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Research Paper

Teacher Attributes and Problems of Improvisation of Instructional Resources among Biology Teachers in Secondary Schools in Oyigbo Local Government Area

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ABSTRACT: The study investigated the influence of teacher attributes on problems of improvisation of teaching resources among biology teachers in secondary schools in Oyigbo Local Government Area of Rivers State. The study was guided by four research questions and three null hypotheses. The study adopted a descriptive survey design. Purposive sampling technique was used to sample all thirty biology teachers in the public secondary schools in the local government area. The instrument used for data collection was the Problems of Improvisation of Teaching Resources Questionnaire (PITRQ). The instrument had a reliability coefficient of 0.71. The study revealed that finances and attitude of teachers were impediments to improvisation among the biology teachers, but teachers' knowledge, creative ability, and teachers' perceptions of improvised teaching resources were not factors affecting improvisation among the biology teachers. The study also revealed that gender, professional status of teachers, and years of teaching experience had no significant influence on problems of improvisation. Based on the findings, it was recommended, among others, that the teachers show commitment to the job by improvising whenever the need arises.

Keyword: Teacher attributes, problems, improvisation, teaching resources, biology teachers

INTRODUCTION

Science serves as the foundational cornerstone upon which monumental technological advancements are built. Owing to its unparalleled significance, nations across the globe are fervently pursuing the realm of science. An illustrative example is the Federal Republic of Nigeria (FRN, 2008), which, in its National Policy on Education, unequivocally emphasizes the necessity for tailored provisions and enticing incentives to promote the study of sciences at all tiers of the educational framework. Additionally, FRN (2014), through the National Policy on Education, underscores the imperative for education to be meticulously directed towards scientific and technological advancement.

Within the spectrum of scientific disciplines, biology emerges as a pivotal field resonating across numerous domains of human enterprise. This is conspicuously evident in sectors such as manufacturing, processing industries, medicine, food production, pharmaceuticals, and medical laboratory science, among others. Particularly within secondary education, biology assumes a pivotal role as one of the fundamental subjects within the realm of basic sciences. Its instruction is designed to arm students with indispensable skills and scientific orientations indispensable for navigating a rapidly evolving technological landscape. Notably, the teaching and learning of biology, being intrinsically scientific in nature, necessitate a practical pedagogical approach to engender comprehension. Noted scholars Kamar and Bello (20017) emphasize that sciences, including biology, inherently possess an abstract nature, thus rendering their acquisition a formidable undertaking. In congruence, Nnoli (2016) underscores the intricate abstractness intrinsic to the sciences, a factor contributing to the inherent challenges in their acquisition. It is in light of these complexities that Okebukola (2014) avers that the essential conduits through which science education

flourishes are the didactic resources employed in the educational process. The deployment of teaching resources and instructional materials assumes paramount importance in engendering effective biology education. The strategic integration of these tools into the instructional paradigm acts as a catalyst to facilitate the assimilation of concepts, the acquisition of vital knowledge and skills, and the fostering of a scientific mindset necessary to navigate a world increasingly characterized by scientific and technological sophistication. Instructional materials (resources) are defined by Nnoli and Okafor (2017) as all the materials, devices, and equipment that a teacher uses to effectively pass across information to the learners so that the learners receive, comprehend, retain, and apply the knowledge acquired to attain the instructional objectives. According to Usman and Adewunmi (2006), successful implementation of any curriculum is almost fully dependent on the quality and quantity of teaching resources available to teachers and students in schools. In the context of this research study, the term resources as used in the topic and the body of the work is interchangeably used with the phrase instructional materials.

The materials and equipment necessary for ensuring activity-oriented and meaningful teaching and learning of biology are often very scantily provided or not available in schools. Reports of many studies (Kamar and Bello, 2017; Nnoli, 2016; Nnoli and Okafor, 2017) indicate that essential material resources for teaching sciences are unavailable or grossly inadequate in most schools in Nigeria. The situation of unavailability of instructional materials is also existing in schools in Rivers State, as stated in the reports (Beals and Koko, 2019; Mgbomo, 2020). The report indicates that students are not learning science (inclusive of biology) meaningfully.

When faced with the predicament of instructional materials being either unavailable or inadequately supplied, the onus falls on proficient biology teachers, as well as other science educators, to seek out alternative means of rendering instruction genuinely effective and meaningful. This predicament underscores the need for improvisation in situations where optimal teaching resources are lacking.

The conspicuous absence or insufficiency of these resources not only suggests a dearth of government funding for procurement but also hints at the lack of proactive improvisational practices among educators. In line with the elucidation of Kamarise (2014), improvisation emerges as a strategic approach to offering near-equivalent substitutes for instructional materials that, due to factors such as availability, size, cost, or handling risks, cannot be conveniently accessed for educational purposes within the classroom environment. Ahmed, as cited in Mensah (2015), explicates that improvised instructional materials encompass resources employed by teachers when the preferred or original materials are unattainable, yet serve to generate analogous learning outcomes as would standard or conventional instructional materials. The process of improvisation, as illuminated by research, encounters a series of impediments delineated by Utibe-Abasi (2015). These hindrances encompass deficiencies in skills and strategies, financial limitations, paucity of requisite tools, and a lack of exposure. Within this context, the dimension of teacher personal attributes, particularly gender, emerges as an influencing factor in the problems encountered during improvisation.

Notably, the works of Anyanwu and Alafiatayo (2015) and Umezinwa and Udogu (2018) bring to the fore the significant differences between male and female teachers in their encounters with improvisational challenges. Conversely, Abdu-Raheem and Oluwagbohunmi (2015), Igwe et al. (2013), and Utibe-Abasi (2015) divulge inconclusive evidence on the gender-based variance in the obstacles encountered during improvisation.

Nonetheless, the extant literature fails to extend its inquiry to encompass other salient teacher personal attributes, such as professional status and accumulated teaching experience.

It is against this backdrop that the present study is situated. Its objectives encompass an exploration of the factors contributing to improvisation-related challenges, alongside an investigation into the potential influence exerted by teachers' personal variables—namely, gender, professional status, and years of teaching experience—on the challenges associated with improvisation among biology educators operating within secondary schools in the Oyigbo Local Government Area.

Research questions

The study was guided by the following research questions

1. What are the factors affecting improvisation among biology teachers?
2. What is the influence of gender on factors affecting improvisation among biology teachers?
3. What is the influence of professional status on factors affecting improvisation among biology teachers?
4. What is the influence of years of teaching experience on factors affecting improvisation among biology teachers?

Hypotheses

Ho_1: Gender is not a significant determinant of factors affecting improvisation of teaching resources among biology teachers.

Ho_2: Professional status is not a significant determinant of factors affecting improvisation of teaching resources among biology teachers.

Ho_3: Teaching experience is not a significant determinant of factors affecting improvisation of teaching resources among biology teachers

METHODOLOGY

The study adopted a descriptive survey design. The population of the study consisted of 30 biology teachers from the public secondary schools in Oyigbo Local Government Area. All 30 teachers were used for the study. The purposive sampling technique was used to involve all teachers handling biology due to the small population. The instrument used for data collection was the Problems of Improvisation of Biology Teaching Resources Questionnaire (PIBTRQ). The questionnaire has two sections, A and B. Section A elicited bio data, and Section B had 18 items arranged into five parts on the likely factors impeding improvisation. The reliability coefficient of the instrument was r = 1.000 for part 1 (financial factor), r = 0.692 for part II (teachers attitude), r = 0.622 for part III (teachers knowledge), r = 0.759 for part IV (creative ability), and r = 1.000 for part v (teachers perception). For the entire instrument, the reliability coefficient was r = 0.712, obtained through Cronbach alpha as a measure of its internal consistency. Data were analyzed using frequency counts, mean, and standard deviation for research questions, and t-tests and ANOVAs were used for hypotheses.

RESULTS

Research Question 1: What are the factors affecting improvisation of teaching resources among biology teachers in secondary schools?

Table 1 shows that finance and the attitude of teachers are factors affecting improvisation, while knowledge, creative ability, and teachers' perceptions of improvised materials are not problems of improvisation because they are< 2.50 being the criterion mean.

Research Question 2: What is the influence of gender on factors affecting improvisation of teaching resources among biology teachers in secondary schools?

Ho_1: Gender is not a significant determinant of factors affecting improvisation of teaching resources among biology teachers in secondary schools.

Table 2 indicates that the factors affecting improvisation such as finance, attitude of teachers, teachers knowledge, creative ability of teachers and teachers perception of improvised materials are not gender based. The null hypotheses that gender is not a significant determinant of factor affecting improvisation is therefore not rejected (accepted). The result is that gender is not a significant determinant of factors affecting improvisation of teaching resources among biology teachers.

Research Question 3: What is the influence of professional status of teachers on factors affecting improvisation of teaching resources among biology teachers?

Ho_2: Professional status of teachers is not a significant determinant of factors affecting improvisation of teaching resources among biology in secondary schools.

Table 3 shows that factors such as finance, attitude of teachers, teachers knowledge, creative ability, and teachers perception of improvised materials that affect improvisation are not based on the professional status of teachers. The hypothesis that the professional status of teachers is not a significant determinant of factors affecting improvisation among biology teachers is therefore not rejected or accepted. The result is that the professional status of teachers is not a significant determinant of factors affecting the improvisation of teaching resources among biology teachers.

Research Question 4: What is the influence of teaching experience on factors affecting improvisation of teaching resources among biology teachers in secondary schools?

Ho_3: Teaching experience is not a significant determinant of factors affecting improvisation of teaching resources among biology teachers.

Table 4 shows that teaching experience has a significant influence on biology teachers attitudes towards improvisation, while financial factors, knowledge of teachers, creative ability, and teachers perceptions of improvised materials are not influenced by teaching experience. The result is that teachers' attitudes towards improvisation as an impending factor are significantly influenced by years of teaching experience. Post Hoc test revealed that the significance was actually on 1-5years and 6-10years teaching experience

The result also shows that there is no significant difference between the attitude of biology teachers with 1 – 5years teaching experience and those with 11 and above years of teaching experience and no significant difference between the attitude of biology teachers with 6 – 10 years teaching experience and those with 11 and above years teaching experience The result is that teaching is not a significant determinant of biology teachers attitude towards improvisation of teaching resources.

DISCUSSION

The findings of the study underscore several crucial

Table 1: Mean and standard deviation showing factors affecting improvisation.

Factor	S/N	Item statements	N	Mean	SD	Remark
Financial	1.	No money to purchase materials	30	3.60	0.62	Agree
	2.	It is tasking in nature	30	3.23	0.72	Agree
	3.	No incentive to motivate me	30	3.40	0.67	Agree
Attitude	4.	Government ought to provide ideal equipment	30	2.60	1.10	Agree
	5.	No reward for improvisation	30	3.20	0.84	Agree
		Average	30	3.11	0.99	Agree
	6	Was not taught improvisation during training	30	2.67	1.00	Agree
	7.	I can easily identify needed materials	30	3.0	0.98	Agree
Knowledge	8	Materials abound in the environment	30	2.63	0.89	Agree
		Average				Agree
	9.	Notice every little thing in my environment	30	3.07	0.98	Agree
	10.	Highly imaginative	30	3.10	0.66	Agree
	11.	Highly inventive	30	3.30	0.59	Agree
	12.	I can easily identify and employ alternative to solve problems	30	3.00	0.74	Agree
	13.	Do not restrict myself to convention	30	2.90	1.09	Agree
	14.	Always come up with novel ideas to solve problems	30	2.97	0.73	Agree
Creative ability	15.	I am a divergent thinker	30	3.07	0.87	Agree
	16.	I am a convergent thinker	30	2.97	0.99	Agree
	17.	Always have the determination and never daunted by obstacles	30	29.7	0.99	Agree
		Average	30	3.02	0.84	Agree
Perception	18.	Improvised material cannot give the desired effect	30	2.43	8.44	Disagree

Criteria mean=2.50

Table 2: Summary of t-test analysis of the influence of gender on the factors affecting improvisation of teaching resources among biology teachers.

	Gender	n	Mean	SD	T	df	Sig	Decision
Financial Factors	Male	16	3.56	0.62	0.35	28	0.73	NS
	Female	14	3.64	0.63				
Attitude	Male	16	12.81	1.56	0.13	28	0.27	NS
	Female	14	12.00	2.35				
Knowledge factors	Male	16	8.56	1.99	0.83	28	0.41	NS
	Female	14	8.00	1.66				
Creative ability	Male	16	27.31	3.05	0.37	28	0.71	NS
	Female	14	26.93	2.50				
Perception	Male	16	2.25	0.93	0.57	28	0.57	NS
	Female	14	2.43	0.76				

* NS = not significant at 0.05 level of significance.

Table 3: Summary of t-test analysis of professional status of teachers on factors affecting improvisation of teaching resources among biology teachers.

	Professional status	n	Mean	SD	T	Df	Sig	Decision
Financial factor	Professional teachers	23	3.57	0.66	0.55	28	0.59	NS
	Nonprofessional teachers	7	3.71	0.49				
Attitude factor	Professional teachers	23	12.48	2.13	022.	28	0.83	NS
	Non-professional teachers	7	12.29	1.49				
Knowledge factor	Professional teachers	23	8.00	1.86	1.67	28	0.11	NS
	Non-professional teachers	7	9.29	1.49				
Creative ability	Professional teachers	23	27.35	3.08	0.77	28	0.43	NS
	Non-professional teachers	7	26.43	1.13				
Perception	Professional teachers	23	2.35	0.89	0.17	28	0.87	NS
	Non-professional teachers	7	12.29	1.49				

NS = Not significant at 0.05 level of significance.

insights pertaining to the factors influencing the improvisation of teaching resources among biology teachers. Among these factors, finance and teachers' attitudes toward improvisation emerged as significant contributors to the challenges faced, while knowledge, creative ability, and teachers' perceptions were not identified as determinants. In congruence with prior research, the present study aligns with the conclusion that financial constraints serve as a notable impediment to effective improvisation, a notion previously articulated by Utibe-Abasi (2015). This notion is reinforced by the assertions of Ezeasor in Umezinwa and Udogu (2018), indicating that financial limitations constitute a pivotal challenge within the improvisational landscape. Similarly, the attitudinal dimension of teachers towards improvisation assumes significance. The present findings

Table 4: Summary of ANOVA analysis of teaching experience on factors affecting improvisation of teaching resources among biology teachers.

	Teaching Experience	N	Mean	SD	t	df	Sig	Decision
Financial factor	1 – 5years	10	3.40	0.843	2			
	6 – 10years	18	3.72	0.461				
	11 and above years	2	3.50	0.707	27	0.885	0.424	NS
	Total	30	3.60	0.621	29			
Attitude factors	1 – 5years	10	11.10	2.23	2			
	6 – 10years	18	13.06	1.47		0.423	0.025	S
	11 and above years	2	13.50	2.12	27			
	Total	30	12.43	1.98	29			
Knowledge factor	1 – 5years	18	7.80	2.04	2			
	6 – 10years	18	8.56	1.82		0.536	0.591	NS
	11 and above years	2	8.50	0.707	27			
	Total	30	8.30	1.84	29			
Creative ability	1 – 5years	10	26.60	2.27	2			
	6 – 10years	18	27.11	2.74		0.288	0.299	NS
	11 and above years	2	3.00	2.83	27			
	Total	30	27.13	2.76	29			
Perception	1 – 5years	10	2.20	0.9190	2			
	6 – 10years	18	2.44	0.856		0.419	0.662	NS
	11 and above years	2	2.00	0.000	27			
	Total	30	2.33	2.33	29			

resonate with the observations of Enenya and Muhammed (2018), who identified a prevailing negative disposition among teachers toward improvisation. However, this alignment stands in contrast to the positive attitude identified by Anyanwu and Alafiatayo (2015), revealing an inconsistency in the overall orientation of educators towards improvisation. Turning to the sphere of teacher knowledge, the current study diverges from the conclusions drawn by Utibe-Abasi (2015) and Akani (2016), both of whom noted teachers' lack of awareness regarding improvisational strategies. A departure from their findings suggests that teachers' knowledge, at least within this specific context, might not be a decisive factor influencing improvisation. Regarding creative ability as a catalyst for improvisation, the present investigation counters the observations of Okori and Jerry (2017) and Ogbu (2016), who highlighted a deficiency in teachers' capacity to innovate. This contradiction implies that within the studied environment, creative limitations might not be as pronounced as suggested by prior research. Teachers' perceptions of improvised materials also bear significance. In concurrence with Odu (2013) work, the present study confirms positive perceptions among educators regarding improvised teaching materials. However, this conclusion contrasts with the findings of Asare et al. (2018), revealing a disparity in how educators perceive improvised instructional resources. Gender-based differences did not emerge as a significant determinant of the factors influencing improvisation in this study. This finding aligns with the observations of Utibe-Abasi (2015) and Igwe et al. (2013), who discerned no substantial discrepancy between male and female educators in terms of improvisation challenges. In contrast, the current study's divergence from the findings of Anyanwu and Alafiatayo (2015) and Umezinwa and Udogu (2018) underscores the complexity of gender's potential influence within this context. Moreover, the study reveals that neither professional status nor years of teaching experience significantly influence the factors affecting improvisation. This result contrasts with Ngure's observations as cited in Makokha (2017), emphasizing that extensive teaching experience facilitated the production and utilization of instructional materials. The present divergence might stem from a broader sentiment among teachers, regardless of professional status or experience, to enhance students' learning experiences. In essence, this study offers a nuanced perspective on the multifaceted landscape of improvisation among biology teachers. The interplay of diverse factors, their intricate associations, and the potential influence of teacher attributes underline the intricate nature of this critical facet of education.

Conclusion

Based on the findings of the study it is concluded that the biology teachers can actually carry out improvisation if they are willing irrespective of gender, professional status and years of teaching experience.

Recommendations

Based on the findings of the study the following recommendations are made:

1. Government should give enough imprest to schools so that the schools can release money for improvisation.
2. Teachers who carry out improvisation should be identified and rewarded as a form of motivation.

3. The teachers should sit up and show commitment by way of improvising teaching resources when the standard ones are not available.

REFERENCES

Abdu-Raheem, B. O., Oluwagbohunmi, M. F. (2015). Pre-service teachers' problems of improvisation of instructional materials in social studies in Ekiti State. *Journal of Education and Practice, 6* (1), 15 – 18.

Akani, O. (2016). Investigating the availability and the extent of use of instructional materials by secondary school chemistry teachers in Nigeria. *International Journal of Education, Learning and Development, 4*(3), 1 – 11. https//www.eajournal.org.

Anyanwu, R. I. Alafiatayo, B. M. (2015). Biology teachers' attitude toward production and utilization of instructional materials in secondary schools in Kaduna State. *ATBU Journal of Science, Technology and Education, 3*(4), 49 -59. Atbuftejoste.com/index.php/jostelarticle/view/163.

Asare, I., Parker, I., Osei-Himah, V. (2018). Teachers' attitude towards improvisation: Its effect on the study of science of the Junior High School in Aowin Municipality, Ghana. *International Journal of Education, Learning and Development 64*(4), 90 – 95. www.eajournal.org.

Beals, I. S. A., Koko, M. N. (2019). Factors affecting availability of instructional facilities in public senior secondary schools, Port Harcourt, Rivers Stat. *International Journal of Innovative Education, 7* (3), 94 – 100. www.seahipag.org.

Enenya, P. R., Muhammed, S. I. (2018). Biology teachers' attitude towards invention of instructional materials in Sabon-Tasha Inspectorate Division of Kaduna State. *ATBU Journal of Science and Education, 6* (1), 198 – 205. File://cluser/downloads/446-1355-lpb.pdf.

Federal Republic of Nigeria (2008). *The National Policy on Education. NERDC Press.*

Federal Republic of Nigeria (2014). *The National Policy on Education. NERDC Press.*

Igwe, I. O., Arop, A. B., Ibe, J. O. (2013). Problems of improvising instructional materials for teaching and learning of chemistry *Proceedings of the Science Teachers Association of Nigeria, 54*, 273 – 278.

Kamar, V. M., Bello, S. (2017). Senior secondary school biology curriculum and society: The need for adequate laboratory equipment and supporting staff. *Proceeding of the 60th Anniversary of the Science Teachers Association of Nigeria, 197 – 202.*

Kamarise, B. T. (2014). Teachers attitude toward improvisation implication for effective, teaching of social studies in Junior Secondary Schools. *International Journal of Special and General Education* 3, 232 – 236.

Makokha, E. L. (2017). Determinants of pre-primary school teachers use of improvised materials in science instruction in Bungoma East sub county, Bungoma county, Kenya (Master Thesis) Kenyatta University, Kenya. https://ir-library.ku.ac.ke>hamell.

Mensah, D. (2015). Using improvised instructional materials to teach chemical methods. New Mexico Tech – education and psychology department 1-55. https://www.nmt.edu/psychol/assets/chenistry.pdf.

Mgbomo, T. (2020), Assessment of the adequacy of science laboratories resources in Rural secondary schools in Rivers State. *Scholarly Journal of Education, 7*(2), 16 -19.

Nnoli, J. N. Okafor, O. U. (2017). Enhancing students' academic achievement and retention through the use of chemistry instructional materials: Implication for STEM education in our society. *Proceedings of the 60th Anniversary Conference of the Science Teachers Association of Nigeria. 266 -271.*

Nnoli, J. N. (2016). Assessment of available chemistry material resources and secondary school student levels of acquisition of entrepreneurial skills. *Journal of the Science Teachers Association of Nigeria,* 5 (1), 127 – 134.

Odu, O. (2013). Improvisation of instructional materials for introductory technology: The Delta State experience. *Journal of Research in Education and Society, 4*(2), 9 – 16. https://www.(idr.org)jres_vol4002_aug2013/improvisationof.

Ogbu, J. E. (2016). Impediments to effective improvisation of instructional materials for teaching electrical installation work in Ebonyi State Technical Colleges. *British Journal of Education, 4* (2) 51 – 60. www.eajournal.org.

Okebukola, P.A.O. (2014). *Practical handbook on instructional media. (2nd ed.*) Graphcom Publishers

Okori, O. E., Jerry, O. (2017). Improvisation and utilization of resources in the teaching and learning of science and mathematics in secondary school in Cross Rivers State. *Global Journal* of Educational *Research*, 16, 21 – 28.

Umezinwa, N. R., Udogu, O. C. (2018). English language teachers' attitude and challenges to utilization of improvised teaching materials. *International Journal of Arts and Humanities (IJAH), 7*(3), 86 – 91.

Usman, K. O., Adewunma, A. O. (2006). Factors responsible for inability of teachers to improvised instructional materials for the teaching of mathematics. *Journal of the Science Teachers Association of Nigeria, 4 (*1&2), 51 – 56.

Utibe-Abasi, S. S. (2015). Problems of improvising instructional materials for teaching and learning of physics in Awka – Ibom State secondary schools, Nigeria. *British Journal of Education, 3* (3), 27 – 35. https://www.eajournals.org.