DOI https://doi.org/10.5281/zenodo.10049652#181

TWIST, 2024, Vol. 19, Issue 2, pp. 479-482

TWIST

Journal homepage: www.twistjournal.net

Unlocking the Potential: Building a Supportive Ecosystem for Primary School Teachers to Develop their Science Teacher Identity

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Abstract
In today's rapidly evolving world, the role of primary school teachers in laying a solid foundation in science among young learners is more important than ever. Additionally, the advancement of science and its activities all over the world and particularly in Nigeria demands a paradigm shift from traditional to a more contemporary way of teaching science in primary schools in Nigeria. Although, many teachers face various challenges in developing their science teacher identity and delivering effective science education in the classroom. Accordingly, to address this issue, it is essential to establish a supportive ecosystem that can empower and equip primary school teachers with the necessary tools and resources to enhance their science teaching skills. This became necessary at the primary school level where the foundation of science and its activities are being laid for science literacy and science career prospects in our societies. However, there is a need for educational policies that will create what it is to be a science teacher through information, formation, and transformation of science teacher identity. Therefore, this article explores the importance of building a supportive ecosystem for primary school teachers to unlock their full potential in science education. From providing professional development opportunities to creating collaborative networks, a comprehensive approach is needed to nurture and develop the science teacher identity. By doing so, we can ensure that primary school teachers are confident, knowledgeable, and passionate about teaching science, ultimately inspiring their students to become lifelong learners and critical thinkers in the field. The paper discusses;

1. Importance of science teaching in primary school
2. Formation of science teacher identity in primary schools
3. Transformation of science teacher identity in primary school

Keywords
Primary school, Teacher identity, Educational policy, Science teacher

BACKGROUND

Science consists of a body of knowledge and the process by which that knowledge is produced. Also, science provides society with a way of discerning and exploring the environment as well as thinking and knowing about the universe. Murphy, Smith, and Broderick (2019) claims that science is a reliable body of knowledge that provides information and explanations about the world. Moreover, science is the key to the future and the future is in the hands of our children (3P learning, 2020). Primary education according to Momoh (2001) is the foundation for formal education on which the subsequent levels of every education system rest.

Although, the introduction of science into Nigeria primary schools has a lot of achievements with the submission of Aina (2012), but the presence of unqualified science teachers still constitutes a major challenge. However, the previous assertion also corroborates Amadioha (2011) who posits that primary school teachers generally teach all the subjects

offered at this level against what is obtainable in other levels of education. More often than not, the uniqueness of primary school curriculum according to Fitzgerald and Kathy (2016) has put primary science at the mercy of teachers with diverse interpretations of science.

Furthermore, 3P Learning (2020) posits in a document that many primary school teachers are not specially trained to teach science which leads to low confidence in teaching, and less efficiency in science teaching. More so, that learners' prior knowledge, conception, and misconception of science, as well as time allotted to science teaching, constitutes part of these challenges. Subsequently, understanding science being a tool for reasonable life on earth has implications for science teaching at the primary schools which is the elementary level where the foundation of every education is laid.

However**,** in line with the aim of science education, Roberts (2007) posits that primary science teachers should assist students at this level to develop a more consistent understanding of the nature of science and as well prepare them to become scientifically literate citizens and as well capture and engage their interest in learning science. However, achieving such learning outcomes will require policies that can help teachers at this level to have a re-think about science and how this thinking will relate to how science teaching is practiced in primary school classrooms. Also, it will require that primary teachers take responsibility and as well as acknowledge and re-imagine their role as a teacher of science.

Therefore, numerous elements could be considered in making sense of the role of primary school teachers in science teaching but, this work discusses three crucial features that can hereafter provide quality primary school science teaching in Nigeria.

IMPORTANCE OF SCIENCE TEACHING IN PRIMARY SCHOOL

Science is significant to the development of every society and so must be handled as a matter of seriousness at the foundation level (Ewesor and Atomafa, 2009). Primary science is to help children to develop basic scientific ideas and understanding, which will enable them to explore and investigate their world. The teaching of science in primary school involves the development of conceptual understanding, procedural understanding as well as attitudes or dispositions (Avbenahga, 2005). The conceptual understanding is concerned with the development of scientific knowledge, the procedural understanding is all about the scientific process and skill involved in the practice of science while dispositions are about the approaches to whatever scientists are doing.

Scientific knowledge is based on evidence, it is testable, developmental, dynamic, and as well provides new information about the world. Kaptan and Tumurlenk (2012) posits that scientific knowledge is the common heritage of humankind and a treasure with the capacity to proffer solution to many challenges of the world. The procedural understanding according to Santos and David (2017) is all about the skills a child will need to cope with daily situations and are grouped into two types- basic and integrated science process skills. The integrated science process skills are more complex, meant for solving problems in science subjects but basic skills provide a foundation for learning the integrated skills. There are six basic science process skills, namely; observing, communicating, classifying, measuring, inferring, and predicting while the integrated science process skills are six, namely; controlling variables, defining operational, formulating a hypothesis, interpreting data, experimenting and formulating Models.

Science education at all levels makes available some values which are to educate learners on scientific nature that can enhance their involvement in the community life. It also provides information to understand the environment with the practice of scientific methods to develop attitudes that will provoke their critical thinking and actions within the community system. These values among others are rationality, curiosity, open-mindedness, objectivity, aversion to superstition, skepticism, intellectual honesty, accuracy, humility, persistency (Ayodele, 2016; Ataha and Ogumogu, 2013; Pitafi and Farooq, 2012)

Therefore, primary science is the first opportunity to develop children's curiosity about the world and it is designed to affect learner's personal, civic, and economic life.

FORMATION OF SCIENCE TEACHER IDENTITY IN PRIMARY SCHOOLS

The teaching profession seems to attract those who fear science rather than those who love it to take up a teaching job at the primary school level. Besides, it has been discovered that many primary school teachers are seen as deficient because of the difficulties they experience with science teaching (Appleton, 2003). Nevertheless, it is what teachers think, what teachers believe and what teachers do at the level of the classroom that ultimately determines what to learn. Moreover, several factors can influence how teachers think about science but for primary school teachers, as 'generalist' teachers, Fitzgerald and Kathy (2016) see teacher identity as a factor to be considered.

Teacher identity is claimed to be formed as part of the process of learning to teach (Britzman, 2001). Also, it is created from a complex cognitive dimension that involves what teachers know, think, believe, and do (Borg, 2006). Moreover, teachers take on a new identity over time and construct a sense of what it means to be a teacher according to (Britzman, 2003; Clarke, 2008). This process is identified as learning to teach and it is fundamentally constructed from factors such as; experience, skills, subject and pedagogical knowledge, classroom practice, and professional development. However, Fajardo Castañeda, (2011) noted that the formation of identity is the process by which the teacher builds up personal and professional knowledge, develops a sense of being a teacher, and as well maximally converts the cultural and contextual paradigms that frame the meaning of teaching.

TRANSFORMATION OF SCIENCE TEACHER IDENTITY IN PRIMARY SCHOOL

Teacher Identity is formed by how a teacher participates and seeks to acquire knowledge and skills (Battey and Franke, 2008). Teacher identity is continually being informed, formed, reformed, and transformed as individuals develop over time and through interaction with others. More so, Chen (2019) claims that elementary teacher Identity Construction in learning to teach science does not only involve an accumulation of knowledge and skills, but it is a process of becoming a certain kind of person in a community of practice. Furthermore, as the teacher participates and engages in science teaching, the formation and transformation of who the teacher is will be made possible through experiences and social interpretations (Kane and Varelas, 2016).

Therefore, considering science teaching as a process of becoming a member of a defined group of practitioners with skills, teacher identity forms how the teacher participates and the knowledge and skills the teacher acquires. Teacher identity is not only initially formed, but also is changing as a complex and on-going process that is constantly being affected as a teacher grows, gains experience and becomes part of a network of other teachers. Therefore, teacher identity is created by multiple perspectives that come together as a whole (Wilt, 2013). Teacher identity formation is linked to Transformative learning theory (Mezirow, 2000), an idea that socialization is learning to teach rather than solitary pursuit is central to identity formation (Carver, 2016).

Transformative learning theory according to Mezirow (2000) captures the various phases of teachers' knowledge and skill expansion through activities such as dialogues, journal writing, structured reading and discussion, case studies, problem-solving with support from a community of peers. In this case, beliefs and actions are transformed when the teacher gains confidence through the process of adopting and adapting new perspectives in science teaching, and ultimately, change results when these new understandings and perspectives lead to action.

CONCLUSION

Teacher identity arises out of participation and intervention and in this case, science teachers will constantly construct and reconstruct, form, reform, and transform who they are, who they become, and who they want to be as a science teacher as they participate in science teaching (Avraamidou, 2018). However, it has been confirmed that many elementary schools teachers dislike, fear, and are intimidated by science based on their peculiarity, and often do not have strong relations to or identify with science as a subject matter. They developed negative, stereotypical views of science and science teaching from their past experiences with learning science, and consequently, being a science teacher is not the kind of teacher they would like to be (Mensah, 2016).

Therefore, a professional development program for primary school teachers must support them in constructing and reconstructing science teacher identities by scaffolding opportunities to participate in positive, collaborative science teaching and learning experiences to build their self-confidence and comfort with science teaching. They also need to be provided with space for self-reflection and reexamination of who they are and are becoming science teachers and developing a sense of urgency to effectively participate in teaching science.

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