# AVAILABILITY AND APPLICATION OF INSTRUCTIONAL MEDIA IN THE INSTRUCTIONAL PROCESS OF JUNIOR SECONDARY SCHOOL BASIC SCIENCE IN LAGOS STATE

**By**

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## Abstract

This study is a survey of the availability and usage of instructional media in teaching and learning of Junior Secondary School (JSS) Basic Science. The study involved two hundred and fifty randomly selected JSS II students and ten Basic Science teachers from five randomly selected Junior Secondary Schools in Education District V of Lagos State. The instrument for data collection was the Availability and Usage of Instructional Media Questionnaire (AAUOIMQ) for teachers and students respectively. Data collected was analyzed using descriptive statistics of frequency counts and percentages to analyze the biographical data of respondents and the inferential statistic of chi-square was used to test the stated hypotheses at 0.05 level of significance. The findings revealed that there was a significant relationship between the availability of instructional media and effective teaching and learning of JSS Basic Science and that most of the schools did not have sufficient instructional media but the available ones were effectively used. The findings also revealed that there was a significant relationship between the usage of instructional media and effective teaching and learning of JSS Basic Science. The study established that most students experienced enhanced learning when teachers use instructional media for teaching. Likewise, the findings revealed that there was a significant relationship between teachers' competence and the selection and utilization of relevant instructional media for effective teaching and learning of JSS Basic Science. The study concluded that the use of instructional media in Basic Science teaching is of importance as they help to stimulate learners' interest and promote understanding of science concepts.

## Introduction

Instructional media are all the materials and physical means an instructor might use for instruction and to facilitate students achievement of instructional objectives. Instructional media encompass print and non-print items that are used to pass information to students in the educational process. Instructional media include items such as kits, textbooks, magazines, newspapers, recorded videos, projectors, visuals such as charts, real objects, photographs, and transparencies, audio visuals such as slides, tapes, films, television, and video, multimedia and so on. Instructional media play a very important role in the teaching and learning process. They enhance the memory level of the students. At this time of knowledge explosion, entirely relying on oral teaching can no longer be the key to successful pedagogy; therefore, the teacher has to use instructional materials to make

the teaching and learning process interesting and successful. Use of instructional media/materials can appeal to the individual attention by creating interest goals that will help the learner achieve direct effort.

Brown, Levis and Haroleanoad (1999) summarized the roles of instructional materials/media as follows:

- They promote meaningful communication and effective learning.
- They ensure better retention thus making learning more permanent.
- They help to overcome the limited classroom by making the inaccessible accessible.
- They provide a common experience upon which late learning can be develop.
- They stimulate and motivate students to learn.

However, the common goal a teacher pursues wherever he is, is to make lesson presentation vitally fresh, stimulating and interesting for students. This will help the teacher to individualize his teaching method as well as the content, and also to work according to students' needs. This goal can only be reached most effectively through the use of instructional materials. The need to emphasize on the use and importance of instructional media in any teaching and learning environment cannot be underestimated. For any meaningful learning to take place, the teacher has to make use of materials that would enable him to reach the students effectively.

The available instructional media to some extent, determines the success of the method the teacher uses in teaching Basic Science. Apart from the chalkboard and textbook which are often available for the teachers' use, instructional media are capable of complementing the teacher's effort in the teaching/learning process. One reason why Basic Science Students in Junior Secondary Schools sometimes find it difficult to comprehend immediately what is being taught is the non use of instructional media that can easily convey the message of the lesson to them.

It has been observed that students comprehend better when they use both their auditory and visual sense organs simultaneously. In the teaching of Basic Science concepts, just like in other areas of instruction, instructional media are indispensable, as sighting is said to control a greater part of all sensory information. To buttress the usefulness of instructional media in creating scientific awareness when used in secondary schools, Bousca and Gallenay (1991) explained that one remembers only 10% of what is heard and 90% of what is heard, seen and done.

Accordingly, Berry and Buktenica (1997) explained that instructional materials are very important in education. This is equally due to the realization of the immense influence which audio-visual materials create on recipients. Also, Bouska and Gallonay (1991) in realization of the significant role of instructional materials on learning, advised that since resourcefulness is a basic quality for a successful life, classroom teaching activities should involve more problems that are resourceful oriented. Thus, the influence of audio visual media in creating awareness is more effective than words alone if they are related to the learning process. This is so because it is believed that some students learn better when they hear and see, while with some, the sense of sound, touch, smell dominate their acquisition of knowledge. This may also confirm the saying that "what we hear we forget, what we see we remember, and what we see and hear we remember more".According to Akkinson (1999), the result of the use of resources is more effective than ordinary words or verbalization. This is because they are capable of conveying the intended message to the recipients

as they received it, understand and apply the experience gained to real life situations. The use of instructional materials can help arouse Basic Science students' interest, provide a clear mental picture, speed understanding, help memory retention and provide a shared experience which in the end creates critical thinking.

Hence, teaching with instructional materials or media like televisions, films, overhead projectors as well as non-projected materials such as flannel graphs, magnetic boards, models, specimens and mock-ups, photographs, pictorials, pamphlets and textbooks, drama, posters, charts, real objects and so on, ease problems that learners encounter during instruction.

**Statement of the Problem**

In spite of the importance of instructional media in the teaching and learning of Basic Science concepts, it has been observed that most students complained of being taught abstract principles and concepts. Students most times found it difficult to comprehend concepts being taught because teachers are teaching in abstract without using relevant instructional methods. Teaching and learning of Basic Science ought to be simplified, comprehensible, and concrete. Efective use of instructional media makes Basic Science interesting, stimulating and understandable to learners. Hence, it is necessary to survey the extent of the availability of instructional media and their usage by Basic Science teachers for effective teaching and meaningful learning in Junior Secondary Schools with particular focus on Lagos state.

**Research Questions**

The following research questions were answered in the study:

1. What is the level of availability of instructional materials for teaching Basic Science in Lagos state Junior Secondary Schools?

2. To what extent would the use of instructional media influence, effective teaching and learning of Junior Senior Secondary School Basic Science?

3. To what extent are teachers competent in the selection and utilisation of relevant instructional media for teaching and learning in Junior Secondary School Basic Science?

**Research Hypotheses**

The following hypotheses were tested at 0.05 level of significance in the study:

**$H_{O1}$**: There is no significant relationship between availability of instructional media and effective teaching and learning of Junior Secondary School Basic Science

**$H_{O2}$:** There is no significant relationship between the use of instructional media and effective Basic Science instruction

**$H_{O3}$:** There is no significant relationship between teachers' competence and selection and utilization of relevant instructional media for effective teaching and learning of Junior Secondary School Basic Science.

## Methodology

Descriptive survey research design was adopted for the study. This design enables the collection of the views and opinions of respondents as well as the survey of resources available in the area of study. The study sample consisted of two hundred and fifty Junior Secondary 2 (JSS 2) Basic Science students and ten Basic Science teachers who were selected through incidental sampling technique from five randomly selected Junior Secondary Schools in Education District V, Badagry Zone of Lagos state.

The instruments used was the Availability and Usage of Instructional Media Questionnaire (AAUOIMQ) for both teachers and students separately. The questionnaire consisted of two sections A and B. Section A sought information on the bio-data of respondents while section B consisted of 20 items with 4 Likert's rating scale of Strongly Agree (SA),Agree (A), Disagree (D), Strongly Disagree (SD). An instructional media check list was also used to collect information from teachers. The instrument was validated by two experts from the Department of Science and Technology Education, Lagos State University, Ojo, Nigeria. The questionnaires were subjected to reliability test. A pilot study was carried out involving one hundred and ten respondents in two Junior Secondary Schools outside the Local Education District used for the real study. The results of the test was used to determines the reliability through the split have method. The reliability of the instrument was determined using Cronbach Alpha which gave an index of 0.75 and 0.71 for teachers and students' questionnaires respectively.

## Results

**Research Question One:** What is the level of availability of instructional materials for teaching Basic Science in Lagos State Junior Secondary Schools?

**Table 1:** Availability of Instructional Materials in Junior Secondary Schools

| S/N | INSTRUCTIONAL MATERIALS | FREQUENCY OF AVAILABILITY | PERCENTAGE (100%) |
|---|---|---|---|
| 1 | Diagrams | 10 | 100% |
| 2 | Chalk board | 10 | 100% |
| 3 | Real objects | 10 | 100% |
| 4 | Wall chart | 8 | 80% |
| 5 | Posters | 8 | 80% |
| 6 | Pictures | 7 | 70% |
| 7 | Models | 6 | 60% |
| 8 | First aid box | 5 | 50% |
| 9 | Flash cards | 4 | 40% |
| 10 | Computer | 3 | 30% |
| 11 | Film strip | 2 | 20% |
| 12 | Audio recorder | 0 | 0% |
| 13 | Video recorder | 0 | 0% |
| 14 | Overhead projector | 0 | 0% |
| 15 | Electronic board | 0 | 0% |
| 16 | Internet facilities | 0 | 0% |

| | | | |
|---|---|---|---|
| | Total | 73 | 45.63% |

The table presents the distribution of the list of instructional materials available for use in teaching by the Basic Science teachers. The table shows that diagrams, chalk boards, and real objects were available for use in all the schools with observations while 80% had wall charts and posters; 70% had pictures, 50% had first aid boxes, 40% had flash cards, 30% had computers, 20% had film strips while none of them had audio recorders, overhead projectors, video recorders, electronic boards and internet facilities. In all the percentage total availability was 45.63%.

**Research Question Two:** To what extent would the use of instructional media influence effective teaching and learning of Junior Secondary School Basic Science?

**Table 2:** Teachers Perception of Effect of Instructional Media on Basic Science Instruction

| S/N | STATEMENT | SA | A | D | SD | TOTAL |
|---|---|---|---|---|---|---|
| 1. | Instructional media when appropriately used by the teachers bring about effective communication during teaching-learning process | 4 | 4 | 1 | 1 | 10 |
| 2. | Instructional media help to arouse and stimulate the interest of learners and make learning interesting | 3 | 6 | 1 | 0 | 10 |
| 3. | The use of instructional media in teaching Basic Science enhances students' proper understanding of science concepts. | 5 | 4 | 0 | 1 | 10 |
| 4. | The use of instructional media saves time and reduces stress, hence makes teaching of Basic Science easier and faster. | 5 | 5 | 0 | 0 | 10 |
| **Total** | | **17** | **19** | **2** | **2** | **40** |
| Percentage (%) | | **42.5%** | **47.5%** | **5.0%** | **5.0%** | **100%** |

The data presented in the table above shows that 90% of the teachers agreed with all the four items while only 10% disagreed. Hence teachers were of the opinion that the use of instructional materials influences effective teaching and learning of Basic Science.

**Table 3:** Students' Perception of Effect of Instructional Materials on Basic Science Learning

| S/N | STATEMENT | SA | A | D | SD | TOTAL |
|---|---|---|---|---|---|---|
| 1 | The use of instructional media makes learning easy. | 105 | 113 | 21 | 11 | 250 |
| 2 | Instructional media helps to draw my attention and motivates my interest and makes learning more interesting | 107 | 120 | 17 | 6 | 250 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 3 | The use of instructional media in Basic Science enhances proper understanding. | 93 | 110 | 31 | 16 | 250 |
| 4 | Instructional media make me to actively participate in the lesson | 100 | 108 | 22 | 20 | 250 |
| **Total** | | **405** | **451** | **91** | **53** | **1000** |
| **Percentage** | | **40.5%** | **45.1%** | **9.1%** | **5.3%** | **100%** |

The table clearly shows that 85.6% of the students agreed with the four items presented on the effect of instructional media on basic science learning while only 14.4% disagreed.

**Research question three:** To what extent are teachers' competent in selection and utilization of relevant instructional media for teaching and learning Junior Secondary School Basic Science?

**Table 4:** Teachers' Competence, Selection and Utilization of Instructional Media

| S/N | STATEMENT | SA | A | D | SD | TOTAL |
|---|---|---|---|---|---|---|
| 1 | Poor knowledge of teachers affects their selection and utilization of instructional media for teaching Basic Science | 3 | 4 | 2 | 1 | 10 |
| 2 | Highly competent teachers are capable in selecting appropriate instructional media to teach Basic Science concepts | 3 | 7 | 0 | 0 | 10 |
| 3 | Lack of adequate professional competence on the part of the teachers affects the effective selection of appropriate instructional media for teaching Basic Science | 4 | 4 | 2 | 0 | 10 |
| 4 | Poor knowledge of teachers on the core factors considered in choosing instructional media influence their use of instructional media | 4 | 3 | 2 | 1 | 10 |
| **Total** | | **14** | **18** | **6** | **2** | **40** |
| **Percentage** | | **35%** | **45%** | **15%** | **5%** | **100%** |

The table shows that 80% of the teachers agreed with the four items presented on teachers' competence in selection and use of instructional media while only 20% disagreed.

**Testing of Hypotheses**

**Hypothesis one:** There is no significant relationship **between** the availability of instructional media and effective teaching and learning of Junior Secondary school Basic Science.

**Table 5:** Analysis of the relationship between Availability of Instructional Media and effective Basic Science instruction

| ITEMS | AGREE | DISAGREE | TOTAL | D/F | SIG. LEVEL | $X^2$ TAB | $X^2$ CAL | DECISION |
|---|---|---|---|---|---|---|---|---|
| 1. | 204 | 46 | 250 | | | | | |
| 2. | 213 | 37 | 250 | | | | | |
| 3. | 222 | 28 | 25 | 3 | 0.05 | 7.81 | 51.21 | REJECTED |
| 4. | 163 | 87 | 250 | | | | | |
| **Total** | **802** | **198** | **1000** | | | | | |

In the data analysis in table 5, calculated $x^2$ value was 51.2 while the table value was 7.81. Since the calculated value was greater than the table value, the null hypothesis was therefore rejected. This implies that there is a significant relationship between the availability of instructional media and effective teaching and learning of Junior Secondary School Basic Science.

Hypothesis Two: There is no significant relationship between the use of instructional media and effective basic science instruction.

**Table 6:** Relationship between the use of instructional media and effective Basic Science Instruction

| ITEMS | AGREE | DISAGREE | TOTAL | DF | SIG LEVEL | $X^2$ TAB | $X^2$ CAL | DECISION |
|---|---|---|---|---|---|---|---|---|
| 1 | 218 | 32 | 250 | | | | | |
| 2 | 227 | 23 | 250 | | | | | |
| 3 | 203 | 47 | 250 | 3 | 0.05 | 7.81 | 11.06 | REJECTED |
| 4 | 208 | 42 | 250 | | | | | |
| TOTAL | 856 | 144 | 1000 | | | | | |

From the analysis in table 6, the calculated $X^2$ value was 11.6 while the table value was 7.81. Since the calculated value was greater than the table value, the null hypothesis was therefore rejected. This implies that there is a significant relationship between the use of instructional media and effective teaching and learning of Junior Secondary School Basic Science.

**Hypothesis Three:** There is no significant relationship between teachers' competence and selection and utilization of relevant instructional media for effective teaching and learning of Junior Secondary School Basic Science.

**Table 7:** Relationship between Teachers' Competence and Selection and Utilization of Instructional Media.

| ITEMS | AGREE | DISAGREE | TOTAL | DF | SIG. LEVEL | $X^2$ TAB | $X^2$ CAL | DESCISION |
|---|---|---|---|---|---|---|---|---|
| 1. | 7 | 3 | 10 | | | | | |
| 2. | 10 | 0 | 10 | | | | | |
| 3. | 8 | 2 | 10 | 3 | 0.05 | 7.81 | 8.26 | REJECTED |

| | | | |
|---|---|---|---|
| 4. | 7 | 3 | 10 |
| **TOTAL** | **32** | **8** | **40** |

The analysis in table 7 shows the calculated $x^2$ was 8.26 while the table value was 7.81. Since the calculated value was greater than the table value, the null hypothesis was therefore, rejected. This implies that there is significant relationship between teachers' competence and the selection and utilization of relevant instructional media for effective teaching and learning of Junior Secondary School Basic Science.

**Discussion**

The study aimed at surveying the availability and usage of instructional media for effective teaching and learning of Junior Secondary School Basic Science in Lagos state. On the availability of instructional media for Basic Science teaching (table 1), it was found out that only 45.63% of necessary instructional materials were available for teaching Basic Science in our schools. In determining the relationship between availability of instructional media and effective teaching and learning of Basic Science, the analysis shows that there was a significant relationship between the availability of instructional media and effective teaching and learning of Junior Secondary School Basic Science. This finding corroborates the study of Agun (2009) who found out that when teaching facilities or materials are available and properly used, help to make the participation of learners in the teaching-learning process more meaningful and useful. Also this study corroborates the study of Smith (2011) who found out that, instructional media, when available, are very effective in the teaching and learning process by providing concrete experiences and increase retention of learnt concepts. Most of the schools did not have sufficient instructional media and teaching facilities, but the available ones such as wall charts, models, real objects and flash cards have great impact on effective teaching and learning of JSS Basic Science. This corroborates Smith (2011) who opines that instructional media have been described as effective tools for teaching-learning process.

The study also revealed that there was significant relationship between the usage of instructional media and effective teaching and learning of JSS Basic Science. It established that most students experienced enhanced learning when their teachers use instructional media for teaching. This finding corroborates the study of Adeboyeje (2011) who also affirms that when instructional media is integrated into the learning process, greater learning is accomplished in less time. Also Volker and Simonson (2014) found out that when instructional media are used for teaching and to reflect what students are to do, the media enable students to portray their ideas, skills and learning activities on visuals, they profit more and make them more creative. The study further established that instructional media motivate and make learners understand science concepts better, make them perform well and improve their retention of science concepts. The finding however contradicts claims by Clarks (2008) that usage of instructional media does not influence learning nor motivate students to learn. From the data generated on the opinions of the respondents on the impact of instructional media on the teaching and learning process, the findings revealed that if instructional media are available and effectively used, learners are motivated and they tend to understand better when taught using instructional media. This finding corroborates the study by Ayot and Patel (2016) that found out that what the teacher does to arouse and maintain interest by the students is the utilization of instructional media, as well as Cook (2011) who further affirms that the choice of instructional media should contribute to the motivation of students to learn. This study further

revealed that there is a significant relationship between teachers' competence and the selection and utilization of relevant instructional media for effective teaching and learning of Junior Secondary School Basic Science. This shows that teachers' competence in selecting relevant and appropriate instructional media to use in teaching different topics and different categories of learners have positive impact on learners' learning outcome. This further corroborate the findings of Volker and Simonson (2014) that effective usage of instructional media make students more creative and enhance their performance.

It is well known that meaningful learning of science requires the use of multisensory approaches where appropriate instructional media are selected and used. This is necessary because for effective learning, students must make use of more than one sense organ. Also, using sufficient instructional media enables learners to easily acquire cognitive skills as well a scientific altitudes like curiosity, sensitiveness, accuracy and so on, which are necessary for engaging in faithful scientific investigation. Likewise, utilization of instructional media for the teaching and learning process improves the quality of teaching and make learning content meaningful.

**Conclusion**

From the findings of the study, it could be concluded that:

- The use of instructional media in science teaching is very essential as they help to stimulate learners' interest and promote understanding of science concepts.
- The teaching and learning of Basic Science, a practical oriented subject requires practical activities for learners.
- Instructional media motivate and make learners understand science concepts better, and to perform well and improve their learning outcome.
- Instructional media in overall, have a positive influence on the teaching and learning of Junior Secondary School Basic Science hence the use of instructional media makes learning real and permanent.

**Recommendations**

Base on the various findings, the study recommends the followings:

- Schools should provide enough readymade instructional media to improve their availability and to ease the selection by teachers
- Basic Science teachers should conduct their teaching and learning process effectively, interactively, efficiently and interestingly through the use of appropriate media. The teacher should be resourceful, knowledgeable and vary their teaching methods at all times. They should ensure appropriate use of instructional media during their lessons.
- Basic science teachers should try to improvise instructional media where there is no readymade ones so that students could benefit maximally.
- Schools should periodically organize seminars and workshops for teachers in order to update their knowledge particularly in the use of instructional media.
- Basic science teachers should also advise their schools on the need for purchasing and availing more diversified types of instructional media.
- The government should establish adequate resource centers to enable Basic Science teachers' source for instructional media which are not available in the schools.

- Basic Science teachers should be encouraged by their principals to make more use of other types of instructional media besides textbooks.

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