

**INFLUENCE OF TEACHERS' CONTINUOUS PROFESSIONAL DEVELOPMENT  
ON STUDENTS' ACADEMIC PERFORMANCE IN BIOLOGY**

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**DECEMBER, 2025**

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**A RESEARCH PROJECT SUBMITTED TO THE DEPARTMENT OF  
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**DECEMBER 2025**

## CERTIFICATION

We, the Undersigned, certify that this research work was carried out by Joan Chidera EMEKA, in the Department of Curriculum and Instructional Technology, Faculty of Education, University of Benin, Benin City, Nigeria.

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## **DEDICATION**

This Work is dedicated, to God Almighty, whose Strength and Grace saw me throughout the duration of my academic journey.

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## TABLE OF CONTENT

TITLE	PAGE
<b>CERTIFICATION</b>	iii
<b>DEDICATION</b>	iv
<b>ACKNOWLEDGEMENTS</b>	v
<b>ABSTRACT</b>	viii
<b>CHAPTER ONE:INTRODUCTION</b>	1
Background to the Study	1
Statement of the Problem	4
Research Questions	5
Purpose of the Study	6
Significance of the Study	6
Scope and Delimitations of the Study	8
Definition of Terms	8
<b>CHAPTER TWO: REVIEW OF RELATED LITERATURE</b>	9
<b>THEORETICAL FRAMEWORK</b>	9
<b>PEGADOGICAL CONTENT KNOWLEDGE THEORY</b>	9
Theory of Academic Performance	11
Concept of Continuous Professional development	11
Teachers' Continuous Professional Development and Students' academic performance in	
Biology	14
Impact of Teachers' Professional Development	18

Limitations to Continuous Professional Development	21
Empirical Studies	22
Summary of Reviewed Literature	25
<b>CHAPTER THREE: METHODOLOGY</b>	<b>27</b>
Design of the Study	28
Population of the Study	28
Sample and Sampling Techniques	28
Validity of the Instrument	29
Reliability of the Instrument	29
Method of Data collection	29
Method of Data Analysis	29
<b>CHAPTER FOUR</b>	<b>30</b>
<b>PRESENTATION OF RESULTS AND DISCUSSION OF FINDINGS</b>	<b>30</b>
Presentation of Results	30
Discussion of Findings	41
<b>CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS</b>	<b>43</b>
Summary	43
Conclusion	44
<b>REFERENCES</b>	<b>46</b>
<b>APPENDIX</b>	<b>50</b>

## **ABSTRACT**

This study investigates the Influence of Continuous Professional Development (CPD) on students' academic performance in Biology in Ovia North-East Local Government Area of Edo State, Nigeria. The purpose of this Study was to determine the extent to which Continuous Professional development programs attended by Biology teachers influence their instructional delivery and subsequently enhance their students' academic achievement.

The design adopted in this study was a quantitative descriptive survey research design was adopted for the study. The population comprised 50 Biology teachers in the 26 public secondary schools within Ovia North-East LGA, while a purposive sample of 50 teachers was randomly selected for data collection. The standard Instrument used to gather data was a structured questionnaire which assessed teachers' participation in CPD, the effects on their students, the challenges that limit them and recommendations and suggestions to improve CPD for Teachers. The Questionnaires was validated by two lecturers in the faculty of Education. The reliability was establish using the Cronbach alpha's method. Descriptive statistics such as frequency counts and percentages were employed to analyze the data.

The Findings revealed that most Biology teachers regularly engaged in CPD activities, including workshops, online courses, and peer collaboration, and that these programs significantly improved their teaching competence. However, limited institutional support, inadequate funding, and lack of incentives were identified as challenges hindering CPD accessibility and effectiveness. Based on these findings, it is recommended that school administrators and Education policymakers invest more in CPD programmes by providing regular training opportunities, resources, and incentives to motivate teachers. Such efforts are essential in improving Biology teaching and learning experience, and fostering academic success among secondary school students.

## **CHAPTER ONE:**

### **INTRODUCTION**

#### **Background to the Study**

Biology is a natural science that focuses on the study of predominantly living things. It is also concerned with the structure, functions, origin, development, evolution, distribution, interrelationships and adaptations of living things, among other aspects of their existence. Biology provides part of the literary knowledge needed for national growth and development. It gives explanations to body anatomy and physiology, health issues, understanding of microorganisms around us, the effects of microbes and how to control them. Biology also serves as the background and foundation for students interested in pursuing advanced education in medicine, dentistry, pharmacy, toxicology, veterinary medicine and all other science-related courses. It also nurtures scientific awareness and serves as a pathway to various career opportunities in the Society.

Biology, as a discipline, would not be very relevant if there is no solid education to groom it. The reason is not far-fetched. The development of a country is hinged on solid education. Education develops critical thinking and problem solving skills that empower students to make informed decisions for personal and national progress (Habitat Broward, 2025). To improve the educational standards of students in Biology, teachers ought to engage in activities that involve the implementation of new programs and innovative ideas that have an

impact on students' learning. The curriculum and educational system keeps changing regularly and it's important for teachers to stay up-to-date with this dynamic educational system. This can perfectly be done through Professional development.

Professional development involves activities aimed at improving a professional's understanding, competence, and abilities in their field. It can include training courses, mentoring, seminars and peer review, which play a crucial role in improving teaching quality.

A Professional development program is supposed to be a continuous, focused, daily learning for teachers individually and collectively (Sodan, 2017). It is also because teachers need to develop subject-matter knowledge, pedagogical knowledge, technical knowledge, new skills, motivation, and competencies in their respective teaching subjects in order to improve their expertise in the classroom as well as their positions in the school system (Ayoubi et al., 2017; Mapulanga and Chituta, 2018; Shaaban and Abou, 2018; Komba and Mwakabenga, 2019; Mapulanga et al., 2023).

The impact of Continuous Professional Development on Biology teachers, and consequently on student academic performance, is a crucial area of educational research. According to previous studies, Continuous Professional Development (CPD) has had an impact in improving science learning outcomes including Biology subjects (Lam, 2015). It aided Biology Teachers in developing their professional aptitudes, capabilities, and expertise (Martin, 2015).

Biology, as a fundamental science subject, holds a crucial position in the educational curriculum shaping students' understanding of living organisms and the natural world (Abiodun, 2021). It is a constantly evolving field, and Continuous Professional Development ensures teachers remain up-to-date with the latest research, discoveries, and advancements in biological sciences. Continuous professional development (CPD) is critical for secondary school teachers to maintain their teaching effectiveness and keep their teaching practices up-to-date. When executed properly and with the appropriate materials, Continuous Professional Development programs have the potential to develop teachers' to the point where they can completely and positively impact students' performance academically. Effective CPD can enhance teachers' content knowledge, and classroom management, leading to improved student learning outcomes. It also offers opportunities for teachers to enhance their content knowledge, refine their pedagogical skills and stay abreast of advancements in Biology education. CPD program offers opportunities to experienced and novice (beginner) teachers to acquire new learning, exploration, growth and development skills. By investing time and effort in Continuous Professional Development, teachers can provide a better learning experience for their students and ensure that they are well-equipped to meet the challenges of a rapidly changing educational landscape.

This study therefore seeks to ascertain the extent to which Biology teachers' are keeping abreast with modern innovations.

## **Statement of the Problem**

Despite the growing relevance of, and interest in Biology, by both teachers and students, it's been discovered that students still perform poorly in the subject. One of the major cause of students' poor academic performance in Biology has been linked to inadequate content knowledge of their teachers, which is caused by lack of continuous professional development.

It is very obvious that students' poor performance and teachers' professional development are interconnected issues in education. In general, the level of teachers' pedagogical content knowledge (PCK) affects how they comprehend the subject matter and the knowledge of the students (Lucenario et al. 2016)

Nigeria faces challenges in providing widespread access to high quality Professional Development programs for Biology teachers (Ajaja, 2017). Due to disparities in learning and inequality across all states in Nigeria, most students in rural regions of Nigeria are not equipped with adequate content knowledge because their teachers are not up-to-date with the changing curriculum and modern Biology skills. These teachers in rural regions lack Continuous PD, because their schools, due to inadequate resources, poor infrastructure and other factors cannot afford them the privilege of effective PD.

Several studies have established that good teaching quality are the key factors that affect students' interest in Biology (Steidtmann et al., 2022). But when these teachers lack adequate continuous professional development, they'll lag behind in teaching and learning and this will in turn prevent them from helping learners during Biology content learning, assimilation and understanding.

### **Research Questions**

The following research questions were raised to guide the study;

1. What is the current level/state of Professional development undergone by teachers?
2. In what ways do Continuous professional Development programs, by teachers, influence students academic performance in biology?
3. What are the challenges that limit effective access to Continuous professional Development for teachers?
4. In what ways can effective Continuous professional development programs be made available for teachers, in order to enhance students' learning?

## **Purpose of the Study**

The purpose of this study is to determine the Impact of Teachers' continuous professional development on Students' academic performance in Biology. In general, the aims of this study include:

1. To determine the current Level/State of Professional development of Biology teachers
2. To examine the Impact of Teachers' Continuous Professional Development on Students' academic performance in Biology
3. To identify the challenges limiting the effective access to professional development programs, for teachers
4. To recommend strategies for effective access to continuous professional development programs for teachers in order to enhance students learning

## **Significance of the Study**

This research study is relevant and beneficial in the society and for various stakeholders in the educational sector.

To the society at large, this research helps to enliven the relevance of Professional development in Biology. Biology is a very core course that plays an important role in healthcare, biotechnology, zoology, environmental management and agriculture. Students are

motivated and encouraged to pursue careers in these courses, if they're well grounded in Biology. Therefore, the findings of this research would enable the equipping of highly skilled and competent professionals who would also contribute to the development and progress of the society.

To Educational policy makers and curriculum developers, this study reveals evidential insights into the Impact of Teachers' Professional development programs on Students' academic performance in Biology. This revelation would enable them to make informed decisions and also facilitate the allocation of resources to adequately fund Continuous Professional development programs.

To school administrators and principals, this study emphasizes the need for provision of an environment where learning is encouraged, not just for students, but for their teachers too. It stresses the fact that schools should play their role in ensuring in training teachers by providing access to Professional development programs.

To Biology teachers, this research study stresses the fact that they need to constantly upgrade their professional skills and content knowledge in the field of Biology. It also explains how constant participation in workshops, seminars, in-service training and other continuous professional programs enables them to effectively deliver accurate and interesting lectures to their students.

In summary, this research seeks to improve the standard of Biology education by emphasizing the need for Teachers' continuous professional development in improving academic performance of students.

### **Scope and Delimitations of the Study**

This research would be based specifically on investigating the impact of Teachers' Continuous professional development on the academic performance of Biology students in all the secondary schools in Oviah North East Local Government area of Benin City. It is delimited to public senior secondary schools.

### **Definition of Terms**

1. Continuous Professional Development: As used in this study, they refer to ongoing academic programs by which teachers' pedagogical skills are enhanced and content knowledge increased.
2. Pedagogical skills: These refer to a teacher's ability to not just instruct their students, but also to effectively manage the classroom.
3. Academic performance: This refers to the measured traits of a student's ability in a particular subject or course of study.

## **CHAPTER TWO**

### **REVIEW OF RELATED LITERATURE**

The Review of related literature is presented under the following sub-headings;

1. Theoretical Framework
2. Concept of Continuous Professional Development
3. Teachers' Continuous Professional Development and Students' Academic Performance in Biology
4. Impact of Teachers' Professional Development
5. Limitations to Continuous Professional Development
6. Empirical Studies
7. Summary of Reviewed Literature

### **THEORETICAL FRAMEWORK**

In this part, two main theories are described. They are;

#### **PEGADOGICAL CONTENT KNOWLEDGE THEORY**

This theory was established by Lee Shulman, an Educational Psychologist, in 1986. It is identified as a blend of both Content knowledge and pedagogical knowledge. It is a type of knowledge in which teachers relate their pedagogical knowledge (what they know about

teaching) to the subject matter knowledge. It indicates a teachers' ability to transform content knowledge so that it suits the needs of different learners.

According to Shulman, Pedagogical content knowledge is a part of Teachers' professional criteria. It is what Biology teachers need to effectively teach Biology as they strengthen it with the aid of Professional development. Its framework serves as the fundamental basis for teachers to enhance their Pedagogical skills (teaching practice) as well as professional development in Biology.

This theory is very useful for studying how Teachers' Continuous Professional Development influences students academic performance in Biology.

According to the PCK theory, CPD is not just knowing what to teach in Biology, it involves knowing how to teach some complex topics like Evolution, Genetics etc in a way that would ignite students' interest and enhance their better performance in the subject. It helps teachers to be able to discover and address common misconceptions and abstract ideas in Biology. It also creates room for teachers to improvise. With adequate Professional Development, teachers are being introduced to new models, simulations etc that would enable them make their classroom lessons more student-centered.

## **Theory of Academic Performance**

This theory of academic performance was developed by Elger (2007). The theory emphasizes 6 different basic concepts that inform a framework for describing performance and performance improvements. These frameworks include level of identity, level of knowledge, personal factors, context, level of skills, and fixed factors. According to this theory, performing involves producing valuable results. Performers can be individuals or groups of people engaged in combined efforts.

Improving performance is a gradual process, and performance reflects the capacity developed throughout that journey. The academic department plays a significant role in influencing performance levels and facilitating effective learning for learners. Creating an effective academic culture and conducting research also contribute to performance. CPD for teachers also focuses on their work in departments. As teachers increase their performance levels, they gain the ability to deeply enhance learning levels, develop skills, and establish meaningful connections within their discipline while investing less time in the process.

## **Concept of Continuous Professional development**

As we head to the mid-point of the 21st century, economies and societies across the globe find themselves needing to urgently respond to the emergence of new technologies such as the rise of Artificial Intelligence and automation in the workplace, new ways of accessing knowledge, as well as ever-present emergencies such as climate change, the rise of populism

and health crises (Brown et al., 2022). The emergence of digital tools and a variety of other reasons have caused a dramatic change in the teaching profession in the 21st century. As a result, among other things, the complexity of the 21st century necessitates that teachers pursue ongoing professional development to avoid becoming irrelevant and alienated (MINEDUC, 2019).

Darling-Hammond, Hyler and Garner (2017) define effective professional development as structured professional learning that leads to changes in teacher practices and improved student learning outcomes. The phrase, 'Continuous professional development' refers to ongoing education or learning processes that professionals pursue. It is the professionals' all-encompassing dedication to improving their own abilities and competence throughout their employment (Malmberg -Heimonen et al., 2016). It helps professionals improve in their work.

Professional development is formal in-service training to upgrade the content knowledge and pedagogical skills of teachers. It is widely viewed as an important means of improving teaching and learning standards (Meichenet al., 2017). Effective Professional Development is structured on Professional Learning which results in changes to teacher knowledge and practices and consequently, improvements in students learning outcomes (Hyler, Gardner. 2017). In Biology, teaching and learning process, CPD helps teachers move beyond mere memory and recall to higher -order thinking, promoting deep and enduring learning (Likisa, 2018).

The Learning Policy Institute (2017) asserted that effective professional development incorporates most of the following:

- Finds out if the content focuses on professional training that focuses on teaching strategies associated with specific curriculum content that supports teacher learning in the context of classroom teachers
- Integrates active learning: Active learning directly engages teachers in designing and testing teaching strategies, giving them the opportunity to engage in the same learning style they design for their students.
- Supports collaboration: High-quality continuing professional development (CPD) creates a space where teachers can share ideas and collaborate in their learning, often in employment-integrated contexts.
- Offering expert coaching and support: Coaching and expert support involves sharing expertise on evidence-based content and practices, focused directly on the individual needs of teachers.
- Offers feedback and reflection: High-quality professional learning often allows teachers to reflect, receive feedback, and make changes to their practice by facilitating reflection and soliciting feedback.
- Is of extended duration: An effective CPD gives teachers sufficient time to learn, practice, implement and reflect on new strategies that facilitate changes in their practices.

## **Teachers' Continuous Professional Development and Students' academic performance in Biology**

Teacher learning is a dynamic and ongoing process encompassing interconnected opportunities contributing to their professional development, whether in pre-service or in-service contexts (Darling-Hammond, 2017; Sancar et al, 2021).

Most schools in the world, even in Nigeria require Biology teachers to possess some certain degree of Professional development and educational qualification in the subject. In some countries, there is the Teaching licensure, whereas the TRCN certificate is required in Nigeria. It was stated in the University Basic Education Annual Report of 2005 that since teachers are expected to continuously find ways of making learning more meaningful to learners and promoting effective use of innovative materials in classroom situations, thereby sharpening their pedagogic skills in the school system, it requires that teachers need Continuous Professional Development in form of in-service training.

The shift in teacher professional qualification reflects a broader acknowledgment of the multifaceted role teachers play in facilitating students' learning. (Bold et al., 2017; Keiler, 2018; Popova et al., 2022). This is to lay more emphasis on the fact that teachers are major

facilitators in a classroom since they are more or less mentors and role models to students. The Federal Ministry of Education, (2014), in conjunction with the Teachers Registration council of Nigeria have categorized individuals with the following certificates and degrees as those professionally qualified to teach in Primary and secondary school system as a teacher; T.C.II, N.C.E, DIP.ED, B.ED, S.A (ED), B.SC (ED), PGDE and M.ED. Rigorous teacher development processes contribute significantly to improved teaching practices and positively influence students' learning outcomes (Tantawy, 2020; Ulla, 2018). This may be because professionally qualified and developed teachers have undergone extensive training and demonstrate enhanced abilities in implementing diverse teaching methods successfully (Saira & Hafeez, 2021).

Their ability to apply various teaching techniques is aligned with acquired pedagogical knowledge and skills, leading to higher academic achievements in students (Wuryaningsih et al., 2019).

Notably, becoming a teacher involves more than just practice; it encompasses understanding subjects, theories, different teaching methods, and students' psychology (Orchard and Winch, 2015). Teacher training now includes courses like pedagogies for specific subjects, where trainee teachers learn how students learn (Popova et al., 2022). It is about engaging students in the learning process and empowering them to take responsibility for their learning

(Fonteijn, 2014; Popova et al., 2022). The goal is to equip trainee teachers with the skills to ensure student learning in the classroom, addressing their specific needs.

The pivotal role of teacher qualification in student achievement remains a subject of ongoing debate. Some argue that having a qualified teacher significantly influences students' performance in core domains such as literacy and numeracy (Croninger et al., 2007; Đerić et al., 2022). Lisa et al. (2020) have stated that when high-quality teacher professional development is provided, teachers' knowledge and skills improve and there is a change in their attitudes and beliefs that has the potential to positively impact students outcome.

Sources explain teacher qualification as an important factor for student satisfaction more than the experience of a teacher and student satisfaction is important to uplift their learning (Aslam et al., 2016; Ekmekci & Serrano, 2022). At the same time, others contend that qualifications alone are insufficient; the experience and expertise of the teacher also matter (Burroughs et al., 2019; Guo et al., 2012).

However there remains an unequal distribution of highly qualified and experienced teachers. It has formed a disparity between rural and urban areas in Nigeria. For instance, in Nigeria, qualified teachers often prefer urban cities, leaving rural areas with a lack of quality learning, same is the case in Pakistan (Ali et al., 2023; Taiwo & James, 2015). Thus, it is not just about obtaining qualified teachers; it is also about ensuring that all schools have equal opportunities. Teachers' Continuous Professional development is not just an investment in teachers; it is

also an investment in the future of students. Kelin and Thornton (2021) showed that teacher professional development has a significant impact on student reading ability.

During the Continuous Professional Development (CPD) process, teachers gain a new understanding of teaching and learning, new beliefs, new teaching methods and new materials for student learning, as well as the ability to develop not only professionally, but also socially and personally. As is the case with most teachers, they also encounter many of the blockages they face before achieving successful professional development (Ucana, 2016). To elucidate the consequences of teacher professional development for students' learning achievement, Borg maintained that teacher professional development is linked to improved student achievement. To him, teachers who regularly engage in formal and informal experiences of professional development are more successful in raising their students' learning attainments. It is mostly because such experiences bring about favorable changes in teachers' subjective knowledge and instructional skills, which empower them to effectively improve their students' achievement. In a similar vein, Patton, Parker, and Tannehill pinpointed the pivotal role of teacher professional development in students' learning outcomes by mentioning the positive changes that professional development programs make in teaching practices. They articulated that professional development programs typically result in the acquisition of new instructional knowledge and skills, which inspire teachers to refine their teaching practices. As they clearly explained, using effective teaching practices helps teachers enhance their pupils' learning outcomes. Further, Kennedy also argued that

teacher professional development can make a huge difference in learners' achievement levels. She believed that Professional Development experiences equip teachers with novel teaching strategies that are essential for promoting learners' accomplishments. In this regard, King postulated that professional development programs help instructors assess their pedagogical knowledge, reflect on their instructional practices, and improve the teaching quality. The higher the teaching quality, the greater the students' learning outcomes. Additionally, Earley and Porritt also attempted to illustrate the value of teacher professional development in improving student achievement by referring to the central purpose of professional development programs. They stated that leading pupils to increased learning achievement is what teacher professional development programs are designed for. Given this, teachers who constantly take part in professional development programs can assist their students to reach higher levels of learning achievement.

### **Impact of Teachers' Professional Development**

The impact of Teachers' Professional Development on student learning is multifaceted and far-reaching. Further ahead, the various teacher professional development components and their impact on student learning include;

1. **Instructional Quality:** One major relevance of teacher professional development is the improvement of quality of teaching. Professionally developed teachers are adept at employing various teaching strategies, differentiating instruction based on student needs, and

effectively managing classrooms. They can understandably present complex concepts, use engaging teaching aids, and create lessons that cater to different learning styles, without making any student feel left out. Enhanced instructional quality inevitably improves students understanding of Biology and, consequently, better academic performance.

2. Pedagogical Skills: Teacher Professional Development programs are designed to equip teachers with the latest pedagogical methods and strategies. These programs provide teachers with tools to create dynamic, interesting and engaging learning environments. From incorporating technology in the classroom to employing interactive teaching methods, teachers are better equipped to adapt to the evolving needs of students. The use of diverse teaching techniques not only caters to different learning styles but also fosters a more inclusive educational experiences.

3. Individualized Instruction: Teacher training emphasizes the importance of recognizing and accommodating individual differences among students. A trained teacher is more likely to implement personalized instruction, tailoring their approach to meet the unique needs of each student. This individualized attention can be particularly beneficial for students with diverse learning styles or special educational needs, fostering a more inclusive and supportive learning environment.

4. Integration of Technology: Teacher professional development programs often focus on familiarizing teachers with the latest educational technologies and methodologies. Teachers

who undergo such training are better equipped to integrate digital tools into their lessons. In today's digital age, the

integration of technology in education is crucial to make learning more interactive and relevant to students and prepare students for the challenges of the future.

5. **Teacher Confidence:** Teacher professional development also significantly impacts teacher confidence. As teachers acquire new skills and knowledge, they become more assured in their teaching capabilities. This confidence enables them to handle diverse classroom situations effectively, innovate with teaching methods, and create a positive learning environment. A confident teacher is more likely to inspire confidence in students, promoting a culture of learning and curiosity.

6. **Classroom Management:** Effective classroom management is another area where teacher training has a profound impact. Teachers who undergo proper training can manage classrooms more effectively, ensuring that the class runs smoothly, students are engaged, and disruptions are minimized. Effective classroom management creates a nurturing and structured environment that is conducive to learning. One of the key aspects of teacher training is developing effective classroom management skills. A well-managed classroom sets the stage for effective learning. Trained teachers are adept at creating a positive and structured environment that encourages student participation and collaboration. By managing

time efficiently, addressing behavioral issues, and creating a sense of order, teachers can optimize the learning experience for their students.

7. Student Engagement: Teacher professional development helps teachers learn how to effectively engage students in learning. Trained teachers can design interactive and interesting lessons, use technology effectively, and connect learning to real-world contexts. These interventions increase student engagement, making learning more enjoyable and meaningful for students.

Above all, Teacher professional development is a cornerstone in the shift toward student-centered learning. When teachers are trained to focus on the individual needs, strengths, and interests of their students, the learning experience then becomes more individualized and meaningful, leading to noticeable changes in students' academic performance.

### **Limitations to Continuous Professional Development**

Lack of Funding/Adequate Resources: Schools and governments oftentimes allocate little to no amount of funds for teacher training programs.

Lack of Quality Resources: Insufficient labs, supplemental materials and textbooks make it hard to apply PD knowledge, especially for hands-on Biology experiments (ERIC, 2016).

Time Constraints: Most Biology teachers often struggle to find time for professional development programmes and activities. This is due to their heavy workload, classroom duties etc.

Lack of Personalization: Some Professional Development programs fail to cater to the individual needs and interests of Biology teachers, leading to disengagement and ineffectiveness of the Program.

Inadequate Incentives and Supports: Institutions rarely reward PD participation with promotions, higher income or reduced workload. This makes Professional Development feel like an extra burden rather than a top priority (CBE - Life Sciences Education, 2012)

### **Empirical Studies**

Several studies on the effect of Continuous Professional Development on academic performance of students have been conducted. This section would reveal some of those empirical studies.

In a Study conducted by Nungunye, I., Mugabo, L.R., & Niyonzima, F.N.(2022), the effect of Continuous Professional Development on Biology teachers in 12 schools in Gicumbu district were determined. Using a mixed research design, they made use of questionnaires and interview protocols as instruments to collect data. Results showed that CPD had significant effects on teaching. CPD activities enhance Biology teaching as well as Biology learning.

Sohail Ahmad (2024) compared the performance of students' who were taught by teachers with B. Ed(Hons), B. Ed and no professional qualifications at all. He also performed a descriptive comparison of classroom teaching practices of these three types of teachers. From the results, it was revealed that students taught by teachers with B.Ed(Hons) qualification have performed significantly better than their counterparts taught by teachers with B.Ed qualifications and those with none at all.

Another study was carried out by Nunguye, I., Nsabayezu, E., Mbonnyuburyo, J., Mugabo, L.R., and Niyonzima, F. N. (2023). The purpose of the study was to find out how teachers felt about Continuing Professional Development in biology. This study used the descriptive research design. The population used in this study was 133 individuals including 73 O'Level Biology teachers and 60 school head teachers. The sample size for the study was 100 persons selected randomly. Data was gathered through questionnaires and an interview. Descriptive statistics was used to analyze the quantitative data while the thematic technique was used to analyze the qualitative data. The results showed that teachers had a positive attitude toward CPD since it had aided in their professional development and it improved the academic performance of their students. It is suggested that more training opportunities be provided to support teachers' professional development. By removing barriers to participation and providing financial support, CPD programs will have a greater impact on the professional development of Biology teachers and students.

Furthermore, Ngendahayo, J. B., Mukulira, O. & Mugo, L. (2023) jointly studied the contribution of Continuous Professional Development for secondary school teachers on students' academic performance in public secondary schools in Rwanda. They used questionnaires & Guided interviews as instruments to collect data. From their findings, they discovered that CPD helps to increase skills and Teachers' CPD greatly improved students' academic performance.

In addition, Yaro Joseph Bawa & Joseph Owobu (2017) investigated the influence of Teachers' PD on students' academic achievement in secondary schools in Benue & Nassarawa. A 10-item structured questionnaire was used for data collection. The findings indicated that teachers' attendance to conferences and workshops had significant influence on students' academic achievement in secondary schools. It was recommended that the government provide adequate funds for sponsorship of teachers in relevant Workshops, conferences, seminars, webinars etc to help them advance in their profession.

Consequently, Harnani Mohamed et al., 2024, assessed the relationship between Teachers' PD programs and students' performance using a quantitative approach. Data were collected through closed-ended questionnaires from 137 secondary school teachers. The findings suggested that well-designed PD programs significantly enhanced students' performance, highlighting the need for high quality initiatives that are closely linked to classroom practices.

This study emphasizes the importance of PD in support teachers' ongoing growth and students' success.

### **Summary of Reviewed Literature**

In conclusion, these studies all reveal consistent results that emphasise that Teachers professional development should be an ongoing process which includes activities and practices that can enhance the teachers skills and attitudes (NEPC, 2002).

Professional development is a tool that countries use to improve the knowledge and skills of their working teachers (Ana et al., 2022). In other words, Professional Development is considered the most common prescription for promoting the effectiveness and health of education systems (Brown and Milito, 2016). Facilitating the professional development of teachers is crucial to achieving the goals of politicians and stakeholders to increase the quality of teaching and learning in schools (Deal et al., 2021). Investments in Teacher Professional Development ensure higher student achievement (Giopta and Giwang-Lea, 2020).

Teachers' Professional Development is based on the fact that if teachers are to perform well in their teaching responsibilities, they must have opportunities for continuing Professional development programs as well as advancements and improvements in their chosen career. Continuous Professional Development doesn't just provide teachers with modern skills in teaching; it makes them enjoy their profession more. Teacher education programmes

worldwide have been designed to foster professionalism among teachers, enabling them to become competent and effective practitioners. The impact it portrays on their students academic performance is usually a sort of motivation to them. Teachers with continuous professional Development are very confident in their teaching ability. Whether preservice or inservice, teacher development significantly contributes to creating a conducive learning environment and improving student performance (Colson et al., 2017; Hafeez, 2021). This aligns with existing literature emphasising the importance of teacher development in addressing teaching-learning challenges (Oliveira et al., 2019; Schütze et al., 2017; Ulla, 2018).

These studies highlights the benefits and importance associated with Teachers' Continuous professional Development and also creates awareness to the general public on the relevance of Continuous Professional Development for teachers and students.

## **CHAPTER THREE**

### **METHODOLOGY**

The methodology adopted for this Study is discussed under the following sub-headings:

- Design of the Study
- Population of the Study
- Sample and Sampling Techniques
- Research Instrument
- Validity of the Instrument
- Reliability of the Instrument

- Method of Data Collection
- Method of Data Analysis

### **Design of the Study**

This study adopted the descriptive survey research design. This design is the most suitable because it allows the researcher collect numerical data from a large population and analyze existing conditions without manipulating any variable.

### **Population of the Study**

In this study, the population consisted of 50 Biology teachers in the 26 public secondary schools in Ovia North-East Local government Area, Benin City, Edo state.

### **Sample and Sampling Techniques**

The Sample consist of 50 Biology teachers in the Public secondary schools in Ovia North-East LGA of Edo State. The Samples were selected from the total population using Purposive Random Sampling Techniques.

### **Research Instrument**

A structured questionnaire was used as instrument to collect data for this research. The questionnaire consists of two sections- A and B. Section A consists of the respondents profile which include Gender, Years of teaching experience and Qualification. Section B comprised

items drawn from the four research questions with the options; Strongly Agree (SA), Agree (A), Disagree(D) and Strongly Disagree (SD).

### **Validity of the Instrument**

The Questionnaire was subjected to correction and validation by the project supervisor and two other lecturers from the Faculty of Education.

### **Reliability of the Instrument**

The reliability of the instrument was established using the Cronbach alpha's method. The Instrument was administered to 20 teachers who were not part of the study's population. A coefficient of 0.98, which showed high reliability, was obtained.

### **Method of Data collection**

The questionnaires will be administered by the researcher to the Biology teachers in the schools and retrieved immediately.

### **Method of Data Analysis**

To ascertain the degree to which each statement in the questionnaire item was accepted or rejected, the data were analyzed using frequency tables and percentages.

## **CHAPTER FOUR**

### **PRESENTATION OF RESULTS AND DISCUSSION OF FINDINGS**

This Chapter presents the results obtained from the Analysis of data from answering the Research questions raised.

#### **Presentation of Results**

**Research Question 1: What is the current level/state of Professional Development undergone by Teachers?**

<b>S/N</b>	<b>Items</b>	<b>SA</b>	<b>A</b>	<b>SD</b>	<b>D</b>	<b>Total</b>
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1	I attend workshops/ seminars on Biology teaching regularly	20 (40%)	18 (36%)	3 (6%)	9 (18%)	50 (100%)
2	My school supports Teachers' participation in Continuous Professional development programs	17 (34%)	20 (40%)	8 (16%)	5 (10%)	50(100%)
3	I have received In-service trainings in the last 3 years	19 (38%)	21 (42%)	8 (16%)	2 (4%)	50(100%)
4	The few CPD programs I attended greatly enhanced my Biology teaching	21 (42%)	24 (48%)	0 (0%)	5 (10%)	50 (100%)
5	Online CPD programs are available and accessible for me	14 (28%)	16 (32%)	8 (16%)	12 (24%)	50(100%)

Table 1 above shows the level/State of Continuous Professional development attained by Biology teachers. 76% of the respondents attend workshops/Seminars on Biology teaching

regularly, while 9(18%) and 3(6%) respondents disagree and strongly disagree respectively. 20(40%) and 17(34%) respondents Agree and Strongly agree respectively that their schools supports their participation in Continuous Professional development programmes, however 5(10%) and 8(16%) respondents disagree and strongly disagree respectively. 21(42%) and 19(38%) respondents Agree and strongly agree that they had received In-service trainings in the last three years, while 2(4%) and 8(16%) respondents Disagree and strongly disagree with this statement. 16(32%) and 14(28%) respondents Agree and strongly agree that the few CPD programmes they attended greatly influenced their Biology teaching, while 12(24%) and 8(16%) respondents disagree and strongly disagree with this statement. 24(48%) and 21(42%) respondents agree and strongly agree respectively that Online CPD programmes are available and accessible for them, while 5(10%) and 0(0%) respondents strongly disagree with this statement.

**Research Question 2: In what ways do Teachers’ Continuous Professional development programmes influence students’ academic performance in Biology?**

S/N	Items	SA	A	SD	D	Total
6	Continuous Professional development has	27(54%)	19(38%)	1(2%)	3(6%)	50(100%)

	helped me improve my Biology teaching experience					
7	Students perform better when I apply skills learned from Continuous Professional development programmes	18(36%)	17(34%)	6(12%)	9(18%)	50(100%)
8	Continuous Professional development programmes expose kebyobmodern teaching strategies	19(38%)	14(28%)	7(14%)	10(20%)	50(100%)

	and effective instructional techniques					
9	Continuous Professional development enables me assess and evaluate students effectively	18(36%)	12(24%)	14(28%)	6(12%)	50(100%)
10	Continuous Professional development encourages the use of student-centered teaching strategies	20(40%)	8(16%)	10(20%)	12(24%)	50(100%)

Table 2 above, shows how Teachers' Continuous Professional development influences the Academic performance of students. 19(38%) and 27(54%) respondents agree and strongly agree respectively that Continuous Professional development have helped them improve their Biology teaching experience, while 3(6%) and 1(2%) respondents disagree and strongly disagree respectively. 17(34%) and 18(36%) respondents agree and strongly disagree respectively that their students performed better when they applied skills learned from Continuous Professional development programmes, while 9(18%) and 6(12%) disagree and strongly disagree respectively. . 14(28%) and 19(38%) respondents agree and strongly disagree that they were exposed to modern teaching strategies and effective Instructional techniques, due to Continuous Professional development, while 10(20%) and 7(14%) disagree and strongly disagree respectively. 12(24%) and 18(36%) respondents agree and strongly agree respectively that Continuous Professional development enables them assess and evaluates their students effectively, while 6(12%) and 14(28%) disagree and strongly disagree respectively. 8(16%) and 20(40%) respondents agree and strongly agree respectively that CPD encourages the use of student-centered strategies while 12(24%) and 10(20%) disagree and strongly disagree respectively.

**Research Question 3: What are the challenges that limit effective access to Continuous Professional development programmes for Teachers?**

S/N	Items	SA	A	SD	D	Total
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11	Lack of funding hinders my CPD Participation	31(62%)	6(12%)	7(14%)	6(12%)	50(100%)
12	Heavy workload limits my CPD Participation	25(50%)	18(36%)	3(6%)	4(8%)	50(100%)
13	CPD centres are too far or inaccessible	13(26%)	12(24%)	11(22%)	14(28%)	50(100%)
14	My school rarely organizes or sponsors	29(58%)	11(22%)	5(10%)	5(10%)	50(100%)

	CPD programmes for us					
15	Most CPD programmes do not meet my needs	18(36%)	14(28%)	11(22%)	7(14%)	50(100%)

Table 3 above shows the challenges that limit effective access to Continuous Professional development programmes. 6(12%) and 31(62%) respondents agree and strongly agree that Lack of funding limits their CPD participation, while 6(12%) and 7(14%) disagree and strongly disagree with the statement. 18(36%) and 25(50%) respondents agree and strongly agree that heavy workload limits their participation in CPD activities while 4(8%) and 3(6%) disagree and strongly disagree respectively. 12(24%) and 13(26%) respondents agree and strongly agree that CPD centres are too far or inaccessible for them, while 14(28%) and 11(22%) respondents disagree and strongly disagree respectively. 11(22%) and 29(58%) respondents agree and strongly agree respectively that their schools rarely organizes or sponsors CPD programmes for them, while 10(20%) respondents disagree with this statement. 14(28%) and 18(36%) respondents agree and strongly agree respectively that Most CPD

programmes do not meet their needs while 7(14%) and 11(22%) respondents disagree and strongly disagree with this statement.

**Research Question 4: In what ways can effective Continuous Professional development programmes be made available for Teachers, in order to enhance students' learning?**

S/N	Items	SA	A	SD	DD	Total
16	Continuous Professional development programmes should be made compulsory and regularly scheduled for Biology teachers	38(76%)	8(16%)	0(0%)	4(8%)	50(100%)
17	Government	28(56%)	17(34%)	1(2%)	4(8%)	50(100%)

	should collaborate with NGOs' to provide CPD programmes					
18	Schools should allocate funds to support Teachers' participation in CPD	30(60%)	17(34%)	1(2%)	2(4%)	50(100%)
19	Online CPD platforms should be promoted	23(46%)	12(24%)	5(10%)	10(20%)	50(100%)

20	CPD Participation should attract incentives in order to motivate teachers	41(82%)	8(16%)	0(0%)	1(2%)	50(100%)
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Table 4 above reveals effective ways of making CPD activities available and effective for Biology teachers. 8(16%) and 38(76%) respondents agree and strongly agree respectively that CPD programmes should be made compulsory and regularly scheduled for them, while 4(8%) students disagree with the statement. 17(34%) and 28(56%) respondents agree and strongly agree respectively that Government should collaborate with NGOs' to provide CPD programmes, while 4(8%) and 1(2%) students disagree and strongly disagree with the statement. 17(34%) and 30(60%) respondents agree and strongly agree that Schools should allocate funds to support Teachers' participation in CPD activities, while 2(4%) and 1(2%) students disagree and strongly disagree with the statement. 12(24%) and 23(46%) respondents agree and strongly agree respectively that Online CPD platforms should be promoted while 10(20%) and 5(10%) respondents disagree and strongly disagree respectively

with the statement. 8(16%) and 41(82%) respondents agree and strongly agree that CPD participation should attract incentives in order to motivate teachers, while 1(2%) respondent disagrees with the statement.

### **Discussion of Findings**

Based on the analysis of data collected from the opinions and responses of the respondents on the Impact of Teachers' Continuous Professional Development on Students' Academic performance in Biology;

Research question one seeks to determine the level/state of Professional development undergone by Biology teachers. Based on the analysis acquired from the responses, it can be deduced that there is a high participation of Biology teachers in workshops and seminars, and this greatly improved their Biology teaching. There is also a fairly moderate support from Schools and a high access and availability of online CPD platforms.

Research question two seeks to determine the Impact of Teachers' Continuous Professional development programmes on Students' Academic performance in Biology. From the findings of this Study, Continuous Professional development skills enable teachers' to improve their Biology teaching experience, leading to effective assessment and evaluation of students, as well as a positive influence in the Students' academic performance. Teachers are also being exposed to effective Instructional techniques and modern teaching strategies, such as Student-centered teaching techniques.

Research question three explores some challenges that limit effective access to Continuous Professional development for Teachers. Here, the major challenges that limits effective access to Continuous Professional development programmes are Lack of funding, lack of support from schools, and heavy workload of teacher. Teachers also experience geographical limitations in accessing CPD centres/venues. However, not all teachers agree that CPD programmes fail to meet their needs. It could be that some teachers feel that CPD programmes are beneficial, while others feel that their needs are not being fully met or addressed.

Research question four examines some strategies that could enhance the access and effectiveness of Continuous Professional development in order to improve students' performance. From the respondents opinions, CPD should be compulsory for teachers and attract incentives to motivate them. The findings also suggest that Teachers want CPD programs that are well-funded and supported by the Government and schools, accessible online, strategically planned, and supported by partnerships

## **CHAPTER FIVE**

### **SUMMARY, CONCLUSIONS AND RECOMMENDATIONS**

This chapter deals with the Summary, Conclusion and recommendations of the Findings.

#### **Summary**

This study investigated the impact of teachers Continuous Professional Development (CPD) on the academic performance of secondary school students in Biology.

The analysis showed that a moderate number of Biology teachers engage in CPD activities, such as workshops, in-service training, and online courses. Respondents also strongly agreed that CPD positively improves their Biology teaching experiences and subsequently improves

students' performance. CPD enhanced their knowledge of modern teaching methods and strategies, use of instructional materials, and implementation of student-centered strategies.

However, the most frequently reported barriers to Continuous Professional development include lack of funding, poor internet access, time constraints, inaccessibility of CPD centres, heavy teaching workload, and inadequate encouragement from school leadership.

Teachers suggested that increased funding, online accessibility, collaboration with universities/NGOs, and incorporation of CPD into school calendars would enhance participation.

The data collection was carried out through the administration of structured questionnaires to Fifty (50) biology teachers in Public secondary schools in Ovia North-East Local Government Area. The data were interpreted and analysed using frequency tables and percentages. The sampling technique used in this Research was the Purposive random sampling technique.

## **Conclusion**

Based on the analysis of the data collected, It is observed that Continuous Professional development is an essential instrument that facilitates Biology teachers professional growth and significantly contributes to the academic success of students.

The analysis of the data showed that a moderate number of Biology teachers engage in CPD activities, such as workshops, in-service training, and online courses. However, access remains inconsistent due to funding, time constraints, Structural and geographical challenges, heavy workload on teachers and lack of institutional support.

Therefore, for students to excel in Biology and science subjects, the Continuous professional growth of their teachers must be top priority. Regular, well-funded, and strategically implemented CPD is not optional — it is essential.

### **Recommendations**

1. Government and School Managements should provide adequate funding, resources and policy support for regular CPD programs.
2. CPD Opportunities should be planned during less demanding academic periods and incorporated into the school calendar to avoid heavy workload for teachers, as well as, time constraints.
3. Online and Blended Learning Platforms should be developed to ensure flexible and cost-effective participation.
4. Collaborations with Non-government organizations and Universities should be pursued to widen access to expert-led CPD.

5. CPD Participation should be linked to teachers promotion and appraisal to increase commitment and encourage active participation.

6. Infrastructure Improvement, such as internet access and ICT facilities in schools, should be prioritized.

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**APPENDIX  
QUESTIONNAIRE**

**DEPARTMENT OF CURRICULUM AND INSTRUCTIONAL  
TECHNOLOGY  
FACULTY OF EDUCATION  
UNIVERSITY OF BENIN, BENIN CITY, EDO STATE, NIGERIA**

**INFLUENCE OF TEACHERS' CONTINUOUS PROFESSIONAL DEVELOPMENT ON  
STUDENTS' ACADEMIC PERFORMANCE IN BIOLOGY**

Dear Respondents,

I would like to thank you in advance for filling out this questionnaire. This questionnaire is part of a research study on the topic, '**The Influence of Teachers' Continuous Professional Development on Students' Academic Performance in Biology**'. I am soliciting for your maximum cooperation as this research is purely an academic exercise and requires your assistance for its successful completion.

Thank you.

Yours faithfully,

Joan Chidera Emeka

Researcher

#### **SECTION A: DEMOGRAPHIC DATA**

Gender: Male( )                      Female( )

Years of teaching experience: 0—5( )                      6—10. ( )                      11+( )

Age: 21—30 ( )                      31—40 ( )                      41—50 ( )                      51+( )

Qualification: NCE( )                      B.ED( )                      M.ED( ).                      OTHERS( )

#### **SECTION B:**

Please tick the option that best represents your opinion for each statement;

Keys: SA—Strongly Agree    A—Agree    SD—Strongly Disagree    D—Disagree

**RESEARCH QUESTION 1: What is the current level/state of Professional development undergone by teachers?**

S/N	Items	SA	A	SD	D
1	I attend workshops/Seminars on Biology teaching regularly				
2	My school supports teacher participation in Continuous Professional development programs				
3	I have received in-service trainings in the last 3 years				
4	The few CPD programs I attended greatly enhanced my biology teaching				
5	Online CPD programs are available and accessible for me				

**RESEARCH QUESTION 2: In what ways do Teachers Continuous Professional Development programmes influence students' academic performance in Biology**

S/N	Items	SA	A	SD	D
6	Continuous Professional Development has helped me improve my Biology teaching experience				
7	Students perform better when I apply skills learned from Continuous Professional Development programs				
8	Continuous Professional Development programs expose me to modern teaching strategies and effective instructional techniques				

9	Continuous Professional Development enables me assess and evaluate students effectively.				
10	Continuous Professional Development encourages the use of student-centered teaching strategies.				

**RESEARCH QUESTION 3: What are the challenges that limit effective access to Continuous professional Development for teachers?**

S/N	Items	SA	A	SD	D
11	Lack of funding hinders my CPD participation				
12	Heavy workload limits my CPD participation				
13	CPD centres are too far or inaccessible				
14	My school rarely organizes or sponsors CPD programs for us				
15	Most CPD programs don't meet my needs.				

**RESEARCH QUESTION 4: In what ways can effective Continuous professional development programs be made available for teachers, in order to enhance students' learning?**

S/N	Items	SA	A	SD	D
16	Continuous Professional Development should be made compulsory and regularly scheduled for biology teachers.				
17	Government should collaborate with NGOs' to provide CPD programs				
18	Schools should allocate funds to support Teachers participation in CPD				

19	Online CPD Platforms should be promoted				
20	CPD participation should attract incentives in order to motivate teachers.				