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Research Article

Instructional resources for teaching biology in secondary schools in Moro, Kwara State-Nigeria

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ABSTRACT

Instructional resources play an important role in conducting high quality education. This research assessed the availability and utilization of instructional resources in Moro Local Government Area (LGA) of Kwara State, Nigeria. Descriptive survey research was adopted for the study. A total of sixty (60) Biology teachers were randomly sampled from eighteen (18) schools in Moro Local Government Area Kwara State. Three research questions and two hypotheses guided this study. Questionnaire was used as an instrument for data collection and the data was analysed using simple percentage, ANOVA and t-test. The results of the study revealed that instructional resources for teaching Biology were not available in most senior secondary schools in Moro LGA of Kwara State. As high as 51% Biology teachers' ultilized available instructional resources. Teachers' academic qualification significantly influences their use of instructional resources for teaching Biology and there was no significant influence of school type in the use of instructional resources in teaching Biology. Recommendations made were that the government should provide more equipment for the schools for effective teaching and learning Biology, teachers should be encouraged to use Biology laboratory equipment, and in-service teachers training should be encouraged to improve their qualification.

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INTRODUCTION

Biology has been known as the study of life which is learnt specifically from secondary school (Michael, 2012; Mnguni, 2015; Sanders & Jenkins, 2018) and even higher level education (Berger, 2005). By studying Biology, students learn more about themselves and the world they live in (National Research Council, 2009; Steigerwald, 2019). There are several branches of science that prove valuable to the society of man, Biology set itself apart as it focuses on life and all that relates to it. Often regarded as the study of living things, including plants and animals, it is a fascinating study that ranges from microscopic-cellular molecules to the biosphere (Kalluri et al., 2014; Ma'ayan, 2011; Stencel & Proszewska, 2018), encompassing the earth's surface and its living organisms (Punnonen et al., 1995).

The great prestige accorded to Biology is manifest in the fact that it is introduced to students at senior secondary school level as a preparatory ground for human development, where career abilities are groomed

(Hinneh, 2017), potentials and talents discovered and energized. The objectives of Biology learning in Nigeria are: the inculcation of the right type of values and attitudes for the survival of the individual society, the training of the mind in building valuable concepts generalization and the world around us, the acquisition of appropriate skills, abilities and competency both mental and physical, equipping the individual to live in the society, the acquisition of a relevant and balanced knowledge of facts about local and world phenomenon. To achieve these objectives, an effective teaching of Biology is compulsory.

The teaching and learning of all science subjects, particularly in Biology, require a lot of instructional resources. Instructional resources are channels of communication through which messages, information, ideas and knowledge are conveyed or disseminated to learners (Estai & Bunt, 2016; Prachagool & Nuangchalerm, 2019). Biology deals with certain concepts which may seem abstract to students (Etobro & Fabinu, 2017; Tekkaya et al., 2001). The use of instructional resources to teach biology has been found to be a reliable result for concreteness in the subject matter. Instructional materials include all the tools that Biology teachers can use to make the students' learning experience more interesting and memorable. According to (Farinella, 2018; Tribull, 2017), availability and adequacy of instructional resources contribute in improving pupils' participation as it exposes learners to the real world of learning as well as building understanding and retention because when things are seen, they are more remembered than when they are simply heard.

Rani et al. (2020) opined that the use of instructional resources that are related to the basic content of a lesson helps learners to understand a particular lesson. The use of various instructional resources makes the learning process more effective because it builds greater understanding, reinforcement and retention of the subject matter (Aisyah et al., 2017; Dwianto et al., 2017). Instructional resource is a very important concept in education and has gained a lot of attention in teacher education. Instructional resource is powerful media to enhance learning and make it more interesting, interactive, and exciting to all categories of learners with the aim of achieving instructional objectives or outcomes.

Furthermore, instructional resource assist teachers to transmit knowledge in an impressive way making learning more effective as they help learners in greater acquisition of knowledge. It encourages participation, especially if students are allowed to manipulate materials used. Hands-on instructional materials show, rather than tell, which increase information retention (Kos et al., 2021). Schools should base instructional resource on fundamental scientific concepts and principles, which help to align students understanding with current knowledge and teach them to monitor and control their own thoughts, to facilitate learning. The pupils taught with various instructional resources have excellent achievement as compared with those taught without various instructional materials. Hence, it is clear that any effort to enhance effective teaching and learning of Biology will encompass the availability and use of instructional materials.

Notwithstanding that the availability of instructional resources is urgent (Olayinka, 2016), however, several previous research findings revealed that reported that most instructional resource for teaching science were neither available nor utilized for teaching-learning process in Nigeria (Aina & Ayodele, 2018). The implication of these conflicting reports calls for more research efforts in this direction. It is in the light of the above that the researcher seeks to find out the level of the availability and utilization of instructional resource for teaching Biology in Senior Secondary schools in Moro LGA, Kwara State.

The purpose of this study is to explore the level of availability and utilization of instructional resources for teaching Biology in Senior Secondary Schools in Moro LGA., Kwara State. To be more detail, this research provides the information about three points: 1) the availability of instructional resources available for teaching Biology in the senior secondary schools; 2) the influence of teachers' academic qualification on handling the instructional resources in teaching Biology; 3) the influence of school type on the use of instructional resource in teaching Biology.

METHOD

This study has been carried out in senior secondary school in Moro LGA, Kwara State, Nigeria. The population comprised of Biology teachers in all Secondary Schools located in Moro LGA, Kwara State, Nigeria. The studies were carried out in 18 secondary schools in Moro, Kwara State. As many as 60 Biology teachers were involved in the study. This research type adopted descriptive survey method to gather relevant information. The variables tested in the study were: instructional resources, academic qualification, school type of biology teachers. The instruments used for data collection was the Availability and Utilization of Instructional Resources (AUIR).

The procedure for data collection was school visit. The researchers visited each of the selected schools that were involved in the study. The researchers sought permission from the school principal or administrator with letter of introduction from the researchers' Head of Department of Science Education University of Ilorin. The researchers explained to the respondents (teachers) which then the researchers administered the questionnaire to the teachers and collected them back immediately after being completed. The data analysis technique involved was descriptive in term of percentage and inferential statistics which were ANOVA and t-test.

RESULTS AND DISCUSSION

Table 1 shows the percentage of instructional resources available for teaching Biology in senior secondary schools. It can be obviously seen that the percentage of unavailable equipment is higher (53.8%) than the available equipment (46.2%). Moreover, a clear interesting data is the availability of Biology Laboratory in which the gap is quite significant. More than 70% teacher stated that Biology Laboratory was unavailable in their schools. Yet, this facility is the most crucial one in biology learning. Yet, Mukhwana (2016) found that Biology Laboratory is a crucial physical resource which should be available. To be more detail, it should meet the requirements of functional, have adequate space, well-maintained by laboratory technicians and comprised of equitable resources which are distributed. Thus, it will be an effective teaching-learning resource.

The availability of Biology equipment will not only enhance the teaching of Biology, but will help the students to acquire the much talked about process skill in Biology. This study reveals that Biology teachers indicated unavailability of stated Biology laboratory equipment in senior secondary schools in Moro Local Government of Kwara State. This may be due to the fact that the selected Biology laboratory equipment are not available in many senior secondary schools in Moro, Kwara State. It is noted that, in fact, science teaching in Nigeria lays more emphasis on content and the use of 'chalk and talk' method neglecting practical activities and not embracing technological advancements.

Table 1. The percentages of teachers' response about the availability of Biology equipment

S/N	Instructional materials	Available (%)	Not Availabe (%)
1	Biology laboratory	28.6	71.4
2	Charts	57.1	42.9
3	Beakers	85.7	14.3
4	Burners	28.6	71.4
5	Gas Cylinders	42.9	57.1
6	Biology textbook	37.6	62.4
7	Microscopes	14.3	85.7
8	Dissecting Boards	42.9	57.1
9	Hand lens	36.2	63.8
10	Human skeleton	37.4	62.9
11	Mammalian bones	28.6	71.4
12	Jars	51.9	48.2
13	Volumetric flasks	53.3	46.6
14	Conical flasks	67.1	32.9
15	Stop watch	55.7	44.3
16	Micrometer	71.4	28.6
17	Test tubes	62.9	37.1
18	Litmus paper	85.7	14.3
19	Watch glass	35.3	64.7
20	Mortar and pestle	52.8	47.2
21	Paraffin wax	76.1	23.9
22	Pipettes	64.6	35.4
23	Fishes	28.6	71.4
24	Toads	71.4	28.6
26	Lizards	81.5	18.5
27	Rabbits	44.5	55.5
28	Snakes	86.7	13.3
29	Grasshopper	46.7	53.3
30	Crustaceans	88.9	11.1
31	Millipedes	7.4	97.6
32	Earthworms	59.3	40.7
33	Centipedes	6.7	93.33
34	Cockroaches	37.0	63.0
35	Sulphuric acid	88.9	11.1
36	Hydrochloric acid	46.7	53.3

S/N	Instructional materials	Available (%)	Not Availabe (%)
37	Other acids`	81.5	18.5
38	Other bases	47.4	52.6
39	Formaldehyde	51.9	48.1
40	Calcium carbonate	29.6	70.4
41	Sodium chloride	48.2	51.8
42	Ammonium Solution	44.5	55.6
43	Ferric chloride	51.9	48.1
44	Ferrous sulphate	70.34	29.6
45	Dyes	48.1	51.9
46	Vinegars	44.4	55.6
47	Citrates	29.7	70.3
48	Phenolphthalein	37.0	63.0
49	Fehling Solution	45.9	54.7
50	Benedict solution	45.9	54.1
51	Iodine solution 2	8.1	91.9
52	Methylated water	37.7	78.3
53	Nose mask	45.2	54.8
54	Disposable hand gloves	37.0	63.0
55	Insect nets	11.9	88.1
	Average %	46.2	53.8

Table 2 shows biology teachers' academic qualification. Out of 60 teachers, 12(20%) of respondents were NCE holders, 8(13.33%), were B.Sc. holder, 22 (36.67%) holds B.Sc. (Ed), 3(5.0) of respondents were OND holders, 2(3.33%) of respondents were HND holders, 3(5.0) of respondents were M. Sc. Holders, 2(.33%) of respondents were B.Sc. (PGDE) holders, 2(3.33%) of respondents were M. Sc. (PGDE) holders, 3(5.00%) of respondents were M. Ed. Holders, and 3(5.00%) of respondents had other qualifications. The result implies that majority of respondents used for this study hold B.Sc. (Ed.) specialized in Biology Education.

This fact can be explained that the better the teachers' academic qualification the wider the knowledge they got about instructional resources. This can be assumed that the teachers with higher competencies will also possess better skill in handling resources to improve their teaching method in their class. Along with those good knowledge and skill, the more various resources they employ in their teaching sessions. As have been revealed by many previous researchers that there are various teaching strategies (Çimer, 2012; Erinosho, 2013), methods (Jeronen et al., 2016), models (Husamah, 2015; Triani et al., 2018), and resources (Jennings, 2011) can improve students' skills (Haave, 2017).

Table 2. Distribution of respondents by academic qualifications

Qualification	Frequency	Percentage (%)
NCE	12	20
B.Sc.	8	13.33
B.Sc. (Ed.)	22	36.67
OND	3	5
HND	2	3.33
M. Sc.	3	5
B. Sc. (PGDE)	2	3.33
M. Sc. (PGDE)	2	3.33
M.Ed.	3	5
Others	3	5
Total	60	100

Table 3 shows the respondent distribution based on school type in terms of private and public school. It is clear that the teachers who were teaching in private schools (53.3%) were higher compared to those who were employed in public schools (43.3%).

Table 3. The respondents' distribution based on school types

School Type	Frequency	Percentage %
Public	26	43.3
Private	34	53.3
Total	60	100

Teachers' academic qualification is very important in determining learning output. Table 4 depicts the analysis results of ANOVA. Based on the table, it can be inferred that teachers' academic qualification

significantly influence their use of instructional resources in teaching Biology [$F(2,17) = 7.61$, $p<0.05$)]. Çimer (2012) reported that one of the factors makes biology presumed to be difficult, based on students' point of view, is teachers' teaching style. It seems that the more competent the teachers, the more interesting the teaching style they use. As the consequences, it will minimize the boredom which possibly emerge in the class.

Table 4. The summary of ANOVA test results of the influence of teachers' academic qualification on the use of instructional resources in teaching Biology

Source of Variable	Df	SS	Mean Square	Cal F-value	Cri F-value	Decision
Between	2	467	233	7.61	3.00	Rejected
Within	17	6.483	381			

*Significant P< .05

Table 5 shows the result if t-test to prove the influence of school type on the use of instructional resource in teaching Biology. It is clear that the is no significant influence of school type on the use of biology instructional resources ($t(28) = 0.65$, $p>0.05$)]. Even though no significant effect of school type, but, based on Table 5, it can also be seen that the mean value of private school is slightly higher (45.95) compared to public schools. This can be assumed that it is widely known that private schools tend to conduct their school management independently, including financial and resources matters. Moreover, private school needs to emphasize their advantages to compete with public schools. Consequently, they will probably provide better facilities to attract students. This, somehow, appears to be a solution to improve learning quality particularly in Biology subject (Mukhwana, 2016).

Table 5. The t-test analysis results of teachers' ability in using instructional resources based on school type

School type	N	Mean	S.D	df	Cal. value	Table value
Public	26	44.27	6.44	28	0.65	2.05
Private	34	45.95	7.46			

CONCLUSION

Based on the previous discussions, it can be concluded three points of this research i.e., 1) instructional resources for teaching Biology are not available in most of the senior Secondary School in Moro local Government as more that 50% (i.e., 53%) of Biology teachers indicated the unavailability of selected Biology laboratory facilities in Senior Secondary schools in Ilorin, Kwara State; 2) teachers' academic qualifications have influence on the use of instructional resources for teaching Biology; 3) there is no significant influence of school type in the use of instructional resources in teaching Biology. Therefore, the recommendations generated from this study are: 1) the Moro local Government should provide more equipment for the schools for effective teaching and learning of Biology; 2) unqualified Biology teachers should be encouraged to attend seminars to improve themselves academically; 3) both public and private school teachers Biology teachers should be sensitized on the importance of the use of instructional resources in teaching Biology.

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