because participants who attended the in-service training were used for the study. Out of one hundred and seventy-two (172) STEM teachers as mentioned in the population, one hundred and forty-seven (147) STEM teachers attended, participated, and returned the questionnaire, served as the participants for the study.

Results

Research Question 1: What is the perception of STEM teachers on the in-service professional development training Program?

Measure	N	Mean	SD
Perception of In-service Training Score	147	4.0	0.8

The perception of STEM teachers regarding in-service professional development training is generally positive. With a mean score of 4.0 (SD = 0.8) on a Likert scale where higher values

indicate a more favorable perception, the results suggest that teachers view the training positively. The relatively high mean score reflects a favorable overall attitude towards the in-service professional development opportunities, indicating that the majority of teachers find these training sessions beneficial.

Research Question 2: Does gender influence the perception of STEM teachers on in-service professional development training?

Gender	N	Mean	SD	T	Df	Sig. (2-tailed)
Male	51	4.1	0.75	1.13	47	0.264
Female	96	3.9	0.85			

The analysis of gender differences in perceptions of in-service professional development training shows no significant effect. Male teachers, with a mean score of 4.1 (SD = 0.75), and female teachers, with a mean score of 3.9 (SD = 0.85), both report positive perceptions of the training. The t-test result (t (47) = 1.13, p = 0.264) indicates that the difference between male and female teachers' perceptions is not statistically significant. This suggests that gender does not significantly influence how STEM teachers perceive in-service professional development training.

Research Question 3: Does teaching experience influence the perception of STEM teachers on in-service professional development training?

Years of Experience	N	Mean	SD
1-5 Years	45	3.8	0.70
6-10 Years	54	40.8	0.80
11+ Years	48	4.2	0.65

Source	Sum of Squares	df	Mean Square	F	Sig
Between Groups	1.21	2	0.61	1.13	0.330

The analysis of the influence of teaching experience on perceptions of in-service professional development training reveals no significant differences among different experience levels. Teachers with 1-5 years of experience have a mean perception score of 3.8 (SD = 0.70), those with 6-10 years of experience have a mean score of 4.0 (SD = 0.80), and teachers with over 11 years of experience report a mean score of 4.2 (SD = 0.65). The one-way ANOVA result (F(2, 46) = 1.13, p = 0.330) indicates that there are no statistically significant differences in perceptions based on years of teaching experience. This suggests that the length of teaching experience does not significantly impact how STEM teachers perceive in-service professional development training

Discussion of Results

The study established that the perception of STEM teachers regarding in-service professional development training is generally positive. With a mean score of 4.0 (SD = 0.8) on a Likert scale where higher values indicate a more favorable perception, the results suggest that teachers view the training positively. This is in agreement with the submission of Bulut (2022), in the research conducted on the Perceptions of Teachers towards In-Service Training Activities; from his findings, a significant portion of teachers were found interested in further participation in in-service training-related activities. The reason is that their participation in in-service training activities would contribute to their professional development. This has shown that their participation in the in-service training has changed their perception positively.

Also, the analysis of gender differences in perceptions of in-service professional development training shows no significant effect. Male teachers, with a mean score of 4.1 (SD = 0.75), and female teachers, with a mean score of 3.9 (SD = 0.85), both report positive perceptions of the training. The t-test result (t (47) = 1.13, p = 0.264) indicates that the difference between male and female teachers' perceptions is not statistically significant. This finding is at variance with Taşdemir (2014), who found that the attitudes of teachers towards in-service training differed significantly according to gender. The attitude of female teachers towards in-service training was observed by him to be more favorable than the attitude of male teachers.

Further, the analysis of the influence of teaching experience on perceptions of in-service professional development training reveals no significant differences among different experience levels. Teachers with 1-5 years of experience have a mean perception score of 3.8 (SD = 0.70), those with 6-10 years of experience have a mean score of 4.0 (SD = 0.80), and teachers with over 11 years of experience report a mean score of 4.2 (SD = 0.65). The one-way ANOVA result (F(2, 46) = 1.13, p = 0.330) indicates that there are no statistically significant differences in perceptions based on years of teaching experience. This finding is also at variance with the result of Taşdemir (2014), who found that the teachers' attitudes towards in-service training activities differed significantly according to their professional seniority. According to him, the attitude of teachers with 6 to 10 years of professional experience was more favorable towards in-service training activities than the attitude of teachers with 11 to 15 years of professional experience.

Conclusion

Based on the findings of the study, the following conclusion was reached:

1. That perception of STEM teachers regarding in-service professional development training is generally positive.
2. That the gender differences have no significant effect on the STEM teachers' perception of in-service professional development training.
3. That analysis of the influence of teaching experience on perceptions of in-service professional development training reveals no significant differences among different experience levels.

Recommendation

Recognizing the importance of in-service professional development training, it is recommended that:

1. Longer time/duration is allotted for in-service training
2. All staff, irrespective of gender or experience level, should be mandated to attend the in-service training programmes.
3. Mentorship programs should be encouraged within the STEM teaching profession to foster professional confidence and inclusion.
4. Motivational support should be given to STEM teachers to boost their morale

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