



Perceived Availability of Infrastructure and Instructional Materials for Learning Basic Science and Technology among Junior Secondary School Students in Zaria Metropolis

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Abstract

This study investigated the perception of students on the availability of infrastructural facilities and instructional materials for the learning of basic science and technology at Junior Secondary Schools in Zaria Metropolis of Kaduna State. A survey research design was used with population comprised of all the JSS III Students in Zaria Metropolis with a total population of 667 students. A sample size of two hundred (200) students participated in the study. Two questionnaires; “Students’ Perception on Basic Science and Technology Infrastructure Availability (SPBSTIA)” and “Students’ Perception on Basic Science and Technology Instructional materials Availability (SPBSTIMA)”, both with fifteen items for infrastructural facilities and instructional materials respectively were used for data collection. The instrument was validated by 3 experts, 2 of them in Educational Management, and 1 in Measurement and Evaluation. The reliability of the instrument was determined using Cronbach Alpha. Alpha value was found to be 0.71, indicating high reliability of the instrument for the study. The Data obtained were analysed using frequencies and percentages. It was found that infrastructural facilities are not adequately made available for the learning of basic science and technology and also, instructional materials were not adequately provided for the learning of basic science and technology as 63% of the respondents respectively agreed that both infrastructure and instructional materials were not available. It is recommended that infrastructural facilities should be provided in all the schools and also, in adequate quantity for effective utilization by the teachers and students, most especially, in Zaria Metropolis. Instructional materials should also be provided in all the schools by the authority concerned in adequate quantity.

Keywords: Instructional Material, Infrastructural Facilities, Zaria Metropolis, Basic science and technology



Introduction

Science education is key to national development in our present day economy; this is as results of the fact that most of the innovations in the world today are products of science and technology. Basic science and technology education is the foundation of science and technology across all the nations of the globe. Science has been characterized as a body of knowledge evolved by scientists while science education builds on the knowledge and skills acquired by the learners so that students can understand scientific principles, laws, and theories. The emphasis on teaching and learning of science is on ensuring that teachers not only teach the processes of science but also enable sensory learners to learn scientific concepts. By this, the “hands” and “minds” of learners must be on scientific activities such that learners will be able to learn actively and thereby participate in knowledge construction (Ausubel, 1963).

For the impact of science and technology to be felt in a country like Nigeria; basic indices which include infrastructure like school blocks and classrooms, sitting desks, school playgrounds/sports facilities, examination halls, library and laboratory blocks, staff rooms, safe water supply and sanitation facilities and clinics for the teaching of basic science and technology. Other materials necessary for the teaching and learning of basic science and technology is instructional materials such as chalkboards, dusters, cardboard drawings, computers systems, projectors, TVs, DVDs, maps, charts, specimens, burners, beakers reagents and demonstration farms.

With the best teachers and the best curriculum, if the school lacks basic infrastructure facilities such as adequate classrooms, benches, and office space, the implementation of the curriculum will not be effective and there will be stagnation in technological development. Okujagu (2013) defined school infrastructure facilities to “encompass all physical facilities needed to make schools function as intended and attain set goals”. Where these infrastructure facilities and instructional materials are absent or inadequate, achievement of educational goals will either be below the target or absent. Adeyemi and Quadri (2012) studied the influence of Universal Basic Education facilities on school learning environment in Lagos State, Nigeria. They raised hypotheses and obtained data from 200 teachers. They sought to examine the influence of provision of Universal Basic Education facilities on the level of classroom control in schools with Universal Basic Education facilities and schools without these facilities. They concluded that availability of learning facilities would foster efficient classroom control in the school setting and overall implementation of the programme. The study is in line with what these particular researchers have in mind and will align this study with this finding. The Federal Republic of Nigeria (2013) in the National Policy on Education stated that governments shall provide infrastructure for the realization of the goals of primary education.

Instructional materials, teaching aids or learning resources are essentially those materials the teacher uses in the course of his lesson presentation to drive home the main points of the lesson and assist the students in understanding the lesson with much ease. These materials could be visuals, audio-visuals, audio, phenomenal, and manipulative. Pareek (nd) explored the availability and utilization of a science laboratory for the teaching and learning of science. The study was a joint collaboration with India’s Ministry of Human Resource Development, the Government of India, and the National Council of Educational Research and Training and the findings revealed in most participating schools; there were no separate science laboratories. It was also found that many teachers faced difficulties when conducting science activities due to the large number of students in each class as well as inadequate equipment and



materials. The findings highlight that as there was no assessment of science laboratory practical activities, these activities did not contribute directly to the measurement of students' academic performance in science. Maduewesi and Ihebereme (2009) noted that most of the needed instructional facilities are yet to be provided for the teaching of basic science. Okujagu (2013) observed that instructional materials are central in the classroom setting. They are pathways to permanent learning. Besides, learning aids give focus to meeting laid down school targets.

The introduction of the universal basic education programme that brought about free and compulsory education resulted in a sort of population explosion in our basic educational institutions in most parts of the country. With the large number of pupils and students at this level of education, the necessary infrastructural facilities and instructional materials for the teaching and learning of basic science and technology is in short supply. The lack of availability or inadequacy of these necessary infrastructural facilities in learning basic science and technology remained a major problems and issues of interest in Nigeria.

Objectives of the study

The objectives of this study were to:

1. Find out the extent of availability of infrastructure facilities for the learning of basic science and technology in Zaria Metropolis.
2. Find out the extent of availability of instructional materials in schools for the learning of basic science and technology in Zaria Metropolis.

Research questions

Two research questions were raised for the study:

1. To what extent are infrastructural facilities available for the learning of basic science and technology in Zaria Metropolis?
2. To what extent are instructional materials available for the learning of basic science and technology in Zaria Metropolis?

Methodology

Survey research design was adopted for this study. The population for this study comprised of all junior secondary schools III students in Zaria Metropolis of Kaduna State with a total population of 667. A sample size of two hundred (200) respondents was selected for this study, representing 30% of the population. Two questionnaires; "Students' Perception on Basic Science and Technology Infrastructure Availability (SPBSTIA)" and "Students' Perception on Basic Science and Technology Instructional Materials Availability (SPBSTIMA)", both with fifteen items for infrastructural facilities and instructional materials respectively were used for data collection. The instrument was validated by three experts, two of them in Educational Management, and one in Measurement and Evaluation. The reliability of the instrument was determined using Cronbach Alpha. Alpha value was found to be 0.71, indicating high reliability of the instrument for the study. The Data obtained were analysed using frequencies and percentages.



Results

Research Question One

To what extent are infrastructural facilities available for the learning of basic science and technology in Zaria Metropolis?

Table 1: Opinion of the respondents on the available infrastructural facilities for the learning of basic science and technology in Zaria metropolis

S/N		Available		Not Available	
		F	%	F	%
1	School blocks	180	90	20	10
2	Laboratories	80	40	120	60
3	Classrooms	156	78	44	22
4	Examination halls	132	66	68	34
5	Libraries	48	24	152	76
6	Staff room	92	46	108	54
7	Computers	32	16	168	84
8	Sitting desks	156	78	44	22
9	Furniture	92	46	108	54
10	Refectories	4	2	196	98
11	Dormitories	4	2	196	98
12	Sport facilities	64	32	136	68
13	School bus	0	0	200	100
14	Clinic	0	0	200	100
15	First aid kits	72	36	128	64
	Total	1112	37	1888	63

The table above shows the results of the opinion of the respondents on the available infrastructural facilities for the learning of basic science and technology in Zaria Metropolis. One Hundred and Eighty (180) respondents representing 90 percent agreed that school blocks were available while 20 respondents representing 10 percent disagreed. It implies that school blocks were available for the teaching of basic science and technology in secondary schools in Zaria Metropolis. Eighty (80) respondents representing 40 percent agreed that laboratories were available for the learning of basic science and technology while 120 respondents representing 60 percent disagreed. It indicated that science laboratories were not available for the learning of basic science and technology in Zaria Metropolis. One Hundred and Fifty Six (156) respondents representing 78 percent agreed that classrooms were available for the teaching of basic science and technology in Zaria Metropolis while 44 respondents representing 22 percent disagreed. It means that classrooms were available for the learning of basic science and technology in Zaria Metropolis.

One Hundred and Thirty Two (132) respondents representing 66 percent agreed that examination halls were available for the teaching of basic science and technology in Zaria Metropolis while 68 respondents representing 34 percent disagreed. It implies that examination halls were available for the learning of basic science and technology in Zaria Metropolis. Forty Eight (48) respondents representing 24 percent agreed that libraries were available for the learning of basic science and technology while 152 respondents representing 76 percent



disagreed. It indicated that libraries were not available for the learning of basic science and technology in Zaria Metropolis.

Ninety Two (92) respondents representing 46 percent agreed that staff rooms were available for the learning of basic science and technology while 108 respondents representing 54 percent disagreed. It means that staff rooms were not available for the learning of basic science and technology in Zaria Metropolis. Thirty Two (32) respondents representing 16 percent agreed that computers were available for the learning of basic science and technology while 168 respondents representing 84 percent disagreed. It indicated that computers were not available for the learning of basic science and technology in Zaria Metropolis.

One Hundred and Fifty Six (156) respondents representing 78 percent agreed that sitting desks were available for the learning of basic science and technology while 44 respondents representing 22 percent disagreed. It means that sitting desks were available for the learning of basic science and technology in Zaria Metropolis. Ninety Two (92) respondents representing 46 percent agreed furniture were available for the learning of basic science and technology in Zaria Metropolis while 108 respondents representing 54 percent disagreed. It implies that furniture were not available for the learning of basic science and technology in Zaria Metropolis. Four respondents representing two percent agreed that refectories were available for the learning of basic science and technology in Zaria Metropolis while 196 respondents representing 98 percent disagreed. It implies that refectories were not available for the learning of basic science and technology in Zaria Metropolis.

Four respondents representing two percent agreed that dormitories were available for the learning of basic science and technology in Zaria Metropolis while 196 respondents representing 98 percent disagreed. It implies that dormitories were not available for the learning of basic science and technology in Zaria Metropolis. Sixty Four (64) respondents representing 32 percent agreed that sport facilities were available in the learning of science in Zaria Metropolis while 136 respondents representing 68 percent disagreed. It indicated that sport facilities were not available for the learning of basic science and technology in Zaria Metropolis.

Zero respondent representing zero percent agreed that school bus is available for the learning of basic science and technology in Zaria Metropolis while 200 respondents representing 100 percent disagreed. It implies that school bus is not available for the learning of basic science and technology in Zaria Metropolis. 0 respondent representing 0 percent agreed that clinics were available for the learning of basic science and technology in Zaria Metropolis while 200 respondents representing 100 percent disagreed. It means that clinics were not available for the learning of basic science and technology in Zaria Metropolis. 72 respondents representing 36 percent agreed that first aid kits are available for the learning of basic science and technology in Zaria Metropolis while 128 respondents representing 64 percent disagreed. It implies that first aid kits are not available for the learning of basic science and technology in Zaria Metropolis.

Research Question Two

To what extent are instructional materials available for the learning of basic science and technology in Zaria Metropolis?



Table 2: Opinion of the respondents on the availability of instructional materials for the learning of basic science and technology in Zaria Metropolis

S/N		Available		Not Available	
		F	%	F	%
1	Chalk board	200	100	0	0
2	Chalk	168	84	32	16
3	Card board drawing	132	66	68	34
4	Magnetic board	20	10	180	90
5	Activity/work book	36	18	164	82
6	Computer Projectors	0	0	200	100
7	Charts	68	34	132	66
8	Maps	100	50	100	50
9	Slides	56	28	144	72
10	Burners	48	24	152	76
11	Analgesics	32	16	168	84
12	Iodine	24	12	176	88
13	Reagent	88	44	112	56
14	Beakers	72	36	128	64
15	Formalin	76	38	124	62
	Total	1120	37	1880	63

Table above shows the results of the opinion of the respondents on course available for the learning of basic science and technology in Zaria Metropolis of Kaduna State. 200 respondents representing 100 percent agreed that chalk boards were available for the learning of basic science and technology in Zaria Metropolis. One Hundred and Sixty Eight (168) respondents representing 84 percent agreed that chalks were available as a instructional materials for the learning of basic science and technology in Zaria Metropolis while 32 respondents representing 16 percent disagreed. It implies that chalks were available as a course material for the learning of basic science and technology in Zaria Metropolis.

One Hundred and Thirty Two (132) respondents representing 66 percent agreed that cardboard drawing were available as a course material for the learning of basic science and technology while 68 respondents representing 34 percent disagreed. It means that cardboard drawing were available as a course material for the learning of basic science and technology in Zaria Metropolis. Twenty (20) respondents representing 10 percent agreed that magnetic board was available as a course material for the learning of basic science and technology in Zaria metropolis while 180 respondents representing 90 percent disagreed. It indicated that magnetic board was not available as a course material for the learning of basic science and technology in Zaria Metropolis.

Thirty Six (36) respondents representing 18 percent agreed that activity/work book was available as a course material in the learning of basic science and technology in Zaria Metropolis while 164 respondents representing 82 percent disagreed. It implies that activity/work book was not available as a course material for the learning of basic science and technology in Zaria Metropolis. Zero respondents representing Zero percent agreed that computer projectors were available as a course material in the learning of basic science and technology in Zaria Metropolis while 200 respondents representing 100 percent disagreed. It indicated that



projectors were not available as a course material in the learning of basic science and technology in Zaria Metropolis.

Sixty Eight (68) respondents representing 34 percent agreed that charts were available as a course material for the learning of basic science and technology in Zaria Metropolis while 132 respondents representing 66 percent disagreed. It implies that charts were available as instructional materials for the learning of basic science and technology in Zaria Metropolis. One Hundred (100) respondents representing 50 percent agreed that maps were available as instructional materials in the learning of basic science and technology in Zaria Metropolis while 100 respondents representing 50 percent disagreed. Fifty Six (56) respondents representing 28 percent agreed that slides were available as a course material for the learning of basic science and technology in Zaria Metropolis while 144 respondents representing 72 percent disagreed. It implies that slides were not available as instructional materials for the learning of basic science and technology in Zaria Metropolis.

Forty Eight (48) respondents representing 24 percent agreed that burners were available as instructional materials for the learning of basic science and technology in Zaria Metropolis while 152 respondents representing 76 percent disagreed. It means that burners were not available as instructional materials for the learning of basic science and technology in Zaria Metropolis. Thirty Two (32) respondents representing 16 percent agreed that analgesics were available as instructional materials for the teaching of basic science and technology in Zaria Metropolis while 168 respondents representing 84 percent disagreed. It means that analgesics were not available as a course material for the learning of basic science and technology in Zaria Metropolis. Twenty four (24) respondents representing 12 percent agreed that iodine was available as a course material for the learning of basic science and technology in Zaria Metropolis while 176 respondents representing 88 percent disagreed. It implies that iodine was not available as a course material for the learning of basic science and technology in Zaria Metropolis. Eighty eight (88) respondents representing 44 percent agreed that reagent was available as a course material for the learning of basic science and technology in Zaria Metropolis while 112 respondents representing 56 percent disagreed. It indicated that reagent was not available as a course material for the learning of basic science and technology in Zaria Metropolis.

Seventy Two (72) respondents representing 36 percent agreed that beakers were available as instructional materials for the learning of basic science and technology in Zaria Metropolis while 128 respondents representing 64 percent disagreed. It implies that beakers were not available as instructional materials for the learning of basic science and technology in Zaria Metropolis. Seventy six (76) respondents representing 38 percent agreed that formalin was available as a course material for the learning of basic science and technology in Zaria Metropolis while 124 respondents representing 62 percent disagreed. It means that formalin was not available as a course material for the learning of basic science and technology in Zaria Metropolis.

Discussion of the Findings

This study investigated the perception of junior secondary school students on the available of infrastructural facilities and instructional materials for the teaching of basic science and technology with Junior Secondary Schools in Zaria Metropolis of Kaduna State as case study. The result revealed that school blocks, classrooms, examination halls, sitting desks were the available infrastructural facilities for the learning of basic science and technology in Junior



Secondary Schools in Zaria Metropolis of Kaduna state. It indicated that the above mentioned infrastructures were adequately available for the learning of basic science and technology while laboratories, libraries, staff rooms, computers, furniture both for students and teachers were not available. Refectories, dormitories, sport facilities, school buses, clinics and first aid kits were also not available and where they are available, they are not adequate to meet the teeming population of the students at the basic science and technology level of education in Zaria Metropolis. The findings of this study agrees with that of Maduewesi and Ihebereme (2009) who noted that the facilities were not adequately provided by the government to schools in the country.

The results also indicated that chalk board, chalks, cardboard drawing were the available instructional materials for the teaching of basic science and technology in Junior Secondary Schools in Zaria Metropolis while magnetic board, activity/work book, computer projectors, charts, maps, slides, burners, analgesics, iodine, reagent, beakers and formalin were not available as a instructional materials for the learning of basic science and technology in Zaria Metropolis. This is in line with Chukwu, Eze and Agada (2016) whose research found that needed instructional materials are not available at the basic education level in Enugu State. Okujagu (2013) is of the opinion that instructional materials are central in the classroom setting. Instructional materials are pathways to permanent learning. Besides, learning aids give focus to meeting laid down school targets.

Conclusion

Based on the findings of this study, it was concluded that infrastructural facilities are not adequately made available for the teaching of basic science and technology in Zaria Metropolis and also, instructional materials were not adequately provided for the teaching of basic science and technology in Junior Secondary Schools in Zaria Metropolis of Kaduna State.

Recommendations

Based on the findings of this study, it is recommended that;

1. Infrastructural facilities should be provided in all the schools in the state and also, in adequate quantity for effective utilization by the teachers and students, most especially, in Zaria Metropolis.
2. Instructional materials should be provided in all the schools by the authority concerned in adequate quantity.

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