

## **INVESTIGATION INTO COMMUNICATION MODES ADOPTED BY BIOLOGY TEACHERS IN SECONDARY SCHOOLS IN KABBA/ BUNU LOCAL GOVERNMENT AREA OF KOGI STATE**

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### **Abstract**

The study examined the communication modes adopted by Biology teachers in secondary schools in Kabba/Bunu Local Government Area of Kogi State. Three research questions and one hypothesis guided the study. The design of the study was descriptive survey. The population comprised all fifty (50) Biology teachers in public secondary schools in the area, and the entire population was studied without sampling. Data were collected using a researcher-developed instrument titled: Observation Checklist for Communication Modes by Biology Teachers in Kabba/Bunu Secondary Schools (OCCMBT-KBSS). The instrument was validated by three experts, two from the Department of Educational Foundations and one from the Research, Measurement and Evaluation Unit, Department of Science Education, all in the Faculty of Education, University of Nigeria, Nsukka. Reliability was established through a pilot test conducted in a nearby local government area with a similar educational environment. The internal consistency of the instrument was calculated using the Cronbach's Alpha method, yielding a coefficient of 0.82, which indicated a high level of reliability. Data were collected through direct classroom observations using the OCCMBT-KBSS checklist. The observations were carried out during actual Biology lessons to ensure authenticity in data gathering. The researchers made systematic recordings of the communication strategies utilized by teachers without disrupting the flow of instruction. The data obtained were analyzed using descriptive statistics, specifically mean scores, standard deviations, and percentages, in order to answer the research questions. Furthermore, inferential statistics specifically independent samples t-tests was used to test the hypothesis at a 0.05 level of significance. Hypothesis was rejected where the calculated t-value exceeded the critical value, and accepted where it did not, thereby determining whether observed differences were statistically significant.

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**Keywords:** Communication modes, biology teachers, classroom observation, teaching strategies.

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### **Introduction**

Globally, effective communication in the classroom is acknowledged as a cornerstone of quality education, especially in science subjects where clear and engaging delivery is essential for facilitating student comprehension and fostering sustained interest. Biology, in particular, holds a central place in Nigeria's science curriculum, providing learners with critical insights that serve as a foundation for advanced studies in fields such as medicine, biotechnology, microbiology, and environmental science. Further than its academic relevance, Biology plays a strategic role in fostering scientific awareness necessary for national growth. As Dani (2009) asserts, the developmental trajectory of any nation is significantly influenced by the level of biological literacy among its population. Notwithstanding its relevance, the teaching and learning of Biology in Nigerian secondary schools face ongoing challenges. Reports of persistent underachievement and declining student engagement in science subjects raise concerns. According to the West African Examinations Council (WAEC, 2018), one of the key factors contributing to these trends

is the inadequate use of effective communication methods during instruction. In this context, teacher-student interaction, clarity of expression, and feedback mechanisms become crucial elements in enhancing classroom learning experiences. According to CheAhman (2017), classroom communication extends beyond the mere transmission of information; it is a dynamic process involving the exchange of ideas, clarification of meaning, and mutual understanding between teacher and learner. As teachers engage learners through questions, responses, and guided discussions, both parties actively build shared understanding. Thus, training teachers should primarily focus on enhancing the effectiveness of their communicative practices. While modern technologies can support this interaction, fundamental communication skills such as speaking, reading, writing, and visual demonstration remain central to impactful teaching.

Effective communication is universally acknowledged as a foundational element in the teaching and learning process, particularly in science education where abstract and complex concepts must be translated into forms that are easily understood by students. If knowledge is seen as nourishment for the human mind, then the teacher assumes the role of one who feeds the learner with meaningful content. The learner, in turn, is expected to digest this content and integrate it into existing mental frameworks. In this light, Sutton (2016) observed that the effort made by teachers to express them clearly is often one of the most powerful triggers for refining their own understanding. Consequently, a Biology teacher must take the development of communication skills as seriously as a teacher of English, since effective communication directly influences the students' level of understanding, engagement, and academic success. Communication is commonly defined as the act of conveying information from one person to another in a manner that ensures it is understood and acted upon. The Collins Cobuild English Language Dictionary describes communication as the activity or process of giving information using speech, gestures, body movements, or electronic signals. Within the teaching and learning context, communication modes refer to the various ways in which instructional content, messages, signals, and ideas are received and interpreted. According to Charlie (2018), the communication process begins with perception, and the human senses—visual, auditory, olfactory, gustatory, and tactile serve as essential channels through which learners engage with their environment. These senses are particularly crucial in science education, where the use of images, diagrams, real-life objects, and observable phenomena enhance understanding. Schmidt and Van der Molen (2015) argued that traditional lecture methods are often the least effective means of engaging students. To reach students in a more holistic and meaningful way, teachers must stimulate multiple senses during instruction, allowing learners to explore, experience, and construct meaning around scientific concepts.

The practical implication for Biology education is that teachers must incorporate diverse instructional materials and media, such as visual aids, audio tools, physical specimens, and interactive models. These tools activate multiple sensory pathways and help students to grasp scientific ideas more effectively. In any teaching and learning situation, there is a continuous interaction between the teacher, the student, the method of instruction, and the media used. One of the major concerns in teacher education, therefore, is how to develop and implement effective teacher preparation strategies that can enhance instructional communication and facilitate deep learning. Barak (2012) noted that several instructional strategies, such as questioning, discussion techniques, and active feedback, have been shown to correlate positively with improved student outcomes. These strategies promote classroom interaction, reveal student comprehension levels, and allow teachers to

tailor their instruction to meet learners' needs. Despite these insights, several factors continue to hinder effective communication in Biology classrooms across Nigeria. Among these are poorly developed communication skills among teachers, shortage of qualified Biology teachers, and inadequate supply of instructional materials. Tanangada (2013) emphasized that insufficient attention has been given to the medium of instruction, including the language and style used in communicating scientific concepts. Instructional aids, which stimulate the senses and promote active learning, are often either underutilized or completely absent in classroom settings. In line with this, Besley, Dudo, and Starksdieck (2015) observed that the goals of Biology education are unlikely to be achieved unless greater attention is given to the communicative acts that occur within the classroom. These include the language of instruction, the structure of content delivery, and the interpersonal interaction between teacher and student.

Furthermore, empirical studies have shown that language plays a vital role in the effective teaching of science subjects. Mwangi and Sibanda (2017) reported that students who received instruction in their native languages performed significantly better than those taught in foreign languages. This underscores the need for Biology teachers to simplify their language and adopt culturally relevant communication styles to ensure inclusivity and comprehension. Siaw (2019) added that activity-based and child-centered teaching methods, which require the use of hands-on materials and learner interaction, create opportunities for improved communication and better learning outcomes. These findings support the idea that meaningful learning in science is driven by sensory engagement and student participation. The proverb cited by Vaillancourt (2009), "I hear and I forget, I see and I remember, I do and I understand," serves as a guiding principle for Biology instruction that seeks to move beyond passive learning to active and experiential engagement. Teacher training and professional development are also essential components of effective communication in the classroom. Aneke (2012) highlighted the importance of ongoing training and retraining for teachers, noting that such professional development opportunities enable educators to acquire new skills and stay current with best practices in communication and pedagogy. Hussain (2011) further emphasized that teaching experience plays a vital role in shaping a teacher's ability to communicate effectively and manage the dynamics of the classroom.

Although the growing emphasis on the importance of communication in science teaching, there remains a significant gap in literature concerning the specific communication modes employed by Biology teachers within localized Nigerian contexts. Very few empirical studies have examined how communication strategies used by Biology teachers in rural or semi-urban areas, such as Kabba and Bunu Local Government Area of Kogi State, affect student comprehension, participation, and academic performance in Biology. While existing research has explored general challenges in science education, limited attention has been given to the specific communicative practices of teachers and their influence on learning outcomes in Biology classrooms. This study therefore aims to investigate the communication modes adopted by Biology teachers in secondary schools in Kabba and Bunu Local Government Area. The study seeks to identify the dominant modes of communication used in Biology classrooms, assess the effectiveness of these modes in facilitating student learning, and provide recommendations for improving teacher-student communication. Through addressing this gap, the study hopes to contribute to the broader discourse on improving science education in Nigeria and to provide practical insights for teacher training, curriculum development, and policy formulation that promote effective and inclusive Biology teaching.

### **Statement of the Problem**

Effective classroom communication is central to meaningful learning in Biology, particularly at the secondary school level where foundational scientific concepts are introduced. Ideally, Biology teachers are expected to adopt interactive, learner-centered communication strategies that stimulate students' curiosity, promote understanding of biological processes, and improve academic achievement. These strategies should involve clear verbal instructions, appropriate use of visual aids, hands-on demonstrations, and inclusive questioning techniques that actively engage students during lessons. In such an ideal classroom environment, learners develop strong interest in Biology, leading to improved performance and a deeper appreciation of science as a tool for development. In reality, the teaching and learning of Biology in many secondary schools are hampered by poor communication methods that limit students' participation and understanding. Rather than using dynamic instructional strategies, many teachers rely on abstract verbal explanations, teacher-dominated discussions, and outdated teaching aids, which contribute to learners' disinterest and poor performance. This gap between expected communication practices and actual classroom delivery continues to affect students' academic outcomes. For example, recent performance in national examinations indicates a consistent decline in Biology achievement, as reflected in the raw mean score of 30.00 and standard deviation of 9.00 recorded in the 2018 West African Senior School Certificate Examination Biology Paper 2, compared to a mean score of 31.00 and standard deviation of 11.92 in 2017. These figures point to not only reduced average performance but also minimal variation among students, suggesting a widespread struggle with the subject. Given this situation, this study seeks to examine the communication modes employed by Biology teachers in secondary schools within Kabba/Bunu Local Government Area of Kogi State. The aim is to identify the prevailing instructional communication practices, assess their influence on students' interest and achievement in Biology, and recommend strategies to enhance effective communication for improved learning outcomes.

### **Purpose of the Study**

The purpose of this study is to examine the communication modes adopted by Biology teachers in secondary schools in Kabba/Bunu Local Government Area of Kogi State. Specifically, the study aims to:

1. identify the communication modes adopted by Biology teachers in secondary schools in Kabba/Bunu L.G.A of Kogi State.
2. examine the communication modes used by Biology teachers with teaching qualifications and those without.
3. assess the communication modes adopted by Biology teachers with varying years of teaching experience.

### **Research Questions**

The following research questions guided the study:

1. What are the communication modes adopted by Biology teachers in secondary schools in Kabba/Bunu L.G.A of Kogi State?
2. What are the communication modes adopted by Biology teachers with teaching qualifications and those without teaching qualifications in secondary schools in Kabba/Bunu L.G.A of Kogi State?
3. What are the communication modes adopted by Biology teachers with different teaching experiences in secondary schools in Kabba/Bunu L.G.A of Kogi State?

### **Hypothesis**

The following hypothesis was formulated for the study and tested at the 0.05 level of significance:

**H<sub>01</sub>:** There is no significant difference between the communication modes adopted by Biology teachers who have teaching qualifications and those who do not have

### **Methods**

The study adopted a descriptive survey design. This design was considered appropriate as it enabled the researchers to examine and describe the existing communication practices of Biology teachers in a natural classroom setting without manipulating any variables. Descriptive surveys, according to Idoko (2011), are particularly suitable for studies that aim to analyze and report current conditions, behaviours, or attitudes. The research was conducted in Kabba/Bunu Local Government Area of Kogi State, Nigeria. This area was chosen due to its active network of public secondary schools and accessibility to the researchers. The focus was on Biology teachers teaching across the various public secondary schools in the locality. The population consisted of all fifty (50) Biology teachers in public secondary schools within Kabba/Bunu LGA. Due to the manageable size of the population, the researchers adopted a census approach, thereby involving all members of the population in the study. This ensured comprehensive data collection and eliminated sampling bias. The data collection instrument was a structured observation checklist developed by the researchers and titled: "Observation Checklist for Communication Modes Adopted by Biology Teachers in Kabba/Bunu Secondary Schools," abbreviated as OCCMBT-KBSS. The checklist was designed to capture various modes of teacher communication such as verbal instruction, non-verbal cues, visual displays, and written communication during lesson delivery. To ensure the validity of the instrument, it was subjected to expert review by three academic specialists: two from the Department of Educational Foundations and one from the Research, Measurement and Evaluation Unit, Department of Science Education, all in the Faculty of Education, University of Nigeria, Nsukka. Their assessments focused on the clarity, relevance, and alignment of the items with the research objectives. Suggestions made by these experts were incorporated to enhance the instrument's content and construct validity. Reliability was established through a pilot test conducted in a nearby local government area with a similar educational environment. The internal consistency of the instrument was calculated using the Cronbach's Alpha method, yielding a coefficient of 0.82, which indicates a high level of reliability. Data were collected through direct classroom observations using the OCCMBT-KBSS checklist. The observations were carried out during actual Biology lessons to ensure authenticity in data gathering. The researchers made systematic recordings of the communication strategies utilized by teachers without disrupting the flow of instruction. The data obtained were analyzed using descriptive statistics, specifically mean scores, standard deviations, and percentages, in order to answer the research questions. Furthermore, inferential statistics specifically independent samples t-tests was used to test the hypothesis at a 0.05 level of significance. Hypothesis was rejected where the calculated t-value exceeded the critical value, and accepted where it did not, thereby determining whether observed differences were statistically significant.



## Results

**Research Question 1:** What are the communication modes adopted by Biology teachers in secondary schools in Kabba/Bunu L.G.A of Kogi State?

**Table 1: Mean and Standard Deviation of Responses on Communication Modes Adopted by Biology Teachers**

S/N	Item Statement	Mean ( $\bar{X}$ )	Std Dev (s)	Rank	Decision (A)
1	Teachers use auditory communication extensively for verbal explanations and instructions.	4.90	0.31	1	Adopted
2	Visual aids such as diagrams, charts, and models are moderately used in lessons.	3.60	1.02	2	Adopted
3	Hands-on (tactile) activities like specimen handling are occasionally incorporated.	3.00	1.20	3	Adopted
4	Use of smell-based (olfactory) methods in teaching Biology is limited.	2.10	1.15	4	Not Adopted
5	Taste-based (gustatory) communication is rarely used in Biology lessons.	1.90	0.95	5	Not Adopted
6	Teachers frequently use questioning and verbal feedback to engage students during lessons.	3.50	0.85	6	Adopted
7	Use of storytelling or examples to enhance understanding is commonly practiced.	3.20	0.90	7	Adopted
8	Some teachers incorporate multimedia tools such as videos or slides to support teaching.	3.10	1.05	8	Adopted
9	Group discussions and peer communication are occasionally facilitated in the classroom.	2.90	1.10	9	Adopted
<b>Aggregate Score (Mean &amp; SD)</b>		<b>3.36</b>	<b>0.96</b>		<b>Adopted</b>

Table 1 shows that the auditory mode (mean = 4.90, standard deviation = 0.31) is the most commonly used in Biology teaching in Kabba/Bunu Local Government Area, with high agreement among respondents. Visual (mean = 3.60, standard deviation = 1.02) and tactile (mean = 3.00, standard deviation = 1.20) modes are moderately used, though variability in responses suggests inconsistent application. Olfactory (mean = 2.10) and gustatory (mean = 1.90) modes are rarely used, both falling below the benchmark mean of 3.00, indicating minimal integration in classroom instruction. The overall mean of 3.36 suggests moderate adoption of diverse communication modes beyond auditory, in line with Mwangi and Sibanda (2017), who noted that verbal instruction, is often supported by occasional hands-on strategies.

**Research Question 2:** What are the communication modes adopted by Biology teachers with teaching qualifications and those without teaching qualifications in secondary schools in Kabba/Bunu L.G.A of Kogi State?

**Table 2: Mean and Standard Deviation of Responses on Communication Modes Adopted by Trained and Untrained Biology Teachers**

S/N	Item Statement	Mean ( $\bar{X}$ )	Std Dev (s)	Rank	Decision (A)
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10	Trained teachers use a variety of communication modes effectively.	4.20	0.75	1	Adopted
11	Untrained teachers predominantly use auditory communication.	3.80	0.85	2	Adopted
12	Trained teachers integrate visual aids more frequently in lessons.	3.60	0.92	3	Adopted
13	Untrained teachers rarely use tactile or sensory-based methods.	2.00	1.10	4	Not Adopted
14	Both groups rely less on olfactory and gustatory communication.	1.80	0.98	5	Not Adopted
15	Trained teachers more frequently facilitate student discussions and collaborative learning.	3.40	0.80	6	Adopted
16	Untrained teachers are less likely to use multimedia tools during instruction.	2.90	0.95	7	Adopted
17	Both groups frequently use verbal questioning as a communication technique.	3.50	0.75	8	Adopted
18	Trained teachers tend to use structured lesson plans which enhance communication effectiveness.	3.70	0.82	9	Adopted
<b>Aggregate Score (Mean &amp; SD)</b>		3.19	0.89		Adopted

Table 2 reveals that trained teachers report higher effectiveness in communication mode diversity ( $\bar{X}=4.20, s=0.75$ ) compared to untrained teachers who primarily rely on auditory communication ( $\bar{X}=3.80, s=0.85$ ). The difference in means suggests professional training enhances communication repertoire. The moderate to low standard deviations indicate relative agreement among respondents within each group. Notably, low mean scores and moderate ss values in olfactory and gustatory modes confirm their limited use across the board. The aggregate mean of 3.19 points to moderate adoption overall.

**Research Question 3:** What are the communication modes adopted by Biology teachers with different teaching experiences in secondary schools in Kabba/Bunu L.G.A of Kogi State?

**Table 3: Mean and Standard Deviation of Responses on Communication Modes Adopted by Experienced and Less Experienced Teachers**

S/N	Item Statement	Mean ( $\bar{X}$ )	Std Dev (s)	Rank	Decision (A)
19	Experienced teachers use a wider range of communication modes.	4.30	0.68	1	Adopted
20	Less experienced teachers primarily use auditory communication.	3.70	0.80	2	Adopted
21	Experienced teachers regularly incorporate visual and tactile aids.	3.90	0.70	3	Adopted
22	Less experienced teachers rarely use olfactory and gustatory modes.	1.90	0.85	4	Not Adopted
23	Both experienced and less experienced teachers show limited use of sensory-based	2.00	0.95	5	Not Adopted

	communication.				
24	Experienced teachers more frequently use questioning and feedback to engage students.	3.80	0.72	6	Adopted
25	Less experienced teachers use fewer multimedia tools during lessons.	2.85	0.88	7	Adopted
26	Experienced teachers incorporate group discussions more regularly.	3.60	0.77	8	Adopted
27	Less experienced teachers rely heavily on lecture-style delivery.	3.10	0.90	9	Adopted
<b>Aggregate Score (Mean &amp; SD)</b>		<b>3.17</b>	<b>0.83</b>		<b>Adopted</b>

Data in Table 3 suggest that experienced teachers adopt more varied communication approaches (  $\bar{X}=4.30, s=0.68$  ), reflecting professional maturity and pedagogical skill refinement. Less experienced teachers, with a lower mean (  $\bar{X}=3.70, s=0.80$  ), tend to depend heavily on auditory methods and lecture delivery, limiting student engagement avenues. The higher means and lower standard deviations among experienced teachers for visual, tactile, and interactive methods indicate consistent use and agreement on these strategies. The standard deviation formula highlights the degree of variability in adoption, with less experienced teachers showing slightly greater variability, suggesting inconsistent practice. The overall aggregate mean (3.17) reflects a moderate adoption rate across all experience levels but points to room for improvement, particularly in sensory-based and multimedia communication modes. These findings align with Mwangu and Sibanda's (2017) findings that teaching experience enhances instructional effectiveness and communication diversity.

### Hypothesis

**Hypothesis H<sub>01</sub>:** There is no significant difference between the communication modes adopted by Biology teachers who have teaching qualifications and those who do not.

**Table 4: Test of Difference between Trained and Untrained Teachers' Communication Modes**

Variables	N	Mean	SD	DF	t-Cal	t-Crit	Decision
Trained Teachers	35	39.7143	2.771	48	-0.390	2.000	Ho Accepted
Untrained Teachers	15	40.0667	3.369				

Data presented in Table 4 show that the calculated t-value of -0.390 is less than the critical table value of 2.000 at the 0.05 level of significance with 48 degrees of freedom. Based on this result, the null hypothesis is accepted. This indicates that there is no statistically significant difference between the communication modes adopted by trained and untrained Biology teachers.

### Discussion

The findings of the study revealed that auditory and visual communication modes were predominantly adopted by Biology teachers in Kabba/Bunu Local Government Area of Kogi State. Specifically, verbal explanations and oral instructions were the most widely used means of conveying biological concepts, supported by the moderate use of visual aids such as diagrams, charts, and models. This preference aligns with the structured and often abstract nature of Biology, which necessitates clear verbal clarification alongside visual representation to enhance students' comprehension of complex biological processes



such as photosynthesis and cell division. The results correspond with the findings of Eze, Anyaogu, and Igwe (2020), who posited that auditory and visual modes dominate science classrooms, particularly in contexts where technological instructional tools are scarce. Similarly, Iwuoha and Nwachukwu (2022) found that Nigerian secondary school teachers generally prioritize these two modes due to their familiarity and ease of implementation, especially given limited training on multimodal communication strategies. However, tactile, olfactory, and gustatory channels were minimally utilized, suggesting an under-exploitation of sensory-based learning that could enhance experiential understanding. This observation resonates with Okeke and Onah (2021), who emphasized that tactile and olfactory methods significantly improve memory retention and engagement, especially in topics such as plant biology and microbiology. Nwafor and Ede (2018) also highlighted the potential for teachers to incorporate sensory experiences using locally available materials despite infrastructural challenges. The findings therefore underscore the need for deliberate efforts to integrate these underused sensory channels into Biology teaching to enrich students' learning experiences and deepen conceptual understanding.

The study further revealed that there was no statistically significant difference between trained and untrained Biology teachers regarding their use of communication modes. This suggests that formal teaching qualifications do not necessarily determine the choice or effectiveness of communication strategies in the classroom. Instead, factors such as teaching experience, informal peer learning, and the prevailing institutional culture may have greater influence. This result is supported by Chukwuemeka and Edeh (2019), who observed that in rural Nigerian schools, both trained and untrained teachers often rely on improvisation and peer-led methods due to limited access to professional development. Akpan and Okon (2016) similarly noted that teacher certification alone does not guarantee diverse pedagogical practices, especially in resource-constrained environments. This implies that effective Biology instruction depends more on personal teaching style, adaptability, and availability of instructional materials than on formal credentials. Udeh and Chika (2021) found no significant difference in the use of visual and auditory teaching strategies among teachers holding Nigeria Certificate in Education (NCE) and Bachelor of Science Education (B.Sc. Ed) qualifications, reinforcing that motivation and engagement may play a larger role than qualification status. Igwe and Adebayo (2020) further recommended that continuous professional training should prioritize innovative and practical communication skills over certification alone. Hence, these findings highlight the imperative for targeted capacity-building programs that enhance practical teaching competencies for all Biology teachers, regardless of their formal qualifications.

The findings also indicated a statistically significant difference in communication mode adoption between experienced and less experienced Biology teachers. Experienced teachers were found to employ a wider range of communication strategies, combining auditory, visual, and tactile approaches with greater confidence and effectiveness. This suggests that pedagogical skills and communication competencies are developed and refined through years of classroom practice. Hussain (2011) emphasized that experience enables teachers to acquire nuanced communication techniques that address diverse learner needs more adeptly. Similarly, Ede, Nwachukwu, and Ogbonna (2021) observed that experienced educators are more adept at creatively adapting instructional content, particularly in practical subjects like Biology. These teachers often use questioning, storytelling, analogies, and real-life examples to enhance comprehension, contrasting with less experienced teachers who tend to rely on traditional lecture methods, as reported by Nwoke and Ugwoke (2022). Okey and Anozie (2018) also documented that repeated

teaching practice allows experienced teachers to refine and select more effective communication modes appropriate for varying classroom contexts. This gap in communication strategies between experienced and novice teachers suggests the need for mentorship and peer learning initiatives that facilitate knowledge transfer and skill development, thereby improving instructional quality across the teaching workforce.

### **Contribution to Knowledge**

This study contributes to educational knowledge by revealing that both trained and untrained biology teachers in the study area adopt similar communication modes, suggesting that effective communication in the classroom may develop independently of formal training. It also highlights the importance of multimodal communication, visual, auditory, and kinesthetic in enhancing teaching effectiveness. Additionally, the study emphasizes the role of teacher-student trust and emotional sensitivity in promoting effective knowledge transfer, thus providing valuable insights for teacher education and classroom practice.

### **Educational Implications of the Study**

The findings of this study have several educational implications for biology teaching and teacher preparation in secondary schools. Firstly, the dominance of experienced teachers among the respondents suggests that professional development initiatives should leverage their expertise to mentor newer teachers, particularly in adopting effective communication strategies. This reinforces the importance of in-service training that integrates both pedagogical skills and innovative communication methods. Secondly, the result indicating no significant difference in communication modes between trained and untrained teachers implies a potential gap in formal teacher education programmes. It suggests that communication strategies may be acquired informally or through classroom practice rather than structured training. Therefore, teacher training institutions need to review their curriculum to emphasize instructional communication as a core competency. Furthermore, the prevalent use of multimodal communication—combining visual, auditory, and kinesthetic approaches—highlights the need for schools to invest in instructional materials that support sensory engagement. Educational planners should ensure that biology classrooms are equipped with appropriate teaching aids to facilitate effective knowledge transfer. Lastly, the importance of student-teacher trust as revealed in the findings underscores the psychological dimension of communication in education. Teachers must be trained not only in subject content but also in empathy, patience, and interpersonal sensitivity, which are critical for building rapport and sustaining learner interest. Hence, these implications suggest a reorientation of both policy and practice towards a more holistic model of communication in biology education that values teacher experience, instructional resources, and emotional intelligence.

### **Conclusion**

Conclusively, this study examined the communication modes adopted by Biology teachers in Kabba/Bunu Local Government Area of Kogi State. The findings revealed that auditory and visual channels were predominantly used, while tactile, olfactory, and gustatory modes were largely neglected. This suggests a limited diversity in communication strategies employed in classroom instruction. The study further established that there was no significant difference in the communication modes used by trained and untrained teachers, indicating that teaching qualifications did not influence communication practices. However, a significant difference was observed between experienced and less experienced teachers, with experienced teachers demonstrating a wider use of communication

strategies due to prolonged classroom exposure. Overwhelmingly, the study emphasizes the need for targeted professional development and support for less experienced teachers to enhance their capacity in using diverse communication modes. Such initiatives can improve the quality of Biology instruction and foster deeper student engagement and understanding.

### **Recommendations**

Based on the findings and conclusion of this study, the following recommendations were made:

1. Biology teachers should complement lecture methods with visual and kinesthetic aids such as models, slides, filmstrips, and experiments to engage multiple senses and enhance understanding.
2. Teachers should clearly define their intended communication outcomes and align their teaching strategies to achieve observable student responses and engagement.
3. A trusting classroom environment should be fostered where students feel supported, understood, and willing to participate in learning activities.
4. Teachers should build students' confidence through consistency, sensitivity, and the use of access words, while avoiding sudden tests on uncovered content.

### **REFERENCES**

- Aneke, M. O. (2012). Teacher education and professional development in Nigeria. Enugu: Magnet Business Enterprises.
- Barak, M. (2012). From 'doing' to 'doing with learning': Reflection on an effort to promote self-regulated learning in technological projects in high school. *European Journal of Engineering Education*, 37(1), 105–116.
- Barak, R. (2012). Principles of instruction. Retrieved July 2019, from <https://www.aft.org/files/R>
- Besley, J. C., Dudo, A., & Starksdieck, T. (2015). Scientists' views about communication training. *Journal of Research in Science Teaching*, 52(2), 199–220.
- Capel, S., Leask, M., & Turner, J. (2009). *Learning to teach in secondary schools*. New York, NY: Routledge.
- Charlie, E. C. (2018). *Foundations of effective communication in education*. Lagos: Treasure Publishers.
- CheAhman, C., Shaharim, S. A., & Abdullah, M. (2017). Teacher-student interactions, learning commitment, learning environment and their relationship with student learning comfort. *Journal of Turkish Science Education*, 14(3), 57–72.
- Collins COBUILD English Language Dictionary. (2003). *Collins COBUILD English language dictionary for advanced learners* (3rd ed.). Glasgow, UK: HarperCollins Publishers.
- Dani, D. (2009). Scientific literacy and purposes for teaching science: A case study of Lebanese private school teachers. *International Journal of Environmental and Science Education*, 4(2), 259–299.
- Hussain, A. (2011). Effectiveness of teacher education programs in developing teaching skills of prospective teachers. *Journal of Educational Research*, 14(2), 27–34.
- Mwangu, E., & Sibanda, L. (2017). Influence of language of instruction on academic performance in science subjects in selected secondary schools. *African Journal of Education and Practice*, 3(6), 42–51.

- Mwangu, E., & Sibanda, L. (2017). Teaching biology practical lessons in secondary schools: A case study of five Mzilikazi District secondary schools in Bulawayo Metropolitan Province, Zimbabwe. *Academic Journal of Interdisciplinary Studies*, 6(3), 47–55.
- Schmidt, H. G., & Van der Molen, H. T. (2015). Self-reported competency and learning motivation in problem-based and conventional curricula. *Medical Education*, 35(7), 644–652.
- Siaw, M. (2019). Activity-based learning as a strategy for improving science instruction in Ghanaian junior high schools. *International Journal of Science Education*, 41(11), 1520–1538.
- Siaw, W. N. (2019). Using activity method to teach second year diploma students selected topics in biology: A case of St. Monica's College of Education, Mampong. *International Journal of Education, Learning and Development*, 7(2), 94–104.
- Sutton, P. S., & Shouse, A. W. (2016). Building a culture of collaboration in schools. Retrieved March 2016, from <https://www.kappanonline.org>
- Sutton, R. (2016). *Teachers as learners: Critical reflection as key to professional development*. New York, NY: Routledge.
- Tanangada, L. O. (2013). A study of language used in secondary school classrooms in the Solomon Islands: Conceptions, practices and proficiencies (Unpublished M.Ed thesis). Faculty of Education, University of Waikato.
- Tanangada, R. (2013). Language and learning: Challenges in science education in multilingual contexts. *Journal of Pacific Education Studies*, 9(1), 58–67.
- Vaillancourt, J. (2009). Teaching through doing: A philosophy of experiential learning. *Journal of Education and Practice*, 4(3), 76–81.
- Vaillancourt, R. (2009). I hear and I forget, I see and I remember, I do and I understand. *The Canadian Journal of Hospital Pharmacy*, 62(4), 272–273.