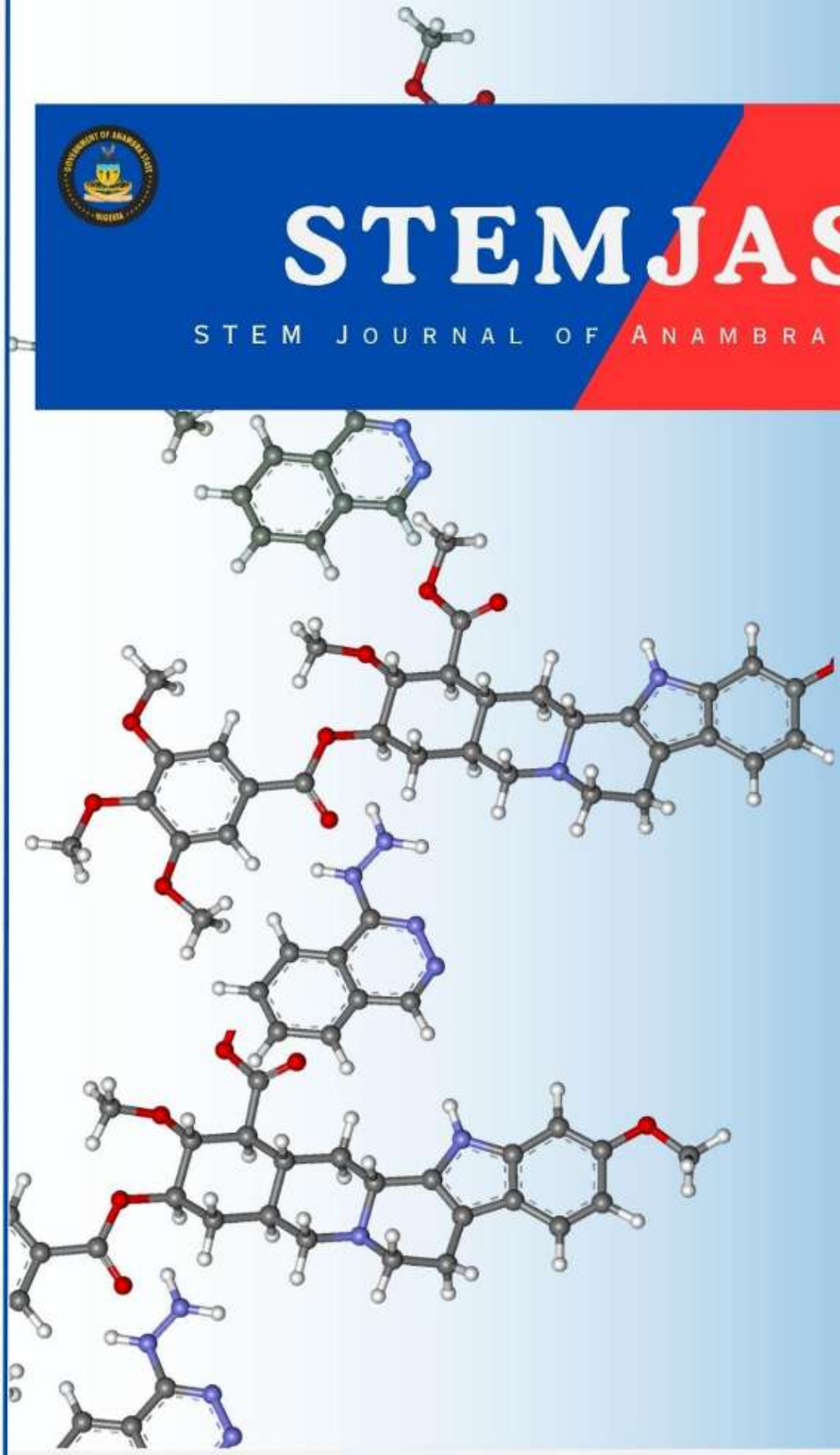
STEM Journal of Anambra State (STEMJAS) Volume 6(2);2026 EDITOR IN CHIEF : PROF. EBELE .C. OKIGBO

STEMJAS

STEM JOURNAL OF ANAMBRA STATE



STEM JOURNAL OF ANAMBRA STATE
Original work of excepional STEM Researchers

VOLUME 6(2);2026 | ISSN : 2705 -1579

EDITOR IN CHIEF
PROF. EBELE .C. OKIGBO

STEM JOURNAL
OF ANAMBRA STATE STAN (STEMJAS), 6(2); APRIL 2026

ISSN: 2705-1579

Published & printed by:

FAB ANIEH NIGERIA LIMITED
Fab Anieh House
Opposite COFI Premium Lounge
Okpuno, Awka
Tel: 08035619395
G-mail: fabprezz82@gmail.com

EDITORIAL BOARD

Officers of Science Teachers Association of Nigeria, Anambra State Chapter

Dr. Bibiana C. Okoli - Chairman
Mr. JohnBosco O.C. Okekeokosisi - Vice Chairman
Dr. Nkiru N.C. Samuel - Secretary
Mr. Arinze Enekwechi - Assistant Secretary
Mr. Clement Okpala - Financial Secretary
Dr. Blessing I. Okafor - Treasurer
Mr. Friday Peter Usang - Science Fair Coordinator
Mr. Solomon C. Okoli - Assistant Science Fair Coordinator
Mrs. Grace N. Okpata - PRO I
Mrs. Ndidamaka P. Okafor - PRO II
Dr. Christiana U. Ezenduka - Immediate Past Chairman
Prof. E.O. Akuezilo - Member Board of Trustee
Prof. Edwin Akusoba – Patron

EDITORIAL

STEM Journal of Anambra STAN (STEMJAS) is a publication of **Science Teachers Association of Nigeria, Anambra State Chapter.** STEMJAS is developed to disseminate information on Science, Technology, Engineering and Mathematics (STEM) Education to teachers, teacher-trainers, researchers and other interested persons. Articles that are of relevance to STEM education are published in this journal. We are grateful to the contributors and hope that our readers will enjoy reading these contributions.

Prof. Ebele C. Okigbo
Editor-in-Chief

Pages vi

TABLE OF CONTENT

RELATIONSHIP BETWEEN MENTORSHIP AND PROFESSIONAL DEVELOPMENT AMONG SECONDARY SCHOOL SCIENCE TEACHERS IN UYO LOCAL GOVERNMENT AREA, AKWA IBOM STATE

[1]Eden, Mabel Ini-Ibehe (*FSTAN*); [2]Mbuk, Williams Ekong; [3]Udo, Agnes Lambert (*FSTAN*)

[1]Department of Science Education, Faculty of Education, Akwa Ibom State University, Ikot Akpanden, Mkpat Enin LGA
[2]Department of Science Education, Faculty of Education, University of Uyo, Akwa Ibom State
[3]Department of Curriculum & Teaching, Faculty of Education, Akwa Ibom State University of Education, Afaha Nsit, Nsit Ubium LGA; Email: agnesudo75@gmail.com; +2348026826989

Corresponding e-mail: [1]mabeleden8@gmail.com; **Contact:** 08065601466

Abstract

The study investigated the relationship between mentorship and professional development among secondary school science teachers in Uyo LGA of Akwa Ibom State. The design adopted for this study was descriptive correlational survey design. The population of the study comprised all the teachers of core science subjects (Biology, Chemistry and Physics) in public secondary schools in Uyo Local Government Area of Akwa Ibom State. Simple random sampling technique was used to sample 8 schools out of the 15 schools in the study area. Ninety six (96) science teachers were sampled using a stratified sampling technique based on subject specialization. A questionnaire titled "Relationship between Mentorship and Professional Development among Secondary School Science Teachers Questionnaire (RMPDSSSTQ)" was used for data collection. The reliability of the instrument was found to be .72 using Cronbach Alpha statistics. Descriptive statistics of mean and standard deviation were used to answer the research questions while Pearson Product Moment Correlation (PPMC) was used to test the hypotheses at 0.05 level of significances. Findings of the study showed that mentorship practices exist but at a low level and the level of professional development is low with teachers participating in workshops, seminars or subject based training only sporadically. There was a positive and statistically significant relationship between mentorship and professional development among secondary school science teachers. It was recommended among others that schools should establish formal mentorship programmes where experienced teachers are paired with less experienced colleagues for ongoing professional support. Educational authorities should integrate mentorship into teacher development policy.

Key words: Mentorship, Professional Development, Science Teachers and Secondary Schools

Introduction

The professional growth of teachers remains a central determinant of instructional quality, learner achievement, and the overall effectiveness of school systems. Within contemporary education, Professional Development (PD) is widely recognized as the continuous process through which teachers expand their content knowledge, refine pedagogical skills, and strengthen professional dispositions throughout their careers. PD encompasses both formal learning opportunities such as workshops, seminars, and in-service training and informal, practice-based learning such as collaboration, reflective inquiry, and classroom-based experimentation. However, while PD provides the conceptual and technical foundation for teacher learning, its impact is often limited when it is not supported by sustained, context-sensitive guidance that enables teachers to translate new knowledge into classroom practice.

It is within this context that mentorship has gained prominence as a complementary and practice-oriented strategy for teacher development. Although mentoring has deep historical roots (Davis & Jones, 2020; Ivey & Dupré, 2022), its nature, forms, and relevance have evolved considerably over time in response to changes in organizational structures, professional expectations, and technological innovations (Poth & Munce, 2020; Pollard & Kumar, 2021). Mentorship refers to a structured and supportive professional relationship in which a more experienced teacher guides, supports, and models effective practice for a less experienced colleague. In contrast to episodic training, mentorship is continuous, relational, and embedded in the daily realities of teaching. It facilitates professional learning through observation, feedback, modelling, co-planning, and reflective dialogue. In science education particularly, where effective teaching demands methodological rigour, laboratory competence, and the ability to guide inquiry-based learning, mentorship provides a pathway for developing both technical expertise and professional confidence.

The relationship between mentorship and PD is therefore both complementary and interdependent. While PD introduces teachers to new ideas, innovations, and instructional strategies, mentorship supports the application, refinement, and contextual adaptation of these ideas in real classroom environments. Mentorship operationalizes professional development by transforming theoretical knowledge into practical competence, while PD strengthens mentorship by equipping mentors with the pedagogical and reflective skills required to guide others effectively. Together, they form a coherent system of teacher learning that is sustained, collaborative, and responsive to professional needs.

Recent studies have also highlighted the emergence of diverse mentoring models that vary by structure, goals, and perspective. These include individual, group, and peer mentoring arrangements (Gadomska-Lila, 2020; Murrell et al., 2021; Bastiansen & Wittek, 2023), as well as demographic and technology-mediated mentoring approaches (Randel et al., 2021; Grant et al., 2020; Lazor et al., 2024). Despite these variations, the underlying purpose of mentorship remains the enhancement of the mentee's knowledge, skills, confidence, and adaptability. Mentoring has been widely recognized for its educational, developmental, and social benefits (Voluiko et al., 2024), enabling

teachers to access practical insights, navigate school environments, and gain confidence in their professional roles.

Nevertheless, research evidence indicates that the benefits of mentoring do not always materialize (Bachkirova et al., 2020). This inconsistency has been attributed to mismatches between mentoring approaches and contextual needs, inadequate preparation of mentors, unclear role expectations, and structural weaknesses within mentoring programmes (Tuma et al., 2021; Hu et al., 2022). These concerns are particularly significant for secondary school science teachers, whose professional responsibilities require sustained pedagogical guidance, effective laboratory management, curriculum interpretation, and safety compliance. Where mentoring programmes are poorly structured or insufficiently aligned with professional development objectives, teachers may struggle to translate training into effective classroom practice.

Against this background, there is a compelling need to examine more closely how mentorship relates to the professional development of secondary school science teachers. Understanding this relationship is essential for clarifying how mentoring practices influence teacher competence, instructional effectiveness, motivation, and career progression. Such understanding will provide evidence for designing mentoring programmes that are structured, contextually relevant, and aligned with professional development goals. Furthermore, the need for this study is underscored by the growing demand for high-quality science education in contemporary society. As science and technology continue to shape economic and social development, the quality of science teaching becomes increasingly important. Strengthening the professional capacity of science teachers through effective mentorship and sustained professional development is therefore not only an institutional priority but also a national educational imperative.

This study is therefore undertaken to provide empirical insight into how mentorship contributes to the professional development of secondary school science teachers. The findings are expected to inform educational policy, guide school-based mentoring practices, and support teacher education programmes in designing integrated systems of professional learning. Ultimately, by clarifying the role of mentorship in teacher development, the study seeks to contribute to improved instructional practice, stronger professional cultures within schools, and enhanced learning outcomes in science education.

Literature Review

Concept of Mentorship

Mentorship is widely conceptualised as a purposeful, supportive relationship in which an experienced individual guides a less experienced colleague to develop professionally and personally (Hussey & Campbell-Meier, 2021). Mentoring relationships often entail the mentor serving as a teacher, advisor, role model, advocate, and source of emotional support (Dirks, 2021; Al Hilali et al., 2020). The process encourages mentees to reflect on their experiences, articulate challenges, analyse their actions, and make informed decisions in their professional practice.

The flexibility of mentorship has resulted in the development of diverse mentoring types and configurations (Mullen & Klimaitis, 2019). These include formal and informal mentorships,

group and individual arrangements, peer mentoring, reverse mentoring across demographic groups, and digital or e-mentoring. Each model serves unique goals, and the suitability of a particular approach often depends on the setting, participant needs, and the developmental objectives (Schwartz-Shea, 2020; van Dam et al., 2021).

Professional Development and Teacher Growth

Professional development (PD) refers to systematic efforts aimed at improving practitioners' skills, knowledge, attitudes, and performance. Studies consistently highlight mentorship as a key driver of PD, aiding individuals in developing the capacity for independent problem-solving, continuous learning, and improved workplace adaptation (Pryimak et al., 2024). Mentoring supports teacher growth by enhancing motivation, self-confidence, commitment, and instructional competence (Susanto & Sawitri, 2022). For science teachers, PD facilitated through mentoring may improve pedagogical knowledge, laboratory practices, classroom management of practical activities, and curriculum implementation. Furthermore, mentoring contributes to organizational learning, helping establish cultures of reflection, collaboration, and self-improvement (Tratsevskyi & Kubitskyi, 2024). Long-term mentoring relationships enhance psychological resilience, career satisfaction, and professional identity formation (Hussey & Campbell-Meier, 2021). These outcomes align with educational excellence and school improvement efforts.

Effects of Mentorship on Career Development

Empirical studies demonstrate that mentorship positively influences career outcomes. Baran and Zarzycki (2021) found that employees engaged in formal mentoring experienced higher rates of career advancement and salary increases than their non-mentored peers. In peer-group mentoring contexts, high levels of trust and autonomy have been reported, particularly in the Finnish model that emphasizes collective reflection and shared expertise (Tynjälä et al., 2019). Such findings underscore the capacity of mentorship to enhance both professional development and broader career trajectories.

Group mentoring and peer mentoring have been shown to produce visible improvements in professional contacts, workplace confidence, and career mobility (Hryshchenko et al., 2025). Peer mentoring is particularly effective in strengthening soft skills, promoting collaborative learning, and encouraging equal participation (Bastiansen & Wittek, 2023; Murrell et al., 2021). These strengths make peer mentoring a valuable model for teacher education, where shared experience and reciprocal learning are central.

Challenges and Limitations of Mentorship

Despite its documented benefits, mentorship is not without challenges. Studies warn that negative mentoring experiences such as poor mentor competence, mismatched expectations, or inadequate emotional support can hinder mentee development and even reduce mentor creativity (Tuma et al., 2021; Hu et al., 2022; Akpan, 2019). Structural weaknesses in programme design, unclear mentoring roles, and inappropriate mentoring approaches may impede the developmental outcomes (Bachkirova et al., 2020; Umoetuk, Boc-Ifeobu, Eden& Mbuk, 2023)). These concerns highlight the need for well-designed mentoring frameworks that clearly define goals, roles, and pathways for implementation. According to Stoeger et al. (2021), addressing problematic issues such as mentor preparation, role clarity, and adequate support systems is key to professionalizing

mentoring practices. Similarly, Treasure et al. (2022) emphasize that successful mentoring programmes require careful planning, monitoring, and evaluation.

Statement of the problem

The quality of science education in secondary schools depends largely on the professional competence, pedagogical skills, and instructional confidence of science teachers. However, across many school systems, science teachers often face substantial challenges that hinder their professional growth. These challenges include limited access to continuous professional development opportunities, inadequate instructional support, insufficient exposure to innovative teaching strategies, and weak collaborative structures within science departments. As a result, many teachers, particularly novice and early-career science teachers, struggle to meet the demands of modern science curricula, adapt to emerging technologies, and effectively facilitate practical activities that are central to meaningful science learning. Thus, a critical gap exists in understanding the nature of mentorship available to secondary school science teachers in Akwa Ibom State, the extent to which they benefit from mentoring relationships, and the specific ways mentoring contributes to their professional development. This study therefore seeks to investigate the relationship between mentorship and professional development among secondary school science teachers, with particular focus on how mentoring practices shape teacher competence, instructional effectiveness, and professional growth.

Purpose of the study

The purpose of the study is to investigate the relationship between mentorship and professional development among secondary school science teachers in Uyo LGA of Akwa Ibom State. Specifically to;

1. determine the extent of mentorship practices among secondary school science teachers in Uyo LGA of Akwa Ibom State
2. examine the level of professional development among secondary school science teachers in Uyo LGA of Akwa Ibom State
3. Ascertain the relationship between mentorship and professional development among secondary school science teachers in Uyo LGA of Akwa Ibom State

Research question

1. What is the extent of mentorship practices among secondary school science teachers in Nsit Uyo LGA of Akwa Ibom State?
2. What is the level of professional development among secondary school science teachers in Nsit Uyo LGA of Akwa Ibom State?
3. What is the relationship between mentorship and professional development among secondary school science teachers in Uyo LGA of Akwa Ibom State?

Hypotheses

1. There is no significant relationship between mentorship and professional development among secondary school science teachers in Uyo LGA of Akwa Ibom State

Method

The design adopted for this study was a descriptive correlational survey design. The population of the study comprised all the teachers of core science subjects (Biology, Chemistry and Physics) in public secondary schools in Uyo Local Government Area of Akwa Ibom State. Simple random sampling technique was used to sample 8 schools out of the 15 schools in the study area. Ninety six (96) science teachers were sampled using a stratified sampling technique based on subject specialization (Chemistry, Biology and Physic). The instrument used for the study was a questionnaire titled "Relationship between Mentorship and Professional Development among Secondary School Science Teachers Questionnaire (RMPDSSSTQ)". The instrument consisted of 3 parts; Part A was information on Biodata of the respondents; Part B was mentorship of secondary school science teacher; Part C was on Professional development of secondary school science teachers. To answer research question one: A rating scale of High Extent – 2.00 points above and Low Extent of 2.00 points below was used. While to answer question two: A 4-point Likert scale was used to elicit information: Strongly Agree-4points, Agree-3points, Disagree-2points and Strongly disagree- 1point.The instrument was validated by 3 experts in the Department of Science Education, Akwa Ibom State University. The reliability of the instrument was carried out by administering it to 20 students that are not part of the sample population but are a part of the population. The data obtained was subjected to analysis using Cronbach Alpha statistics and was found to be 0.69. The method of data analysis used was a descriptive statistics of mean and standard deviation to answer the research questions and Pearson Product Moment Correlation (PPMC) to test the hypotheses at 0.05 level of significances.

Results

Research question one: What is the extent of mentorship practices among secondary school science teachers in Uyo LGA of Akwa Ibom State?

Table 1: Mean and Standard deviation of mentorship practices among secondary school science teachers (N=95)

S/N	Statement	Mean	SD	Decision
1.	I have access to an experienced mentor who guides me in my professional duties as a science teacher	1.25	0.44	Low Extent
2.	My mentor provides constructive feedback that helps me improve my teaching practices.	1.29	0.48	Low Extent
3.	Mentorship activities in my school have improved my classroom management and instructional delivery.	1.60	0.49	Low Extent

4.	I regularly discuss teaching challenges and solutions with my mentor.	1.79	0.41	Low Extent
5.	My mentor serves as a good role model in professional ethics and conduct.	1.49	0.50	Low Extent
6.	Mentorship programmes in my school are well structured and organised.	1.49	0.50	Low Extent
7.	Mentorship has helped me to integrate innovative teaching strategies in science.	2.20	0.40	High Extent
8.	I receive adequate support from my mentor in handling practical lessons.	1.61	0.49	Low Extent
9.	Mentorship in my school has increased my motivation and commitment to the teaching profession.	1.87	0.33	Low Extent
10.	Lack of formal mentorship limits my professional growth as a science teacher.	1.80	0.60	Low Extent
	Grand Mean	**1.46**		

The result in Table 1 above showed that all items had their mean ratings ranging from 1.25 to 2.20. Except for one item which was above the bench mark of 2.00. This indicates that the extent of mentorship practices among secondary school science teachers in Uyo LGA of Akwa Ibom State is low (grand mean= 1.46). The standard deviation of all the items range from 0.33 to 0.60, which showed that the respondents were not too far from the mean and opinion of one another in their responses on the extent of mentorship practices among secondary school science teachers.

Research Question two: What is the level of professional development among secondary school science teachers in Uyo LGA of Akwa Ibom State?

Table 2: Mean and Standard deviation of mentorship practices among secondary school science teachers (N=95)

S/N	Statement	Mean	SD	Decision
1.	I regularly participate in professional development programmes such as workshops, seminars, or conferences.	1.52	0.52	Disagree
2.	Professional development activities in my school are relevant to my classroom teaching needs.	1.80	0.54	Disagree
3.	I often apply new instructional strategies learned through professional development programmes.	2.02	0.68	Agree
4.	Participation in professional development activities has improved my science teaching skills.	2.40	0.79	Agree

5.	My school administration supports teachers' participation in professional development programmes.	1.63	0.48	Disagree
6.	I collaborate with colleagues to share knowledge gained from professional development activities.	1.51	0.50	Disagree
7.	Professional development has increased my confidence as a science teacher.	1.89	0.61	Disagree
8.	I find it difficult to attend professional development programmes due to funding constraints	1.85	0.53	Disagree
9.	Continuous professional development is essential for improving science education in secondary schools.	2.45	0.90	Agree
10.	My participation in professional development activities is evaluated and followed up by school authorities.	2.44	1.16	Agree
	Grand Mean	**1.95**		

The result in Table 2 above showed that the items had their mean ratings ranging from 1.51 to 2.45. 4 items had mean rating above the bench mark of 2.00. This indicates that the level of professional development among secondary school science teachers in Uyo LGA of Akwa Ibom State (grand mean= 1.95). This implies that the level of professional development among secondary school science teachers is low meaning that participate in professional development programmes such as workshops, seminars, or conferences is not attended regularly. The standard deviation of all the items range from 0.48 to 1.16, which showed that the respondents were not too far from the mean and opinion of one another in their responses on level of professional development among secondary school science teachers.

Research question three: What is the relationship between mentorship and professional development among secondary school science teachers in Uyo LGA of Akwa Ibom State?

Table 3: Pearson Product Moment Correlation analysis of the relationship between mentorship and professional development among secondary school science teachers (N=95)

Variable	Mean	SD	R
Mentorship	1.63	0.17	
			0.88
Professional Development	1.64	0.20	

The information in Table 4RRRR shows that there is a moderate p linear relationship between mentorship and professional development among secondary school science teachers in Uyo LGA of Akwa Ibom State. (r=0.127)

Testing the hypotheses

Hypothesis One: There is no significant relationship between mentorship and professional development among secondary school science teachers in Uyo LGA of Akwa Ibom State

Table 4: Correlation analysis of the relationship between mentorship and professional development among secondary school science teachers (n=95)

Variable	Mean	SD	r	p-value
Mentorship	1.63	0.17		
			.88	0.000
Professional Development	1.64	0.20		

Significant at the 0.05 level of significance.

The information in Table 4 shows that there is a significant positive relationship between mentorship and professional development among secondary school science teachers in Uyo LGA of Akwa Ibom State (r=0.88, p=0.000). This means mentorship decreases with increase in professional development among secondary school science teachers in Uyo LGA of Akwa Ibom State. Hence the null hypothesis which states that there is no significant relationship between mentorship and professional development among secondary school science teachers in Uyo LGA of Akwa Ibom State is rejected.

Discussion of findings

The findings showed that mentorship practices among secondary school science teachers in Uyo LGA were generally low, as most items fell below the benchmark, indicating that teachers are not receiving adequate professional guidance or support. This may be due to poorly structured mentoring systems, limited mentor preparation, and the absence of formalised programmes within schools. The result aligns with the observations of Bachkirova et al. (2020), who reported that mentorship often fails where organisational structures are weak and mentor roles are unclear. However, it contrasts sharply with the assertions of Hussey and Campbell-Meier (2021), who emphasised that mentorship typically, enhances reflective practice, confidence, and instructional competence when properly implemented. This divergence suggests that although mentorship is widely acknowledged as beneficial, its potential is not being realised in the study area due to contextual and structural constraints.

The findings revealed that the level of professional development among secondary school science teachers in Uyo LGA was generally low, as indicated by a grand mean of 1.95, showing that although four items were above the benchmark of 2.00, teachers do not regularly participate in professional development activities such as workshops, conferences, and seminars. This low level of participation may be attributed to factors such as limited access to training opportunities, inadequate institutional support, or a lack of structured mentoring systems that typically enhance teacher growth. The result aligns with the observations of Bachkirova et al. (2020), who found that professional development efforts often fall short when mentoring structures are weak or poorly implemented. However, the finding contrasts with the position of Pryimak et al. (2024), who emphasized that professional development particularly when supported through mentorship tends to enhance teachers' motivation, confidence, and instructional competence, suggesting that strong professional development systems generally yield substantial benefits. The discrepancy between these expected outcomes and the low professional development levels observed in this study

underscores the need for more intentional, well-supported, and appropriate professional development initiatives for science teachers in Uyo LGA.

The findings revealed a statistically significant positive relationship between mentorship and professional development among secondary school science teachers in Uyo LGA, indicating that improvements in mentoring practices are associated with enhanced professional growth. This suggests that mentorship plays an important role in supporting teachers' acquisition of new skills, reflective practice, and professional confidence. The result may be attributed to the capacity of mentoring relationships to provide guidance, feedback, emotional support, and opportunities for collaborative learning, which are critical for sustained professional development. This finding is consistent with Hussey and Campbell-Meier (2021), who conceptualised mentorship as a structured and supportive process that fosters both personal and professional growth, and with Pryimak et al. (2024), who identified mentorship as a key driver of teachers' continuous learning and adaptive competence. Similarly, Susanto and Sawitri (2022) reported that mentoring enhances motivation, instructional competence, and commitment, all of which are core components of effective professional development for science teachers.

However, the strength of the observed relationship also suggests that mentorship alone may not fully account for variations in professional development outcomes, pointing to the influence of contextual and structural factors within the school system. While the finding aligns with studies that highlight the positive contribution of mentoring to professional growth and career development (Baran & Zarzycki, 2021; Tratsevskyi & Kubitskyi, 2024), it contrasts with the position of Bachkirova et al. (2020) and Tuma et al. (2021), who found that mentoring does not always yield positive outcomes, particularly where programmes are poorly structured, mentors are inadequately prepared, or roles are unclear. This contrast underscores the importance of well-designed mentoring frameworks, as emphasized by Stoeger et al. (2021) and Treasure et al. (2022), and suggests that strengthening the quality and organisation of mentorship practices is essential for maximizing their impact on teachers' professional development.

Conclusion

Findings of the study showed that mentorship practices exist but at a low level and the level of professional development is moderate with teachers participating in workshops, seminars or subject based training only sporadically. There was a positive and statistically significant relationship between mentorship and professional development among secondary school science teachers. . This finding confirms that mentorship remains a vital mechanism for enhancing teachers' professional growth by supporting reflective practice, instructional improvement, and career development.

Recommendation

1. School administrators should establish structured and formal mentorship programmes for secondary school science teachers with clearly defined goals, roles, and expectations.
2. Education authorities should organize regular training and capacity-building workshops to equip mentors with effective mentoring skills and strategies.
3. Adequate institutional support, including time allocation and resources, should be provided to sustain effective mentorship practices.

References

Akpan, I. F. (2019). Global Challenges in Science Education in Higher Education and the way forward. *International Journal of Academic Discourse,* 11(1), 200-207.

Al Hilali, K. S., Al Mughairi, B. M., Kian, M. W., & Karim, A. M. (2020). Coaching and mentoring. Concepts and practices in development of competencies: A theoretical perspective. *International Journal of Academic Research in Accounting, Finance and Management Sciences, 10*(1), 41-54. https://doi.org/10.6007/ijarafms%2Fv10-i1%2F6991

Bachkirova, T., Arthur, L., & Reading, E. (2020). *Evaluating a coaching and mentoring program: Challenges and solutions.* In J. Passmore, & D. Tee (Eds.) Coaching researched: A coaching psychology reader (pp. 361-378). John Wiley & Sons Ltd. https://doi.org/10.1002/9781119656913.ch19

Baran, M., & Zarzycki, R. (2021). Key effects of mentoring processes − Multi-tool comparative analysis of the career paths of mentored employees with non-mentored employees. *Journal of Business Research*, 124, 1-11. https://doi.org/10.1016/j.jbusres.2020.11.032

Bastiansen, S., & Wittek, L. (2023). Problem-based peer group mentoring: A tool for faculty development. In T. de Lange, & L. Wittek (Eds.) Faculty peer group mentoring in higher education: Developing collegiality through organised supportive collaboration (pp. 131-154). *Springer International Publishing*. https://doi.org/10.1007/978-3-031-37458-6_8

Davis, S. N., & Jones, R. M. (2020). The genesis, evolution, and influence of undergraduate research mentoring relationships. *International Journal for the Scholarship of Teaching and Learning,* 14(1), 6. https://doi.org/10.20429/ijsotl.2020.140106

Dirks, J. L. (2021). Alternative approaches to mentoring. Critical Care Nurse, 41(1), e9-e16. https://doi.org/10.4037/ccn2021789

Gadomska-Lila, K. (2020). Effectiveness of reverse mentoring in creating intergenerational relationships. *Journal of Organizational Change Management,* 33(7), 1313-1328. https://doi.org/10.1108/JOCM-10-2019-0326

Grant, M. A., Bloom, G. A., & Lefebvre, J. S. (2020). Lessons learned: Coaches' perceptions of a pilot e-mentoring programme. *International Sport Coaching Journal,* 7(1), 22-30. https://doi.org/10.1123/iscj.2018-0058

Hryshchenko, Artechuk, Zavhorodnya, Tymosheno & Purhani (2025). The role of mentoring in the employee professional development and career growth.*Sapienza: International Journal of Interdisciplinary Studies,* 6(1), 1-13

Hu, Z., Li, J., & Kwan, H. K. (2022). The effects of negative mentoring experiences on mentor creativity: The roles of mentor ego depletion and traditionality. *Human Resource Management,* 61(1), 39-54. https://doi.org/10.1002/hrm.22076

Hussey, L., & Campbell-Meier, J. (2021). Are you mentoring or coaching? Definitions matter. *Journal of Librarianship and Information Science,* 53(3), 510-521. https://doi.org/10.1177/0961000620966651

Ivey, G. W., & Dupré, K. E. (2022). Workplace mentorship: A critical review. Journal of Career Development, 49(3), 714-729. https://doi.org/10.1177/0894845320957737

Lazor, O., Lazor, O., Zubar, I., Zabolotnyi, A., & Yunyk, I. (2024). The impact of digital technologies on ensuring transparency and minimising corruption risks among public authorities. *Pakistan Journal of Criminology,* 16(2), 357-374. https://doi.org/10.62271/pjc.16.2.357.374

Mullen, C. A., & Klimaitis, C. C. (2019). Defining mentoring: A literature review of issues, types, and applications. Annals of the New York Academy of Sciences, 1483(1), 19-35. https://doi.org/10.1111/nyas.14176

Murrell, A. J., Blake-Beard, S., & Porter Jr, D. M. (2021). The importance of peer mentoring, identity work and holding environments: A study of African American leadership development. *International Journal of Environmental Research and Public Health*, 18(9), 4920. https://doi.org/10.3390/ijerph18094920

Pollard, R., & Kumar, S. (2021). Mentoring graduate students online: Strategies and challenges. *International Review of Research in Open and Distributed Learning*, 22(2), 267-284. https://doi.org/10.19173/irrodl.v22i2.5093

Poth, C., & Munce, S. E. (2020). Commentary-preparing today's researchers for a yet unknown tomorrow: Promising practices for a synergistic and sustainable mentoring approach to mixed methods research learning. *International Journal of Multiple Research Approaches,* 12(1). https://doi.org/10.29034/ijmra.v12n1commentary

Pryimak, M., Bigun, V., & Lazorenko, T. (2024). Model of management of professional growth and career *development of employees.* Scientific Innovations and Advanced Technologies, 2(30), 498-509. https://doi.org/10.52058/2786-5274-2024-2(30)-498-509

Randel, A. E., Galvin, B. M., Gibson, C. B., & Batts, S. I. (2021). Increasing career advancement opportunities through sponsorship: An identity-based model with illustrative application to cross-race mentorship of African Americans. Group & Organization Management, 46(1), 105-142. https://doi.org/10.1177/1059601120978003

Schwartz-Shea, P. (2020). Mentoring: The consequences of formalization in the age of corporatization. PS: *Political Science & Politics,* 53(4), 775-779. https://doi.org/10.1017/S1049096520000517

Stoeger, H., Balestrini, D. P., & Ziegler, A. (2021). Key issues in professionalizing mentoring practices. Annals of the New York Academy of Sciences, 1483(1), 5-18. https://doi.org/10.1111/nyas.14537

Susanto, P. C., & Sawitri, N. N. (2022). Coaching, mentoring, leadership transformation and employee engagement: A review of the literature. *Dinasti International Journal of Education Management and Social Science,* 4(2), 297-308. https://doi.org/10.31933/dijemss.v4i2

Tratsevskyi, S., & Kubitsky, S. (2024). The impact of intellectual capital management on organisational competitiveness. In M. Holdenblat (Ed.) V International scientific and theoretical conference «The process and dynamics of the scientific path», collection of scientific papers «SCIENTIA» (pp. 15–20). *International Center of Scientific Research.* https://previous.scientia.report/index.php/archive/article/view/1590

Tuma, T. T., Adams, J. D., Hultquist, B. C., & Dolan, E. L. (2021). The dark side of development: A systems characterization of the negative mentoring experiences of doctoral students. CBE—Life *Sciences Education,* 20(2), ar16. https://doi.org/10.1187/cbe.20-10-0231

Tynjälä, P., Pennanen, M., Markkanen, I., & Heikkinen, H. L. T. (2019). Finnish model of peer-group mentoring: review of research. Annals of the New York Academy of Sciences, 1483(1), 208-223. https://doi.org/10.1111/nyas.14296

Umoetuk, E. U., Boc-Ifeobu, J. A., Eden,M. I.& Mbuk, W. E. (2023). School Discipline, Reward System and Administrative Efficacy of Principals in Secondary Schools in Akwa Ibom State, Nigeria. *Asian Journal of Education and Social Studies,* 49 (3), 312-317

van Dam, L., Blom, D., Kara, E., Assink, M., Stams, G. J., Schwartz, S., & Rhodes, J. (2021). Youth initiated mentoring: A meta-analytic study of a hybrid approach to youth mentoring. *Journal of Youth and Adolescence,* 50, 219-230. https://doi.org/10.1007/s10964-020-01336-5

Voluiko, O., Druchek, O., Benkovsky, S., Zelenyi, V., & Yarema, V. (2024). The social and humanitarian function of law enforcement agencies under martial law. *Pakistan Journal of Criminology*, 16(2), 375-388. https://doi.org/10.62271/pjc.16.2.375.388