



Teachers' Professional Development Training Needs for Improved Science Education Teachers in Niger State

Abdullahi Dokochi Mohammed

Department of Science Education,
Ibrahim Badamasi Babangida University Lapai,
Niger State.

ABSTRACT

This paper examined the involvement of teachers' professional development in improving science education teachers. The quality of education is central to the sustainable national development that can be attained by any country. Hence, the teachers' professional development is critical to classroom practices in the education system. Teachers supposed to attend various professional development activities every year to improve teachers' classroom practices such as STAN. The paper aimed at establishing teachers' perspectives on professional development activities. The contents of the professional development activities intend to adequately address teachers' needs for dynamics in terms of innovations for teaching-learning processes in the classroom practices. It is therefore recommended that teachers' classroom practices be assessed by their heads of departments, vice principals/principals or subject specialists to determine how teachers' classroom practices would be enhanced. The frequency of professional development activities for teachers should be encouraged every year in order to improve teachers' classroom practices. Therefore, conferences, seminars and workshops can be organized by the Niger government through STAN and other relevant bodies on teachers' professional development to improving science education teachers. The study also seeks to advice that, there should be teachers' participation in continuing professional development activities to update teachers' knowledge by regularly attending programmes on current research studies and innovations for effective teaching and classroom practices to improve teachers' understanding and usage of available resources for the best classroom and learning experiences of the students, and the use of appropriate resources for teachers' lessons.

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INTRODUCTION

The quality of teachers is exhibited in their classroom practices, as teaching and learning are designed, planned and facilitated by teachers. Various professional approaches have been designed for teachers to improve their classroom practices. The professional development programmes designed to improve teaching and learning are critical for sustainable development in education. The study believed that, the perspectives of teachers and heads of department on the existing professional development activities, and how these activities would impact on classroom teaching and learning in Niger State high schools. The main

objective of the education system is to provide students with learning experiences that will make them responsive to contributing their share to national growth and development.

PROFESSIONAL DEVELOPMENT OF TEACHERS

This refers to skills and knowledge attained for both personal development and career advancement. Professional development encompasses all types of facilitated learning opportunities, ranging from colleges and degrees for formal coursework, conferences and informal learning opportunities situated in practice. It has been described as

Corresponding author: Abdullahi Dokochi Mohammed

✉ abdullahid@ibbu.edu.ng

Ibrahim Badamasi Babangida University, Lapai, Niger State.

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intensive and collaborative, ideally incorporating an evaluative stage. There are variety of approaches to professional development, including consultation, coaching, and communities of practice, lesson study, mentoring, reflective supervision and technical assistance (Ajani 2020).

The place and role of teachers as a valuable resource in the school as a system of educational activities cannot be overemphasized. In general, studies have shown that certain factors within the teacher's control significantly influence the academic attainment or progress of his students (Cox, 2015). Some of these factors are the teacher's teaching skills, his professional characteristics and the classroom climate which together accounted for well over 30% of the variance in students' progress. Some of these skills in teaching and professional characteristics are developed in teacher training and re-training activities in organized Continuing Professional Development (CPD) programmes by relevant professional bodies and institutions. Parents and sometimes, students in certain allowable circumstances use teacher quality differences among teachers to request for class placement with specific teachers. The teacher plays several roles in the context of the school system. Some of the roles of the teacher have been summarized by Cox (2015):

The role of a teacher is to help students apply concepts, such as Math, English, and science through classroom instruction and presentations. Their role is also to prepare lessons, grade papers, manage the classroom, meet with parents, and work closely with school staff. Being a teacher is much more than just executing lesson plans, they also carry the role of a surrogate parent, disciplinarian, mentor, counselor, book keeper, role model, planner and many more. As can be seen, the teacher has very many roles from the stage of lesson preparation, selection of appropriate delivery techniques, lesson presentation and classroom management, to that of skills in effective assessment and feedback to students, parents and school authorities, not excluding some other roles that posit the teacher as a role model, counselor, facilitator and even a surrogate parent. These enormous task bequeathed on the teacher demands that, the teacher is not only well trained or satisfy some

basic teacher standards in his initial qualification process, but that the teacher whilst in-services prepared adequately with training and re-training programmes that would sufficiently support the teacher in demonstrating enhanced skills and knowledge development in those teacher standards that would enable him actualize his classroom roles and expectations effectively. Some scholars would improve teachers' quality of instruction, lesson delivery skills, subject content knowledge and confidence which could in turn result in school pupils obtaining higher academic attainments (DeChenne, and Houston, 2013).

WHAT IS IN-SERVICE TRAINING?

In-service training is defined as a workshop for employed professionals, para-professionals and other practitioners to acquire new knowledge, better methods, etc. for improving their skills toward more effective, efficient and competent rendering of service in various fields and to diverse groups of people. Furthermore, such a workshop is a training designed to benefit a specific group of teachers at a particular school. A good in-service training should, via workshop trainees and improve the quality of programming for the development of teachers in service.

In-service professional development programmes provide opportunities for teachers to reflect on their classroom practices, to improve their teaching approaches, and enhance learners' academic performance. Research has established that, cluster systems, workshops, conferences, and other development opportunities succeed in their goal, as approaches to professionally developed teachers for effective and enhanced classroom practices (Ajani, 2021).

Professionally developed activities, according to Mahmoudi and Yonca Özkan (2015), appeared to be one of the ways to preserve a high standard of teaching and retain high-quality teaching staff, as the teacher is the centre of classroom instruction.

Teachers should constantly learn new things so as to improve their professionalism, and use more effective teaching methods. According to Huang and Shih (2017), indicated that, students' academic achievement increase, when their teachers participated in professional



development programmes compared to students whose teachers did not participate in such programmes, it is evidence on attainment of Professional development activities.

TEACHERS' PROFESSIONAL DEVELOPMENT AND TEACHER EFFECTIVENESS

Teachers are important resources in the teaching and learning enterprise. According to Hanushek, (2011) to influence students' attainment, teachers are the most important factors in the school system than any other measured variable of schools. Teachers' professional development and competence are related to the quality of instructions as one of the 9 productive factors of Walberg's educational theory. It is therefore very important that; there are not just teachers in the classrooms, but that the teachers in the classrooms are those who are very highly qualified and are worthy of their salt.

There is research evidence that associates effectiveness with teacher-professional development. In the view of Nwogbo and Chinwe, (2023) improving professional learning for educators is a crucial step in transforming schools and improving academic attainment. According to them, to accomplish this, schools with the support of school systems and state departments of education need to make sure that professional learning is planned and organized to engage all teachers regularly and to benefit all students. This position assumes that if teachers are effectively trained professionally, then students they teach would benefit from such quality of training in way of effective learning and better academic attainments. The National Center for Learning Disabilities, NCLD (2010), opined that the teachers' understanding and mastery of pedagogy and subject matter, together with their ability to apply effective teaching practices, are the keys to learning for all students. It further stated that, teacher performance and effectiveness must be measured with valid and reliable assessments of teacher knowledge and classroom performance that are linked to student learning. It is therefore important that teachers receive good support from their employers for good classroom teaching practices that would ensure effective learning of students especially in science classrooms.

Teachers deserve regular and quality professional development training that is constant and consistent aimed at enhanced classroom practices (Adolphus, 2021). In other words, teachers, whom are facilitators of learning need adequate professional development that will assist them in effective curriculum delivery (National Policy Framework for Teacher Education, 2013; McMillan Education South Africa, 2017). From the state of basic education in Nigeria, it can be deduced that many teachers are confronted with how best to facilitate learning and reduce learners' challenges in their academic performance (Fareo, 2013; Akpan, and Ita, 2015; Ajani, 2021).

Ukaigwe, and Adieme, (2018) further stated that, classroom practices of teachers need to be improved to support and improve learners' problem-solving skills in the classroom. Similarly, teachers need to be responsible for how they can individually and collectively improve their classroom teaching to enhance their learners' performance.

To ensure the effectiveness of professional development, the Teacher Registration Council of Nigeria (TRCN) is responsible for the continuous design of varieties of professional development activities for teachers, taking cognizance of the effectiveness of such activities aimed at teaching improvement (TRCN, 2010). The 'one-size-fits-all' or cascade model of professional development activities usually are ineffective in improving the classroom performance of the teachers and needs to be improved. Govender, and Ajani, (2021) argued that one-size-fits-all professional development activities do not address the professional needs of individual teachers. This approach brings together teachers with different subject backgrounds and tends to present common knowledge and skills to them in the same approach, while cascading expects of teachers who attend professional activities to transfer knowledge gained during professional development activities to their colleagues upon return to their schools (Ejima, and Okutachi, 2012).

In the same vein, Oluwatoyin, (2022) disagrees with the use of professional development activities to introduce teachers and familiarize them with new curriculum policies. According to him, much emphasis

Corresponding author: Abdullahi Dokochi Mohammed

✉ abdullahid@ibbu.edu.ng

Ibrahim Badamasi Babangida University, Lapai, Niger State.

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rather should be placed on teachers' subject pedagogy and classroom practices which can improve the curriculum delivery and learners' performance. Based on various challenges identified, Olubunmi, (2023) emphasized the need to develop teachers regularly (for example, every year) to ensure they perform efficiently in their professional duties. They need to be updated and have to keep abreast of the trends in their classroom practices via in-service professional development activities. Education is dynamic and requires teachers to be professionally developed to satisfy learners' yearning for learning.

This is necessary because learners believe that teachers are encyclopedia of knowledge which can provide learners with appropriate knowledge, skills, attitudes and values. Basically, responsibilities are critical and require lifelong training that is content-focused and beneficial to support teaching and learning processes. The development of any nation depends on educational change and reforms. Hence, teachers must access continuous professional development activities frequently. Education is the vehicle to the national development of any nation, and no nation can be greater than the quality of the teachers in the education system (Olubunmi, 2023)

EXISTENCE OF VARIOUS ACTIVITIES FOR TEACHER PROFESSIONAL DEVELOPMENT

Findings revealed that teachers attended different professional development activities to improve their classroom teaching. Teachers classified these activities as on-site based and off-site based professional development. Off-site based activities refer to professional development activities attended outside teachers' school premises, and usually are organized by the Ministry of Education, while the on-site based professional development activities take place on the school premises and are usually organized by the schools (Oluwatoyin, 2022).

ENHANCED CLASSROOM PRACTICES THROUGH ACTIVITIES

It is globally believed that the essence of professional development in any profession is to improve the professional responsibilities of the members of such a profession. Hence, the main focus of teacher professional development

will be to improve classroom practices of teachers as well as to improve learners' performance. Based on that, the participants would affirm that professional development activities should improve their classroom practices (Oluwatoyin, 2022).

Teachers require relevant and adequate teaching resources that can enhance teaching and learning, while adequate and regular professional development activities should be designed for them. According to them, they agreed with Ajani, (2021) that teachers should be viewed as adult learners when designing the contents of any professional development programme. Hence, the contents of the professional development should adequately address their classroom needs.

The importance of maintaining teachers' pedagogical and subject-matter knowledge, however, cannot be overstated. Chuku, (2018) suggested that, teachers be given opportunities to come together, participate in professional development, collaborate, analyze the common core standards, break them down, and discuss across grade levels elementary, middle and high school how their common core works and how it breaks down to deeper learning, as knowledge is not static and does not solely rest on an individual. While supporting this, Oluwatoyin, (2022) argued that teachers should pursue ongoing professional development to become aware of best practices that could improve students' performance.

It is crucial to realize that trained teachers have received training in pedagogy, classroom management, and teaching techniques. However, outside of longer-term professional development, updating teachers' content and pedagogical knowledge is inevitable. One of the most common excuses teachers give for performing below expectations is a lack of on-the-job training and retraining Adeniran, Ishaku and Akanni (2020). It follows that raising the standard of the teaching workforce is equivalent to raising students' outcomes since researchers have identified improving teacher quality as a successful strategy for raising student achievement Nwogbo and Chinwe, (2023) postulated that, even after teachers and graduate, their education is still ongoing.

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✉ abdullahid@ibbu.edu.ng

Ibrahim Badamasi Babangida University, Lapai, Niger State.

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WHAT IS SCIENCE?

Science refers to the study of the world around us by carry out activities inform of observation, examination, measures, interpret data and come out with body of meaningful knowledge. Science is not static or stagnant. However, it is dynamic, testable, discovery and revolutionary. Also, it is guided by attitude, rational, objectives and experiments. Although, the results obtained through the search for truth can be challenged, modified or altered in view of the further explanations and findings. The process adopted by science in the explanation of the truth is known as scientific method. Science through its study helps in bringing a typical change in the attitude of its reader and followers. The development of such attitude is known as scientific attitudes (Mohammed, 2022)

The three main objectives of teaching science

1. To acquire the knowledge of science
2. To acquire the processes of developing scientific skills
3. Acquisition of scientific knowledge (method) and attitude.

IMPACT OF SCIENCE ON THE MODERN LIFE

Science has brought about changes in our ways of thinking, attitude, outlook and life style as such the average span of human life has been double by bringing about a change in health, medicine and sanitation. There is a revolutionary change in communication, transportation, agriculture, engineering, power etc. The material benefits of science are immense and universal. The impact of science is evident in agriculture, industry, health, modern civilization, democracy (Mohammed, 2022)

Mohammed (2017) defined education as the process of developing the cognitive, affective and psychomotor skills through which culture of one's generation is transferred to others which also makes expedient values added to the society. In line with the National Policy on Education (FRN, 2013) the goal of education in Nigeria are the; development of the individual into a morally sound, patriotic and effective citizen as well as development of appropriate skills, mental, physical and social abilities and competencies to empower the individual to contribute positively to the society.

Also, to promote functional education for entrepreneurship skills acquisition, job creation and poverty reduction.

Science education is the process of imparting scientific knowledge and skills to individuals to develop a scientific mindset, critical thinking abilities, and an understanding of the scientific method. Science education is the systematic and intentional teaching of science concepts, practices, and principles to develop students' scientific literacy, inquiry skills, and understanding of the nature of science, (National Research Council 2012).

CONCLUSION

As the demands of education continue to evolve, teachers must continually update their knowledge, teaching strategies, and technological competencies to meet the needs of diverse learners. Professional development ensures that educators remain informed about current pedagogical trends, curriculum changes, and innovative instructional methods that enhance student learning outcomes.

In today's rapidly changing world, students require not only subject-specific knowledge but also critical thinking, problem-solving, and digital literacy skills. To effectively equip students with these competencies, teachers must engage in continuous learning through workshops, training programs, mentorship, and collaborative learning communities. A well-developed professional development framework allows educators to refine their instructional approaches, integrate modern teaching tools, and adapt to new educational policies and reforms.

The research aimed to understand how teachers perceive the relevance, accessibility, and impact of different professional development opportunities in their teaching careers. By examining their experiences, challenges, and expectations, the study sought to highlight the effectiveness of existing programs and identify areas for improvement. Insights from this research can inform policymakers, school administrators, and educational stakeholders in designing more targeted and impactful professional development initiatives that align with teachers' needs and the evolving educational landscape.

RECOMMENDATIONS

The following recommendations were made.

1. In order to raise the academic performance of every student, teachers should work to comply with state and federal accountability requirements by updating teachers' pedagogical and subject-matter knowledge practices.
2. Educators should be given regular opportunities to meet together via workshops, seminars, and conferences, participate in professional development activities, work together, and debate so as to share core standards across grade levels.
3. The Niger State government and other stakeholders in the education sectors should spend more money on the professional development of instructors. Teachers who are yet to benefit from the program should be motivated through heads of departments, principals or subject specialists to attend the subsequent sessions of the workshop.
4. Niger State teachers should attend to seminars, workshops, and conferences after graduation to stay up to date on the latest information. Hence, Niger State government should collaborate with local, national and international as well non-governmental organizations to provide basic school teachers with in-service training. These give them the chance and exposure to brush up on the material they learned during their initial teacher training as well as discover new techniques.

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