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ASSESSMENT OF VIRTUAL TEAM TEACHING APPLICATION AMONG PRE-SERVICE TEACHERS IN FEDERAL COLLEGE OF EDUCATION ABEOKUTA

Abstract: A detailed study of pre-service teachers at the Federal College of Education in Abeokuta examines their collaborative skills and virtual team teaching issues. The major goal is to determine how virtual team teaching affects pre-service teachers' ability to collaborate and navigate its complexities. The study aims to show how virtual team teaching affects pre-service teachers' problems and collaboration. The underlying hypothesis posits that participants engaged in virtual team teaching will exhibit heightened levels of collaboration and critical thinking skills compared to their counterparts employing conventional teaching methods. To accumulate robust empirical evidence, a meticulous 20-item Likert scale questionnaire was judiciously administered to a representative sample of pre-service teachers at the Federal College of Education Abeokuta. The questionnaire methodically gauged participants' perceptions regarding the influence of virtual team teaching on collaborative skills and the challenges encountered. In the subsequent analytical phase, the data underwent rigorous scrutiny using descriptive statistics, meticulously assessing the levels of agreement with each questionnaire item. This study's discerning discoveries make a substantial scientific contribution, propelling our knowledge of how virtual team teaching molds pre-service teachers' collaboration skills and navigates challenges. Rooted in scientific rigor, these insights bear potential significance for educational institutions and teacher education programs. They furnish a nuanced understanding of the efficacy of virtual team teaching as a transformative pedagogical approach, offering valuable guidance for the optimization of pre-service teachers' skills to meet the evolving demands of the modern educational landscape.

Keywords: *Virtual team teaching, Pre-service teachers, Collaborative skills, Challenges, Education*

Introduction

The adoption of virtual team teaching at the Federal College of Education Abeokuta aligns with contemporary educational trends and methodological advancements. This highlighted the importance of experiential learning in teacher education, highlighting the need for prac-

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tical experiences that go beyond just theoretical knowledge [1]. The virtual team teaching approach satisfactorily meets this need by providing pre-service educators with practical, simulated classroom experiences through remote collaboration. The collaborative nature of virtual team teaching is in line with the findings that emphasize the importance of teamwork in promoting both innovative and logical thinking in the field of education [2]. This programme enriches the educational experiences of aspiring educators and fosters a culture of collaborative problem-solving by integrating resources and information from many geographical regions. This expertise is especially advantageous in the present era of global interconnectivity. The emphasis on intercultural engagement and inclusivity is in line with research that highlights the importance of cultural competency in the field of education [3]. Virtual team teaching provides pre-service teachers with a unique opportunity to develop a global mentality by exposing them to many ideas and educational systems. This expertise improves their capacity to efficiently meet the needs of a diverse student group.

However, it is crucial to acknowledge potential barriers and limitations. Experiential learning is valuable because it allows for the practical application of theoretical knowledge in a simulated environment, which may present challenges [4]. Virtual environments may not possess the whole veracity of physical classrooms, and educators should acknowledge this while designing and executing virtual team teaching programmes. The rationale for undertaking this research is intricate and encompasses various facets. The paper states that the dynamic nature of the education industry necessitates continuous evaluation and adaptation of instructional methods. An examination of the effectiveness of virtual team teaching at the Federal College of Education Abeokuta provides useful insights into the practicality and impact of such initiatives.

Moreover, the research aims to improve the existing scholarly literature by evaluating the exact execution of virtual team teaching within the educational system of Nigeria. The unique socio-cultural and institutional factors in Nigeria can have diverse impacts on the results and effectiveness of virtual team teaching, despite the insights provided by global studies. Therefore, this study acts as a concentrated examination of a certain action inside a given context. The adoption of virtual team teaching at the Federal College of Education Abeokuta exemplifies a progressive approach to teacher training. The critical analysis evaluates both the benefits and potential challenges, employing findings from previous research. This research aims to assess the efficacy of the programme in adapting to evolving educational trends and to contribute to the broader discourse on innovative teaching approaches across different educational environments.

Literature review

Increasing Trend in Education

The popularity of virtual team teaching has risen due to several factors, including technological improvements and the necessity to connect theory and practice in teacher education. Therefore, it is imperative to thoroughly analyse the significant rise in virtual team teaching and its effects on preparing future educators for the digital age, promoting global connectivity, and facilitating the development of practical skills. The rapid growth of technology has had a significant impact on the emergence of virtual team teaching. The utilisation of advanced communication and collaboration technology has led to the rise in popularity of virtual team teaching in educational institutions. This method offers cost-effective and easily accessible education. Educational institutions around have acknowledged the significance of preparing pre-service teachers for the digital age [5]. Virtual team teaching facilitates immediate interaction, allows for the utilisation of a wide range of resources, and fosters the development of cooperative learning settings, irrespective of geographical or cultural disparities.

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To adequately equip future educators for the technology-driven era, teacher training programmes should incorporate virtual team teaching. Pre-service teachers can develop expertise in utilising digital tools, platforms, and learning management systems, which have become essential for effective teaching as technology becomes integrated into the educational process. Pre-service teachers can improve their capacity to develop and deliver online courses, enhance their proficiency in digital literacy, and get a thorough comprehension of how technology can be employed to aid student teaching through virtual team teaching [6]. The COVID-19 epidemic has highlighted the essential function of virtual team teaching in cultivating a sense of connectivity among pre-service teachers with the worldwide community. Educational institutions have the ability to employ technology to provide worldwide connections among pre-service teachers, promoting cross-cultural interactions and partnerships. This global partnership allows prospective teachers to enhance their comprehension of education, enhance their cultural awareness, and cultivate the necessary competencies to proficiently instruct in heterogeneous classrooms. Virtual team teaching facilitates the adjustment of future educators to the expanding globalised educational settings by removing geographical obstacles and fostering a feeling of interconnectedness. The utilisation of virtual team teaching in teacher education has the capacity to effectively connect theoretical knowledge with practical application, hence playing a crucial role in the expansion of this technique. According to researchers, pre-service teachers have the chance to utilise instructional strategies, participate in reflective practices, and receive constructive feedback from both instructors and peers through virtual team teaching [7, 8]. This practical training allows aspiring teachers to acquire competencies that are in line with actual classroom teaching situations.

The rapid increase in virtual team teaching in recent years can be attributed to several factors, including advancements in technology, the necessity to adapt to the digital age, the growing global connectivity, and the endeavour to bridge the gap between theory and practice in teacher education, which is one of the strengths of this study. Organisations and educators should modify their teaching techniques and integrate technology to establish engaging and dynamic learning environments as we fully embrace the potential of virtual team teaching. Virtual team teaching will remain crucial in educating and equipping aspiring teachers for the diverse and constantly changing field of education in the digital age. The scientific novelty of this study lies in its emphasis on the integration of technology, the cultivation of digital literacy and practical skills, the promotion of global interconnectedness, and the continued significance of virtual team teaching in teacher education. This study contributes to improving the understanding of effective teaching approaches within the framework of current educational demands.

Importance of Effective Learning Outcomes for Pre-service Teachers

When pre-service teachers engage in virtual team teaching, it is imperative for them to achieve great learning outcomes as they begin their path towards becoming skilled educators. Therefore, it is now more crucial than ever to develop a solid comprehension of educational theories, pedagogical practices, subject matter, and critical skills such as lesson preparation, assessment creation, and classroom management. By achieving these educational objectives, potential educators are provided with the essential tools to provide captivating and effective learning environments, hence promoting student learning. To ensure the best possible learning experience for students, it is crucial that pre-service instructors have a thorough understanding of their specific fields of study. Therefore, it is crucial to emphasise the importance of pre-service teachers gaining a thorough comprehension of educational theories in order to successfully shape their teaching practices and utilise evidence-based solutions [9]. By uti-

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lising this understanding, educators may create educational plans, organise classrooms, and present information in a way that corresponds to the requirements and capabilities of their pupils. Pre-service instructors can foster a conducive climate for student engagement, motivation, and academic achievement by prioritising learning objectives that are firmly rooted in a robust theoretical framework.

Pre-service teachers participating in virtual teamwork must not only improve their academic knowledge, but also develop essential skills that will enhance their effectiveness as educators. These skills include lesson preparation, assessment design, and classroom management, which are crucial for creating effective learning environments [10]. In order to attain successful learning results, it is important to possess the skill to organise lessons in a coherent fashion and utilise a variety of teaching techniques. Pre-service instructors must possess the aptitude to create meaningful exams that accurately gauge students' progress and offer relevant feedback to foster improvement. Establishing and upholding a positive and efficient learning atmosphere, in which pupils feel safe, appreciated, and driven to learn, requires great classroom management abilities.

Challenges Faced by Pre-service Teachers in Virtual Team Teaching Strategies

Many education experts have identified several barriers that hinder the effective implementation of virtual team teaching by pre-service instructors. Technological obstacles pose a significant impediment. Studies have also shown that technology is susceptible to glitches and connectivity issues, which can impede communication and collaborative efforts [11]. Considering the existence of these technical barriers, it becomes imperative to take proactive measures. Highlight the significance of pre-service teachers cultivating their ability to solve problems and actively seeking out alternative answers [12]. Multiple researches have affirmed that staying updated with the latest innovations in online tools and platforms is considered an effective approach to tackle technology challenges [13, 14].

In addition, it is acknowledged that pre-service teachers who participate in virtual team teaching may experience a sense of isolation. This is consistent with observations that indicate a lack of tangible support from peers and mentors, which can lead to students feeling unsupported and deprived of the typical social interactions found in traditional classrooms [15]. To address this challenge, researchers emphasise the importance of actively participating in online forums, professional networks, and mentorship programmes to foster a sense of connection and support [16]. Integrating online group discussions, peer reviews, and collaborative projects is considered essential for enhancing the collaborative and supportive aspects of virtual team education [17].

In addition, pre-service teachers encounter more challenges when it comes to adjusting and being adaptable in order to successfully instruct virtual teams. This aligns with the findings that highlight the significance of instructors adjusting their teaching techniques and delivery approaches to accommodate different learning preferences and technological settings for optimal effectiveness [18]. In addition, another academic also highlights the importance of ongoing training and professional development to enhance teaching skills in the virtual environment [19]. Hence, it is crucial for pre-service teachers to embrace a development mindset and employ reflective practice techniques, as suggested, to continually strengthen and refine their virtual teaching abilities [20].

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Methodology. Research Design

Sample and Sampling Techniques: ($N = 150$)
$ni = 50$ pre-service teachers per level
Simple Random Sampling (SRS)
Instrument: VTT & $PTSSQ$
Sections:
$A \rightarrow 3$ items (Biographical information)
$B \rightarrow 6$ items (Virtual team teaching and collaborative skills)
$C \rightarrow 6$ items (Difficulties of virtual team teaching)
$D \rightarrow 5$ items (Pre-service teachers' perceptions of virtual team teaching)
Total items in VTT & $PTSSQ = 20$ items

The study employed a Descriptive Survey Design *DSD* to comprehensively population. The population, denoted as N, consisted of all pre-service teachers at the Federal College of Education in Abeokuta, Ogun State. The sample size ni was determined to be 50 pre-service teachers from each level, totaling 150 respondents.

The sampling technique applied was Simple Random Sampling (SRS) where 50 respondents were purposefully chosen from each level. This ensured a representative sample for a thorough examination of virtual team teaching's impact on pre-service teachers' skills and challenges.

The primary research tool, denoted as VTT & $PTSSQ$, comprised four sections. Section A focused on biographical information, containing 3 items related to age, gender, and academic years. Sections B and C contained 6 items each, addressing virtual team teaching, collaborative skills, and difficulties faced. Section D encompassed 5 items exploring pre-service teachers' perceptions of virtual team teaching. In total, the questionnaire comprised 20 items, providing a structured approach to gather comprehensive data on the specified variables.

Reliability of the Instrument. A group of students who are not part of the research population but who have some of the same characteristics as the study's participants were given 30 questionnaires. The Virtual Team Teaching and Pre-service Teachers' Skills and Challenges Questionnaire (VTT & $PTSSQ$) reliability was assessed using the Cronbach alpha technique. The outcome, 0.73, demonstrated the instrument's dependability.

Research Questions

1. To what extent has virtual team teaching determine the collaborative skills of pre-service teachers in Federal College of Education Abeokuta?
2. What are the challenges faced by pre-service teachers in Federal College of Education Abeokuta when implementing virtual team teaching strategies, and how can these challenges be mitigated effectively?
3. What is the identified perception of pre-service teachers' about virtual team teaching?

Results and Discussion

RQ_1: To what extent has virtual team teaching determine the collaborative skills of pre-service teachers in Federal College of Education Abeokuta?

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Table 1. Impact of virtual team teaching and collaborative skills on pre-service teachers'

	Virtual Team Teaching and Collaborative Skills	SA	A	D	SD	Mean	Std.
1	Virtual team teaching has improved my ability to collaborate with other pre-service teachers.	46	21	61	22	2.61	1.074
2	Virtual team teaching has enhanced my communication skills.	28	28	65	29	2.97	.958
3	Virtual team teaching has helped me understand diverse perspectives in education.	35	52	18	45	2.51	1.151
4	Virtual team teaching has improved my problem-solving skills.	68	26	46	10	3.01	1.017
5	Virtual team teaching fostered my critical educational practice.	26	42	36	46	2.68	1.089
6	Virtual team teaching has allowed me to share and receive feedback on my teaching strategies effectively.	28	69	31	22	2.31	.942
	N= 150, Weighted Mean=2.58					**2.58**	**1.045**

Mean <2.5 indicates lower skill, Mean 2.5 indicates moderate skill, and Mean > 2.5 indicates higher skill.

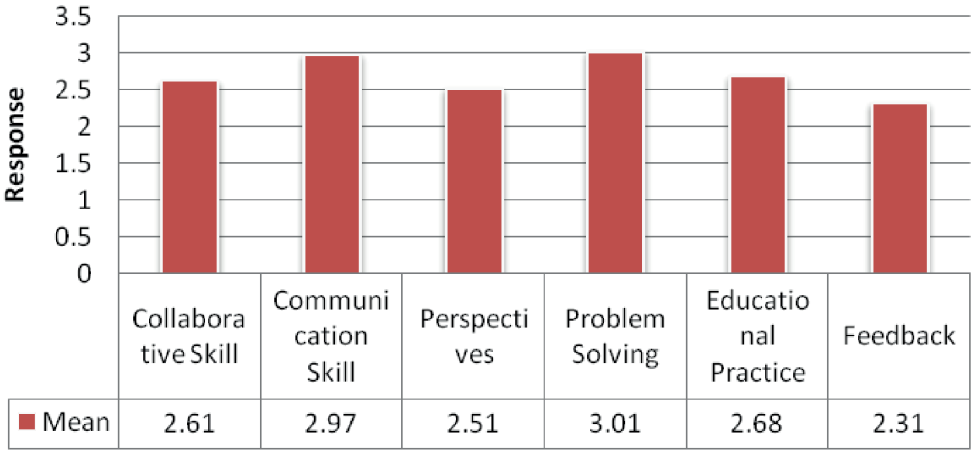

Figure 1. Virtual team teaching and collaborative skills

According to the aforementioned Table 1; Figure 1, mean X= 3.01, SD= 1.017 (problem solving) indicated a higher level of pre-service teachers' competency in virtual team teaching and collaborative skills, followed by mean X= 2.97, SD=.958 (communication skill) which indicated a higher level of pre-service teachers' competency in using virtual team teaching to foster communication skills, mean X= 2.68, SD= 1.089 (educational practice) which indicated a higher level of pre-service teachers' competency in critical educational practice and by using virtual team teaching, pre-service teachers were able to obtain a variety of educational perspectives, as indicated by their mean X= 2.51 and SD= 1.161 (perspectives in education). Additionally, mean X= 2.31, SD=.942 (feedback) indicated that pre-service teachers had lower skill competency while using virtual team teaching to share feedback.

The findings in Table 1, indicate that the majority of pre-service teachers had higher ability levels in using virtual team teaching methodologies generally. This assertion was supported by the mean and standard deviation that were employed. The weighted mean and standard

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deviation score of (Weighted Mean=2.58, Standard Deviation=1.045) were used to demonstrate this. Four of the six mean scores and standard deviations (3.01, 2.97, 2.68, 2.61, 2.51, and greater than 2.31) are higher than the weighted mean scores.

The implications of this data thus revealed the wonderful news of the instructive virtual team teaching technique in encouraging a culture of immersive cooperation and providing prospective teachers with crucial abilities for effective teaching in the prestigious Federal College of Education, Abeokuta.

RQ_2: What are the challenges faced by pre-service teachers in Federal College of Education Abeokuta when implementing virtual team teaching strategies, and how can these challenges be mitigated effectively?

Table 2: Challenges faced by the pre-service teachers in the usage of virtual team strategies.

	Virtual Team Teaching Challenges	SA	A	D	SD	Mean	Std.
7	Managing time effectively is a challenge when participating in virtual team teaching.	53	52	19	26	2.88	1.080
8	Coordinating tasks among team members can be challenging in virtual team teaching.	47	14	47	42	2.44	1.201
9	Lack of face-to-face interaction impacts the effectiveness of virtual team teaching.	52	14	47	37	2.92	1.065
10	Technical difficulties hinder the implementation of virtual team teaching.	25	24	47	54	2.54	1.202
11	Balancing academic workload with virtual team teaching commitments is challenging.	29	19	69	33	2.13	1.085
12	Different time zones pose a challenge when collaborating with remote team members.	42	14	47	47	2.29	1.020
	N=150, Weighted Mean= 2.53					**2.53**	**1.108**

Mean < 2.5 Low Challenge, Mean 2.5 Moderate Challenge, Mean > 2.5 is Higher Challenge

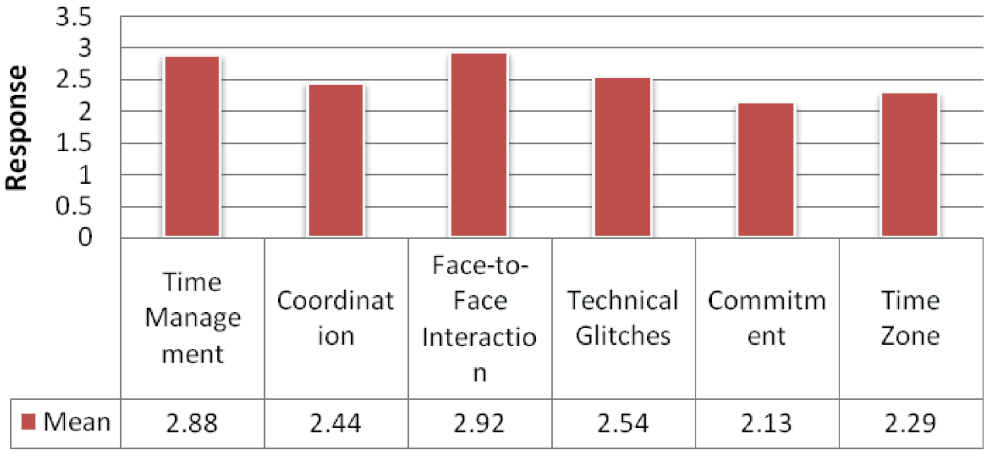

Figure 2. Virtual team teaching challenges

In line with the scale above, Table 2; Figure 2, mean X= 2.92, SD= 1.065 signified higher challenge on the impact of lack of face-to-face interaction on virtual team teaching strategy, follows by mean X= 2.88, SD= 1.080 signified higher challenge on the level of pre-service teachers' compliance to time management in the course of team teaching application, mean

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X= 2.54, SD= 1.202 signified higher challenge in the pre-service teachers' ability to cope with technical capabilities in the usage of team teaching, mean X= 2.44, SD= 1.201 signified a lower level of challenge in the coping capacities of the pre-service teachers' in achieving effective coordination among the users, mean X= 2.29, SD= 1.020 signified lower challenges in the area of timing in respect of the time zones because virtual team teaching strategy allows for flexibility regardless of the time zones. Furthermore, mean X= 2.13, SD= 1.085 signified lower challenges on balancing academic workload with virtual team teaching commitments. The result show a mixed pattern in the outcome of the findings among the pre-service teachers' in respect to the challenges they faced in the application of virtual team teaching strategies. The mean and the standard deviation used corroborated this claim. This was shown with the weighted mean and standard deviation score of **(Weighted Mean=2.53, Standard Deviation= 1.108)**. Out of six mean score and standard deviation, three are with higher challenges with weighted mean score (2.92, 2.88, 2.54) while the remaining three sets of mean (2.44, 2.29, 2.13) are below the weighted mean score.

The implications of this data highlight the high prevalence of difficulties pre-service teachers encounter when attempting to implement virtual team teaching strategies due to technical issues, a lack of face-to-face impact, and a lack of effective time management. These challenges may indicate a need for additional support and training resources in these areas. Pre-service teachers might be helped by methods like offering technical troubleshooting sessions and thorough instruction on time management approaches. On the other hand, the relatively lower level of challenges in time zone differentiation, balancing academic workload with virtual team teaching challenges, and task coordination among pre-service teachers' indicates that they may have developed effective strategies to handle these particular challenges and as a result leveraging these existing competencies.

RQ_3: What is the identified perception of pre-service teachers' about virtual team teaching?

Table 3: Perception of pre-service teachers' about virtual team teaching

	Pre-Service Teachers' Perception of Virtual Team Teaching	SA	A	D	SD	Mean	Std.
13	Virtual team teaching is a valuable approach in preparing me for the modern classroom.	42	14	47	47	2.34	1.192
14	Virtual team teaching facilitates the exchange of innovative teaching practices.	19	19	69	43	2.09	.958
15	Virtual team teaching helps me develop adaptability and flexibility in my teaching methods.	28	15	69	38	2.22	1.029
16	I feel more confident in my teaching abilities as a result of participating in virtual team teaching.	34	52	19	45	2.50	1.145
17	Virtual team teaching contributes to my overall professional growth as a pre-service teacher.	28	14	47	61	2.06	1.119
	N=150, Weighted Mean= 2.24					**2.24**	**1.089**

Mean < 2.5 Low Perception, Mean 2.5 Moderate Perception, Mean > 2.5 is Higher Perception

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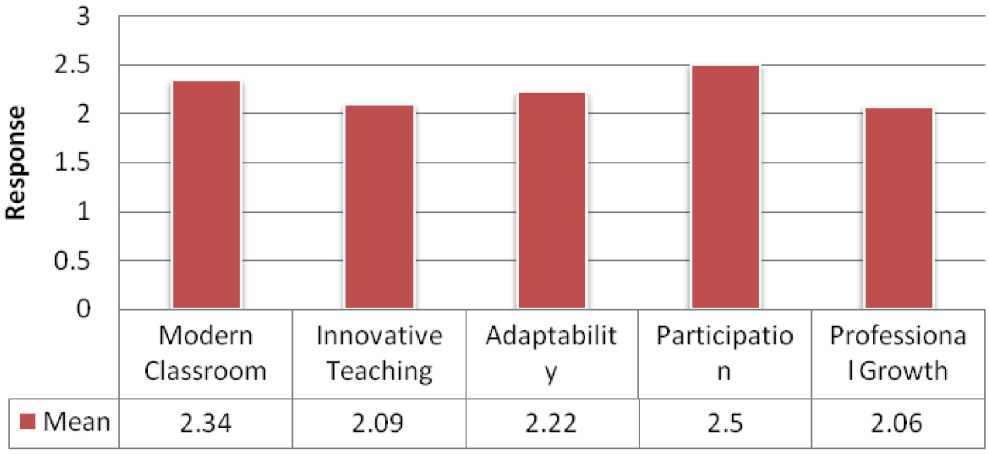

Figure 3. Pre-Service teachers' perception of Virtutal Team Teaching

Using the scale above, Table 1; Figure 1, mean X= 2.50, SD= 1.145 signified moderate perception level of the pre-service teachers' are more confident in their teaching abilities with the usage of virtual team teaching, follows by mean X= 2.34, SD= 1.192 signified low perception of the pre-service teachers' towards recognition of the valuable approach of virtual team teaching in the preparation for modern classroom, mean X= 2.22, SD= 1.029 signified low perception on how virtual team teaching help pre-service teachers' to develop adaptability and flexibility in the teaching methods, also, mean X= 2.09, SD= .958 signified low perception of the pre-service teachers' towards how virtual team teaching facilitates the exchange of innovative teaching practices. Furthermore, mean X= 2.06, SD= 1.119 signified low perception of the pre-service teachers' understanding of how virtual team teaching contributes to their overall professional growth.

The findings indicate that the majority of pre-service teachers have low perceptions of how instructional tactics are used generally. This assertion was supported by the mean and standard deviation that were employed. The weighted mean and standard deviation score of (Weighted Mean=2.24, Standard Deviation=1.089) were used to demonstrate this. Out of five mean scores and standard deviations, four (2.34, 2.22, 2.09, and 2.06) are lower than the weighted mean score, and only one (2.50) is moderate.

This study has two ramifications for how students view online team instruction. The prevalence of mean scores that are below the weighted mean emphasises the need for focused interventions to address the difficulties that students are facing. To assist students in overcoming the challenges of virtual team teaching, these interventions include offering extra assistance, materials, and training opportunities. Furthermore, putting into practice successful development initiatives will require an awareness of the causes of these difficulties, such as technological difficulties, poor communication, or insufficient instruction. However, the availability of one data set with a mean score above the weighted mean suggests that virtual team teaching has produced effective results. Understanding and examining the causes influencing these favourable judgments might offer useful

Conclusion

It is clear from the research on the Virtual Team Teaching (VTT) programme among aspiring teachers at the Federal College of Education in Abeokuta that it significantly fosters a grand culture of collaboration and equips teachers with critical abilities for successful teaching. On the other side, a high frequency of problems such a lack of face-to-face communication, inef-

fective time management, and technical issues point to the necessity of supplemental materials and training. While there are still difficulties, the pre-service teachers demonstrated skill in managing some complexities, such as juggling academics and VTT issues while coordinating work despite time zone disparities. This innate ability is a great starting point for creating all-encompassing training and intervention programmes. The data also shows how students perceive the VTT, with larger mean scores below the weighted mean emphasising the necessity for careful intervention addressing particular student difficulties. This has a dual-faced significance that suggests both the benefits and need for improving the VTT project, which is a genuinely enlightening finding from this in-depth investigation.

Recommendations

1. Thorough training programmes that give future teachers the all-encompassing information and abilities necessary for effective teaching should be required of them. More emphasis should be placed on developing practical skills than only academic understanding.

2. They should work on enhancing their technical abilities given the advent of virtual instruction. This involves utilising different teaching platforms, resolving typical problems, and staying current with new digital teaching technologies.

3. It is important to develop time-management abilities. Teachers can think about enrolling in workshops or online courses that teach good task prioritisation, balance, and scheduling techniques.

4. They should think about creating study groups or collaborative circles with peers to exchange experiences, techniques, and answers to problems that they face in common. This encourages a culture of ongoing learning and development.

5. Regularly attending professional development workshops, even during their pre-service period, can expose them to innovative teaching strategies, new research in the field, and valuable networking opportunities.

6. To continue improving, seeking regular feedback from mentors and peers is vital. It presents a clear picture of their strengths and identifies areas that need enhancement.

7. Lastly, aspiring teachers must adapt their teaching methods to cater for the various learning styles of students. This requires a focus on student engagement, differentiated instruction, and individual students' needs and progress.

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