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## **Effect of Multimedia on Primary School Pupils Retention and Interest in Basic Science Concepts**

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### **Abstract**

*The study examined the effect of multimedia on male and female pupils' retention and interest in basic science. Forty-four (44), primary five (5) pupils were randomly selected from two (2) private primary schools in Port Harcourt. The study employed quasi-experimental and control design. The instrument for data collection was Basic Science Retention Test (BSRT) and Basic Science Interest Test (BSIT). Analysis of covariance (ANCOVA) was employed for data analysis. Findings revealed that multimedia has no significant effect on male and female pupils' interest in Basic Science Concepts studied. However, the effect on the male pupils tended to be superior to their female counterparts with regard to retention in Basic Science Concepts studied. It was recommended that science teachers in primary schools should pay attention to the issues of gender difference which are not related to innate tendency by using appropriate instructional materials such as multimedia.*

**Key words:** Multimedia, Retention, Interest, Basic Science.

### **Introduction**

In this modern age of advanced technology, the success of any educational enterprise could be measured not only in terms of how much instruction is given by teacher, but also in terms of technologies and / or media employed to ensure maximum cognitive development or advancement of learners. In consonance with this, Giddens, Duneier and Applebaum (2005) pointed out that the medium of any form of communication is the message.

Multimedia aids in education could be defined as the various electronic and technological devices employed by the teacher/ learner to enhance the interest, acquisition and retention of knowledge. These include print media like newspapers, magazines, journals and books. Electronic media include Television, Radio, Slide, CD Rom, Projectors, CDs, DVDs and interactive media like cell phones and the internet. Multimedia combines five basic types of media into the learning environment: text, video, sounds, graphics and animation, thus providing a powerful new tool for education.

As was observed by Orstein and Levin (2006), the media both stimulate and reflect fundamental changes in attitudes and behaviours that prevail in our society. Media literacy therefore becomes imperative for the learner and even the teacher who faces the challenge of motivating and sustaining learners' interest. A wide range of research has shown that the quality of learning can be significantly enhanced when ICT is used as an intellectual multi-tool adaptable to learner's needs. Bradford, Brown and Cocking in Gyang (2008) referred to this as: critical thinking, information skill, higher level conceptualization and problem solving. It has also been observed that average school age child spends much time watching television; playing video games and exploring other electronic media devices, including the cell phones. These exploration and manipulations have been found to stimulate further interest and create enabling environments for learning to take place both inside and outside the classroom. Care must however be taken in exposing children to those multimedia devices. There is too much information on the internet. Since there are no limit in what should be disclosed. Parents, schools and government should censor what children watch and whom they interact with on the web so that these devices which should act as worthy aids in the educational and overall development of children would not turn out to be objects of destruction to them.

The primary school stage (ages 5-11) is the formative stage of an individual. At this stage, audio and visual impressions made on a child in the process of teaching and learning leave a long-lasting effect on the educational development of the child. Children are naturally curious and inquisitive about their environment. They learn through experimentation. They are observant, persistent and enjoy entertaining learning experiences. They love to make sense out of natural world. They could therefore be regarded as natural scientists.

The use of multimedia in teaching practical and mind-stimulating subjects like Basic Science in primary school helps to expose them to some experiment that may be considered too difficult, expensive or too dangerous to perform by children of that age in school environments. Moreover, video images could be used to demonstrate chemical reactions without exposing children to highly volatile chemicals. They could also be used in medical education, where real life situations can be better understood through video. In this regard, Orstein and Levin (2006) pointed out that the computer can be used to build a sense of enquiry, to explore and to improve thinking skills. When students learn how to think and explore with the computer, their potential for innovation and creativity is unlimited.

The interactive nature of some of these electronic media further helps to stimulate their interest and readiness to learn, since they make information more accessible now. It also makes learning easier and knowledge more easily retained. Moreover, Akbiyik and Akbiyik (2010) are of the view that critical thinking, decision making, problem solving, reflective thinking and creative thinking are various forms of cognitive learning outcomes of multimedia aids.

Different multimedia Presentation forms or aids may have different effects on these different learning outcomes. For instance, print or text ties the entire take other media elements together. If used creatively, sound becomes a stimulus to the imagination. When images are accompanied by a sound track, students are able to utilize their own power of imagination and also develop more interest in the learning process and activities. It is common knowledge however, that less emphasis is now being placed on print media; in recent times, books and journals a longer time to leave the shelves.

At this point, it becomes pertinent to find out how the application of multimedia affects the retention and interest of male and female pupils in Basic Science.

### **Purpose of study**

In general terms, the purpose of the study was to find out the effects of multimedia on the Retention and Interest of male and female pupils in basic Science.

Specifically, the study ought to:

1. determine the extent to which multimedia affects male and female pupils in terms of retention in Basic Science Concepts.
2. determine the effect of multimedia on male and female pupils' interest in Basic Science.

### **Research questions**

Based on the purpose of the study, the following research questions were posed to guide the study:

1. How do male and female pupils who were taught basic science concept with multimedia perform in terms of retention?
2. How does multimedia affect male and female pupils in terms of interest in Basic Science Concepts?

### **Hypothesis**

The following corresponding hypotheses were equally postulated:

1. There is no significant difference between male and female pupils' retention on the effect of multimedia.
2. There is no significant difference between male and female pupils' interest on the effect of multimedia

### **Scope of the study**

The study focused on the effect of multimedia on the teaching of two units in primary five (5) Science curriculum in Port Harcourt.

The Units were:

- (a) Domestic, farm and Wild Animals.
- (b) Reproductive system in mammals.

### **Research methodology**

A quasi-experimental study using control group pre-test and post-test design was used. The study was carried out in two (2) private primary schools in

Port Harcourt. Private schools were chosen because of their special nature of having intact classes besides being coeducational schools.

Out of one hundred and thirty five (135), primary five pupils, forty-four (44) pupils were purposively selected twenty-two (22) males and twenty-two (22) females for the study. The classes were randomly assigned to the experimental and control groups respectively.

The test instruments; Basic Science Retention Test (BSRT) and Basic Science Interest Scale (BSIS) were adopted by the researchers. These were validated by two experts in science education and measurement and evaluation departments.

The BSRT and BSIS were based on two content areas in Basic Science Curriculum for Primary 5, items for the test were developed using a validated test blue print on content areas. An estimate of temporal stability, using test-retest method was used to establish reliability of BSRT.

An internal consistency coefficient of 0.81, using the Cronbach Alpha was computed for the BSIT. The actual experiment was conducted by the regular Basic Science teachers in the sample schools. The teachers were given orientation and tested on the use of lesson notes prepared by the researcher for this purpose. The treatment for the experimental group took place in six lessons of 35 minutes each which lasted for four weeks. The control group was taught using lecture method, on the same topic.

The interest of the students was measured using a 20 item Basic Science Interest Scale with a 5 point modified likert-type response. This was administered to the respondent to indicate their extent of agreement or disagreement about the units of content in Basic Science Concepts Studied. Results obtained were analyzed using Analysis of covariance (ANCOVA)

## **Results**

The data in table 1 reveal that male pupils had a higher mean retention score of 20.48 with SD of 5.30 than their female counterparts, who recorded a mean retention score of 16.32 with a Standard Deviation of 6.15.

Table 2 showed an indication of male pupils having more interest, with post mean Interest score of 26.30 and SD of 4.85 than their female counterparts, who recorded post mean score of 24.25 with SD of 6.15

The F-value calculated for the retention of basic science concept as shown in table 3 was 2.14 against a critical value of 1.92 at 0.05 significance level. Hypotheses 1 of no significant difference was thus rejected since the calculated F-value was greater than critical value.

Table 4 revealed no significant difference on the effect of multimedia between male and female pupils in terms of interest in basic science concept. The calculated F-value was 0.13 as against the critical F-value of 1.92 for numerator and 364 for denominator at 0.05 level of significance.

### **Discussion of results**

The findings in table 1 revealed that male pupils have a higher post mean retention score than their female counterparts. This finding is in line with the study carried out by Obomanu and Nwankezi (2006) in which gender was a significant factor in students overall score of primary science concepts.

Study conducted by Nworgu (1990) on the effect of material types on achievement considering retention and interest in integrated science as well as the effect of gender and its interactive effect on the resource types were examined. Results of the study among others, showed a significant gender difference of students achievement and retention in favour of the females. On the other hand, Nwankezi's (2004) study on the influence of combined effect of student interaction pattern (SIP) and gender on pupils cognitive achievement in primary science, showed a tendency for male pupils to be more responsive than their female counterparts to the co operative and individualistic learning strategies.

Findings in table 2 indicated that male pupils tend to show more interest with post mean interest score than their female counterparts. This conforms with Anekwe's (1996) view in which gender was a significant factor in students' overall score of chemistry concepts. The male pupils recorded higher than their female counterparts.

In respect of hypotheses generated for the study, tables 3 and 4 revealed that there were significant differences between male and female pupils in terms of retention and interest respectively. Similarly, Anekwe (1996) reported gender differences in achievement in favour of the male, while Chidolue (1983) reported that some of the reasons given for apparent lack of interest shown by female students towards physics and chemistry were mathematical

requirements, various laws, principles to be committed to memory and inadequate qualified teachers in these subjects

### **Conclusion**

Teaching and learning in primary schools may not be effective without the use of multimedia. This calls for serious consideration of adequate provision of multimedia by Government and their utilization by teachers for effective teaching and learning. No doubt the integration of multimedia into the foundation level of Nigerian education will assuredly produce learners that are self-reliant and above all provide education that will be accepted in the competitive global market

### **Recommendations**

To ensure adequate provision and utilization of multimedia for effective teaching and learning of basic science in primary schools, we recommend as follows,

1. That Government should ensure adequate provision of multimedia for effective teaching of basic science in primary schools.
2. Curriculum experts should pay attention to the issues of gender-related differences in the classroom that are not related to the innate tendency by restructuring basic science curriculum
3. Basic science teachers should incorporate the use of multimedia which has been found very effective in reducing issues on gender differences that are not related to the innate tendency
4. Teachers should also incorporate multimedia in subjects other than basic science.

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Table 1: The Mean and Standard Deviation of Male and Female pupils' retention using multimedia

		Male			Female		
Group	Types of test	X	SD	n	X	SD	n
Multimedia	Pre-Test	12.17	6.70	22	15.03	5.10	22
	Post-Test	20.48	5.30		16.32	6.15	
Control	Pre-Test	10.07	6.00	22	11.07	6.47	22
	Post-Test	15.05	5.15		15.20	5.10	

Table 2: The mean and Standard Deviation of male and female pupils' interest by multimedia

		Male			Female		
Group	Types of test	x	SD	n	x	SD	n
Multimedia	Pre-Test	18.50	5.45	22	17.55	5.55	22
	Post-test	26.30	4.85		24.25	5.15	
Control	Pre-Test	15.02	5.10	22	17.50	5.16	22
	Post-Test	22.25	12.95		23.30	5.20	

Table 3: Summary table of ANCOVA of pupils' retention by multimedia/gender

Sources of variation	Sum of square	DF	Mean square	F-Cal	F-Crit
Covariance pre/post test	960.11	1	930.22	11.30	
Mean effect of multimedia	11576.83	2.3	28.94	33.14	1.30
Gender multimedia x	186.67	6	186.87	2.14	1.92
Gender	827.88		275.96	1.16	1.30
Explain Residual	3334.82	4	1666.85	19.03	
Total	29228.71	186	78		

At 0.05 level of significance

Table 4: Summary of ANCOVA of pupils' interest by multimedia/ Gender

Sources of variation	Sum of square	DF	Mean square	F-Cal	F-crit
Covariance pre/post test	4227.30	1	36.32		
Mean effects	4967.10	2	1242.27	10.53	
Gender multimedia x	15.4729.22	6	15.475337	0.13	1.92
Gender					
Explain Residual	94442142.43	4.182	1180.5258.99	10.01	1.30
Total	25964.05	186	83.11		

At 0.05 level of significance