

## Teacher Education and Development: The Way Forward in Repositioning Education in the 4<sup>th</sup> Industrial Revolution

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**Abstract:** This paper investigated the rationale for teacher education and professional development in repositioning education in the 4<sup>th</sup> industrial revolution in Enugu State, Nigeria. Two research questions were raised to guide the study. A descriptive survey design was employed as the research design for the study. The population of the study is made up of 60 respondents selected across all levels of education, comprising 20 teachers each drawn from 2 public and 2 private schools across all levels of education in Enugu State. Structured questionnaire was the instrument for data collection. The sample size is the same as the population of the study because the size was manageable, the whole population was studied. The collected data was analysed using frequencies and percentages. The findings of the study state that most teachers across all levels of education both private and public schools have the desire to adopt advanced technologies, to help them develop themselves professionally, promote their students' academic excellence, make them better teachers, and as well enhance their intellectual growth. Based on these findings, the study recommends that the educational system should as a matter of necessity, enlighten, motivate, and embolden teachers across all levels of education on the need to link these technologies and smart devices to teaching and learning to promote teacher education and teacher professional development.

**Keywords:** Teacher education, teacher professional development, repositioning education, Fourth industrial revolution

### Introduction

Today, Information and Communication Technology (ICT) are changing the teaching and learning processes, therefore, the educational system should as a matter of necessity wake up to adopting these new advanced technologies to enable them to train and re-train teachers as well as connect these technologies to teaching and learning (Saroj, 2020). The incessant change which today's society is embracing is amazing, and only those who adapt to these changes stand to benefit from it. The world has gone through different revolutions which were relevant to different spheres of society, from analogue base to digital base and to the most recent advanced digital base characterized by the 4<sup>th</sup> industrial revolution.

The fourth industrial revolution refers to a range of new technologies that are blending the physical, digital, and biological worlds and impacting disciplines, including education. This developing society represents very fast changes affecting the way we live, learn, work and relate with one another as a result of the adoption of cyber-physical systems. The fourth industrial revolution comprises disruptive technologies such as Smart devices,

Robotics, Big Data, 3D printing, Internet of Things (IoT), Virtual reality (VR) and Artificial Intelligence (AI) which affect our perceptions, work places and learning centres (Ajah and Chigozie, 2019). Since the advancement in technological devices, information and innovation in education took a different turn, where teachers' professional growth, improvement and opportunities increased drastically.

Linking these technologies to education, it is paramount that teachers should be provided with trainings about the processes of extracting useful information from these disruptive technologies and smart devices to enable them connect it to teaching and learning (Day, 2020). Teacher education and professional development are key elements to preparing teachers, not only those who have professional competencies but those who have the desire to becoming better teachers (Saroj, 2020). Saroj (2020) further stated that the quest to grow and upgrade in one's profession is an innate feelings which stirs up to pave way for its accomplishment.

Teacher education encompasses the knowledge, skills and abilities which are relevant to the life of a teacher as a teacher, this is very significant in the development of teachers that desire to grow and impact positively in the formation of their student. The basic thrust of teacher education is to inculcate into teachers, the content knowledge of what is to be taught to learners, because teachers who lack knowledge and understanding of their subjects matter are likely to have misrepresentations to their students (Kumar, 2020). Teacher Education could be perceived to be procedures and policies which are designed to prepare the would-be-teachers with knowledge, attitude, behaviours and skills needed to perform their tasks effectively in the profession (Chikelu & AmaechiAni, 2023). Teacher education also signifies the professional education acquired by teachers to equip them in their profession.

Encouraging innovation in teaching and learning, curriculum development and teaching practices are progressive elements towards teacher education and development in Nigeria (Guskey, 2022). Guskey (2022), further stated that teachers' desire for professional growth should be motivated and encouraged by their support systems such as their institutions and immediate environments, to elicit their success in this professional journey. Creative, civilized and innovative society could be achieved through teacher education and professional development, this is because creativity and innovative ideas are part of a productive mind (Han, 2016). Professional development of teachers is perceived to be a long-term complex process of quantitative changes in teaching, aimed at teacher performance improvement in the classroom and ensuring student's success (Guskey, 2022). Professional development of teachers centers on the effective means for improving teaching quality and student's learning outcome (Bicaj & Treska, 2014).

Teacher's professional activities must not focus on individual content only but must bear in mind the student's intellectual, spiritual, physical, moral, social and cultural well being. Professional development of teachers encompasses the knowledge of their subject matter, understanding the pedagogy and teaching techniques in teaching and learning which are required to perform their professional functions (Singha & Sikda, 2018). The purpose of the teacher development is to systematically change the teaching methods and approaches, teacher beliefs, attitudes and perceptions which bring about wholesome learning outcomes for the students (Kelly, 2015). These changes in student outcome results from applying new teaching procedures, improved instructional approaches, new technologies and new curricula, all these are parts and parcel of teacher professional development (Kelly, 2015). Singha and Sikda, (2018) argues that teacher development contributes the yardstick for improving the quality of education and students learning, this is because as a teacher expands his knowledge

base, he acquires best teaching techniques and new procedures to enhance his students learning outcomes and better teaching qualities.

Teacher education and development is centered on employing those procedures, methods and techniques that could improve the professionalism and responsibilities of a teacher in carrying out her work (Ogunyinka et al, 2015). Some of these approaches, methods and techniques include: continuous learning, autonomy, clear expectations, reflective teaching, professional associations etc. These approaches are solely the business of the teacher because it all depends on the efforts of the teacher as an individual to get them accomplished.

Continuous learning helps to encourage teachers to pursue and upgrade on their education and training to stay relevant, updated and be an expert on their subject matter. Autonomy gives the teacher the freedom to design and deliver the curriculum content in ways that best meet the needs of their students. Clear expectations enable teachers to establish clear goals, expectations and standards for teacher performance and student learning outcomes. Professional Associations encourage teachers to participate in professional associations and networks, to help them stay connected with colleagues and stay updated isn industry developments.

Reflective teaching is perceived to be one of those approaches which could improve the professionalism, autonomy and responsibilities of a teacher. Reflective teaching refers to a process of teaching through which the teacher reminds himself of what he is doing and why he is doing that (Barlett, 2021). Han(2016) states that reflective teaching is when a teacher looks at what he does in the classroom, thinks about why he is doing that and thinks if it works. Han (2016) further states that reflective teaching is a process of self-observation and self-evaluation, which comprises an act of recognizing, examining and ruminating over the way the teacher, teaches. Reflective teaching contributes to the changes and improvement on how the teacher handles his classroom and teaching methods. Barlett,(2021) observes that reflective teaching guides the teacher on how to look at his professional behaviors and practices with the intention of improving and developing them, it should act as a beneficial form of teacher professional development at different levels of teaching and learning.

The growth and advancement of technologies and smart devices in the fourth industrial revolution has made every profession including education to upgrade to its utmost level. It is widely accepted that excellent professional development is essential to improving education, the revolution has brought about significant changes in the definition and redefining of teacher education and professional development (Ogunyinka, Okeke, & Adedoyin, 2015). The advancement of advanced technologies have broken down the old concept of ‘Jug to mug’ theory of teaching thereby bringing teaching and learning to students centered where the teachers are facilitators of students’ developments.

Training and re-training of teachers is considered to be very paramount in teaching profession, these professional trainings do not only improve their activities but equip them with adequate skills and knowledge to perform their professional functions (Evans, 2018). The direction and perception on good teaching and good education have shifted towards focusing on effective pedagogical practices and technologies which promote active learning, critical thinking, problem solving and creativity among students. These advanced technologies provide training on how to effectively use digital tools, online resources and educational software to enhance teaching and learning outcomes (Ajah and Chigozie, 2019). Integrating technology into teacher education and teacher professional development enhances accessibility, flexibility and effectiveness, where online platforms, virtual reality, simulation and AI (Artificial intelligence) driven tools could provide personalized learning experiences for teachers and students alike.

Having the desire to become a contemporary teacher is all embedded on the teacher's preparations, knowledge of subject matter, teaching techniques and having well defined pedagogical approaches cum technological devices to facilitate the students' academic performance, these are what teacher education and professional development address. The gap which this study intends to fill is to investigate the specific competencies and skills required for teachers to effectively integrate emerging technologies and 4<sup>th</sup> industrial revolution skills into teaching and learning.

### ***Statement of the Problem***

Though, teacher education and professional development of teachers could be perceived to be relative, in terms of individual's interpretations and understandings, its relativity could be a challenge which could either hinder or promote growth and development of teachers in different levels of education in Enugu state. The act of being stagnant in ones profession might not be intentional, rather it could be attributed to some constraining factors such as financial instability, lack of promotion on the part of the institutions concerned, ignorance, lousiness and rigidity towards growth on the part of the individual. These factors contribute to the educational system not growing progressively like every other profession.

In different levels of Nigeria's educational system, either private or public sector, there are hindrances that contribute to the slow rate of teachers' professional development. These hindrances could be as a result of denial or refusal to grant occupational/job promotions at its appropriate time by the institutions concerned, these goes a long way to discouraging the desire and zeal of an average teacher in the development and growth of his profession. Teachers sometimes face the challenges of lack of professional development opportunities by their support systems, such as their institutions and immediate environments which should act as motivational factors to encourage them as they delve into the professional development process.

The problem of this study is to investigate the rationale for teacher education and teacher professional development towards achieving the needs and goals of the students and the wider society, using the advanced technological devices and pedagogical approaches in Enugu State, Nigeria.

### ***Purpose of the study***

The main purpose of this study is to address the rationale for teacher education and teacher professional development towards achieving the needs and goals of the students and the wider society, using advanced technological devices and pedagogical approaches. The specific objectives were:

- 1) Ascertain the relevance of teacher education and teachers' professional development on the students' academic performance across all levels of education in both private and public schools.
- 2) Find out the effective ways to boost the desire for teacher education and teacher professional development across all levels of education in both private and public schools.

### ***Research Questions***

- 1) What is the relevance of teacher education and teacher professional development on students' academic performance across all levels of education in both private and public schools?
- 2) What are the effective ways to boost the desire for teacher education and teacher professional development across all levels of education in both private and public schools?

### ***Methodology***

The research design for this study is a descriptive survey research design. This study was carried out in Enugu Metropolis in Enugu State which comprises three local government areas namely, Enugu North, Enugu South,

and Enugu East local government areas. These local government areas are among the 17 local government areas in Enugu State and 774 local government areas in Nigeria. The population of this study is 60 respondents comprising 20 teachers each drawn from 2 public and 2 private schools across all levels of education. The sample size was the same as the population of the study because the size is manageable, sizeable, and accessible. Therefore, there was no need for sampling.

A structured questionnaire was used for data collection in this study which consists of 15 items in two sections, 5 items in section A which represent the personal data of the respondents, and 10 items in section B which represent the substantive issues of the study derived from the research questions. The researcher administered and collected the questionnaires by herself. Frequencies and percentages were used to analyse the data collected from the field.

**Result**

*Research Question one*

What is the relevance of teacher education and teachers’ professional development on students’ academic performance across all levels of education in both private and public schools in Enugu State?

**Table 1**

*Relevance for Teacher Education and Professional Development*

s/no	Responses	Frequency	Percentage
1	Enhances Teachers’ intellectual abilities	9	15
2	Expand teachers’ knowledge base & make them better teachers for themselves and their students in all ramifications, be it intellectual, social, moral, cultural, etc	31	51.7
3	For promotions, salary increases, incentives, and allowances	10	16.7
4	Promotes effective teaching and learning environments	4	6.7
5	Develops students’ critical thinking abilities & analytical skills	6	10

*Source: Field survey, 2024*

Responses from Table one above indicate that over half of the respondents, representing 51.7% believe that the relevance for teacher education and professional development encompasses the expansion of teachers knowledge base which gives them the opportunity to learn widely not only on their subject areas but also across other disciplines, adopting best approaches to teaching and learning with advanced technological devices, making them better teachers, not only for themselves but also for their students. This is followed by other respondents, representing 15%, 16.7%, 6.7% and 10% respectively, who are of the opinion that the relevance for teacher education and teacher professional development could be viewed separately.

*Research Question Two*

What are the effective ways to boost the desire for teacher education and teachers’ professional development across all levels of education in both private and public schools in Enugu State, Nigeria?

**Table 2**

*Effective ways to boost the desire for teacher education and teacher professional development*

s/no	Response	Frequency	Percentage
1	Through enlightenment campaigns such as workshops, seminars, and conferences	12	20
2	Establish a recruitment policy across all levels of education for both private & public schools	5	8.3
3	Investing in teacher' professional development boosts their morale	8	13.3
4	Providing teachers with new teaching & learning techniques & advanced technologies could boost their desire to grow professionally	11	18.3
5	All the above options are all-inclusive to boost the desire for teacher education and teacher professional development	24	40

*Source: Field survey, 2024*

Responses from Table two above indicate that over two-thirds of the respondents representing 40% think that effective ways to boost the desire for teacher education and teacher professional development could be compounded not really in a single way but in a variety of ways. This is followed by other respondents who believe that effective ways to boost desires for teacher education and development could be viewed separately.

**Discussion of the Findings**

The findings concerning research question one indicate that the relevance for teacher education and teacher professional development encompasses the expansion of teachers' knowledge base which allows them to learn widely not only in their subject areas rather across other disciplines, adopting the best approaches to teaching and learning with advanced technological devices, making them better teachers, not only for themselves but also for their students. This could be explained in line with Singha and Sikda (2018), who observe that the professional development of teachers encompasses the knowledge of their subject matter, understanding of the pedagogy, and teaching techniques in teaching and learning which are required to perform professional functions. This also corroborates with (Saroj, 2020), who states that teacher education and professional development are key elements to preparing teachers, not only those who have professional competencies but those who have the desire to becoming better teachers.

Findings regarding research question two indicate that the effective ways through which teachers’ desires could be boosted towards teachers’ professional development should not be acquired through a single way, but rather, by varieties of ways. This could be explained in line with Guskey (2022), who observes that encouraging innovation in teaching and learning, curriculum development, and teaching practices are progressive elements of teacher education and teacher professional development in Nigeria. Similarly, Evans (2018) opines that training and re-training of teachers in the educational system through seminars, workshops, and conferences have been considered very important parameters in the teaching profession.

**Conclusion and Recommendations**

Teacher education and the professional development of teachers are contributory factors towards the successful repositioning of education in the 4<sup>th</sup> industrial revolution. This success could be attributed to how teachers are trained on how to link these advanced technological devices characterized by this revolution to effective teaching and learning. Since the advancement of the teaching profession is centred on the educational formation of students, teacher education and professional development are lifelong and ongoing processes wherein teachers are required to improve their knowledge, master new skills, and modify their teaching practices (Ogunyinka et al, 2015). Teachers who have the desire for growth in their profession are always perceived to be ‘extraordinary teachers’, this is because they know what to teach, how to teach, and how to improve, for such teachers, their passion are centred on four things, learning, mastery in their field, their students and their teaching strategies (Ogunyinka, et al, 2015).

Based on the findings of this study, these recommendations were made:

1. Teachers should be open to opportunities to acquire and adopt the best approaches for effective teaching and learning at all levels of education in this 4<sup>th</sup> industrial revolution.
2. The government and institutions concerned should enlighten the teachers on the rationale for teachers' professional development as a parameter for the students' wholesome academic performance.
3. The government and the institutions concerned should act as support systems to help motivate teachers as they delve into their professional development process.
4. Teachers should be allowed to be trained and re-trained in new and advanced technological devices to facilitate their use in teaching and learning.

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