International Journal of Advanced Education and Research
ISSN: 2455-5746
Impact Factor: RJIF 5.34
www.alleducationjournal.com
Volume 3; Issue 6; November 2018; Page No. 09-15

Influence of multimedia instructional package on voter education of secondary school students in Bauchi metropolis

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Abstract
This study was carried out to determine the influence of multimedia instructional package on the students' abilities to participate in the electoral process. The study adopted experimental research design, and stratified random sampling technique was used to obtain the representative participants of 194 students. The subjects were randomly sampled from four different secondary schools within Bauchi Metropolis in such a way that two schools were selected from Bauchi North and Bauchi South respectively. The subjects were randomly assigned to either experimental or control group in each of the selected schools. The groups were first subjected to pre-test before the application of the multimedia instructional package. And the results t (386) = 0.409 and p = 0.682 show that there were no significant differences between the performances of the experimental and the control groups. Consequently, the study failed to reject the null hypothesis in favour of the alternative hypothesis. On the other hands, the experimental groups in each school were exposed to the multimedia instructional package, and then subjected to the post-test. The results t (386) = 19.524 and p = 0.000 show that the multimedia instructional package had a huge influence on the experimental groups as there were significant differences between the performances of the experimental (treatment) and control groups. Consequently, the null hypothesis was rejected in favour of the alternative hypothesis. Hence by implication, multimedia instructional package is a veritable tool for sensitizing senior secondary school students and other prospective voters on the subject of electoral process in Nigeria.

Keywords: multimedia, technology of multimedia-based instruction, video & voter education

Introduction

The use of audio-visual materials for teaching is nothing new, but what is new as far as this study is concerned is the use of multimedia instructional package to educate the prospective voters on the subject of electoral process (voter registration, accreditation and voting procedures) which is the fundamental issue this research sets to address. We have heard that 'seeing is believing', and researches have also shown that 'seeing is remembering too'. What this means is that people can hardly forget what they see but can easily forget what they hear. This assertion is validated by Dele's cone of experience. According to him, People generally remember 10% of what they read, 20% of what they hear, 30% of what they see, 50% of what they see and hear, 70% of what they say and write and 90% of what they do as a task (Dale, 1969) [5].

Multimedia resource is a powerful tool with high capacity to enhance learning experience of its users. Research has shown that multiple tracks of audio and visual information convey powerful learning benefits as one source complements the other. In fact, from experience, all learners, with and without a strong dominant modality preference, benefit from instruction that includes video. For the fact that brain is programmed to remember experiences that have an emotional dimension means that multimedia has the ability to relay such experiences through the emotions evoked by the images.

Multimedia is the combination of a variety of communication channels into a co-ordinated communicative experience for which an integrated cross-channel language of interpretation does not exist (Elsom-Cook, 2001) [7]. This definition gives way to two approaches, one that is termed the "multiple-media" utilization, and the other which is a combination of different channels acquired unification as a medium. The latter approach leads us to the next definition, which is "an integration of multiple media elements (audio, video, graphics, text, animation, etc.) into one synergetic and symbiotic whole that results in more benefits for the end user than any one of the media elements can provide individually" (Reddi, 2003) [27]. Reddi essentially tries to emphasize on the second approach of Elsom-Cook's view with more clarity as he stresses on the components of multimedia.

The 'multimedia' component is characterized by the presence of text, pictures, sound, animation and video; some or all of which are organized into some coherent programme. The 'interactive' component refers to the process of empowering the user to control the environment usually by a computer" (Phillips, 1997) [26].

Learning is primarily the process through which we become human as we are, and it takes place through a variety of media, strategies, and processes, of which multimedia is just one of them. Using these media and technologies, we internalize information and knowledge available in the external world to construct our own experiences. Individuals learn, retain, and transfer information better when the instructional environment involves words and pictures rather than words or pictures alone (Mayer, 2001) [17].

Many scholars have opined that voter education at secondary

school level is essential as proper orientation of the students on the essence of casting their votes would instil some sense of civility in them (Uhunmwuangho & Aibieyi, 2012, Igini, 2012) [12, 33]. However, none of the researchers have been able to develop a resource material to be used for the sensitisation of these students; hence the need for this study. For this laudable objective to be realized, it requires a coherent strategy of developing a multimedia instructional package with requisite information for this group of individuals for effective assimilation of its contents. Young people who are planning to vote for the first time need special messages, explaining how to register and cast acceptable ballot.

Objectives

1. Determine the significant differences between the performances of the experimental (treatment) and the control groups in the pre-test.
2. Determine the significant differences between the performances of the experimental (treatment) and the control groups in the post-test.

Research Hypotheses

H0: There are no significant differences between the performances of the experimental (treatment) and the control groups in the pre-test.

H0: There are no significant differences between the performances of the experimental (treatment) and the control groups in the post-test.

Literature Review

Although verbal learning offers a powerful tool for humans, however, an alternative to purely verbal presentations is the use of multimedia package in which people learn from both words and pictures. Recent advances in graphic technology have prompted new efforts to understand the potentials of multimedia as means of promoting human understanding.

Multimedia

Graphics is the most commonly used element of multimedia. The richness of multimedia and the effective communication are through graphic presentations. The attributes of colour, texture, patterns and animation technique enrich a multimedia presentation. Multimedia refers to the integration of two or more different information media. These media can include text, images, audio, video, and animation (Sethi, 2005 & Mayer, 2001) [17]. Vaughan (2011) [34] defined multimedia as a combination of digitally manipulated text, photographs, graphic art, sound, animation, and video elements.

Technology of Multimedia-Based Instruction

Instructional systems and educational technology have been gaining great attention by educators in order to enhance students' learning. Educators are always looking for ways to make their educational initiatives more effective (Hsu, 1999) [10]. Multimedia permits the demonstration of complicated processes in a highly interactive and animated fashion. Instructional material can be interconnected with other related topics in a more natural and intuitive way. Multimedia instruction that refers to presentations involving words and pictures can foster learning.

Multimedia-based instruction can be efficient and effective for three reasons (Issa, Cox & Killingsworth, 1999) [13]:

It is self-paced learning: the individualized pace of the learning allows students to break down the group instructional setting, which often inhibits some people's natural progression;

It includes video/audio productions: enhancing a learner's interaction with the course material through less bridging effort between the learner and the information being processed;

It provides autonomy in the learning process: self-regulated instruction shifts the sense of responsibility from the instructor to the student.

Multimedia has been one of the most well-known and effective training tools and was referred to as the technological wave of the future. Thus, this study seeks to deploy it in the area of voter education to educate the prospective voters so as to participate meaningfully in elections when they attain voting age.

The Cognitive Theory of Multimedia Learning (CTML)

The cognitive theory of multimedia learning (CTML) centres on the idea that learners attempt to build meaningful connections between words and pictures and that they learn more deeply than they could have with words or pictures alone (Mayer, 2009) [20].

According to Mayer and Moreno (1998) [22] and Mayer (2003) [18], CTML is based on three assumptions:

- The dual-channel assumption: the dual-channel assumption is the working memory that has auditory and visual channels based on Baddeley (1986) theory of working memory, Paivio (1986) and Clark & Paivio, (1991) dual coding theory
- The limited capacity assumption: the limited capacity assumption is based on cognitive load theory (Sweller, 1988) [31] and states that each subsystem of working memory has a limited capacity.
- The active processing assumption: the active processing assumption which suggests that people construct knowledge in meaningful ways when they pay attention to the relevant material, organizes it into a coherent mental structure, and integrates it with their prior knowledge (Mayer, 1999) [16].

CTML accepts a model that includes three memory stores known as sensory memory, working memory, and long-term memory. Sweller (2005) [32] defines sensory memory as the cognitive structure that permits us to perceive new information, working memory as the cognitive structure in which we consciously process information, and long-term memory as the cognitive structure that stores our knowledge base. We are only conscious of information in long-term memory when it has been transferred to working memory. Mayer (2005) [19] states that sensory memory has a visual ability that briefly holds pictures and printed texts as visual images; and auditory memory that briefly holds spoken words and sounds as 'auditory images'.

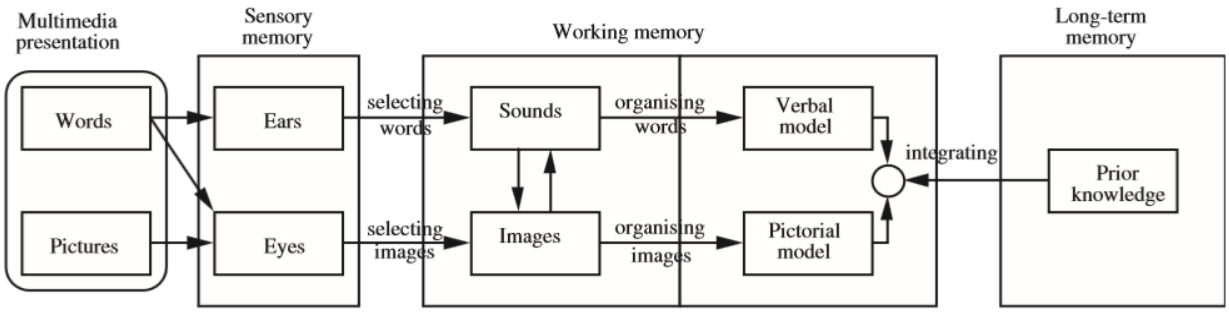

Fig 1: A cognitive theory of multimedia learning (Mayer 2010) [21]

Video

Recent studies such as Hsin & Cigas, (2013) [9]; Kay, (2012) [14]; Moore & Smith, (2012) have shown that videos particularly, can be a highly effective tool for the delivery of learning and teaching experiences. Over the next few years, there will be an increase in the development and the use of videos in the delivery of teaching services. What makes it effective is its ability to bring abstract experiences to concrete reality thus elicits positive responses from the learners.

Guo, Kim and Rubin (2014) [8] noted that video allows instructors to situate themselves on the same level as the learner offering more learner engagement rather than talking at the learners' instructor's mode. Davis (2012) [6] highlighted the short duration of these types of videos which enable reinforcement of key learning concepts, promoting mastery, which has advantages over traditional lecture-based learning.

Voter education

It has been contended that political order and stability are guaranteed through popular voter education aimed at creating a climate of knowledgeable political participation by all potential voters in an election. Also, some political philosophers have held that it seeks to enable potential voters to cast their votes with confidence and achieve stipulated objectives that benefit the individual participants by giving them sense of value, dignity, self-worth and self-realization (Alapiki, 2004) [1].

It has therefore become pertinent for INEC to urgently address the issue of voter education. All potential voters should be equipped with requisite information needed to be responsive in the face of elections. This has to be learnt as they can help in the process of credible elections. This is because, quite number of voters know little or nothing about their suffrage. Most Nigerian voters lack the requisite knowledge to freely and independently vote for credible leaders. This can be alluded to the absence of voter education during their adolescent years.

Voter education takes place to assist the election management authority in its task of delivering a free, fair, efficient and cost-effective election. It encompasses the basic voter information that every voter must have in order to arrive prepared at the voting station and vote on the set voting day(s). Voter education sensitises the electorates on the importance of participating in elections. Voter education is a prerequisite for sustaining democracy. In the light of this presupposition, Sewant (2000) [29] notes that the requisites of democracy include, a well-informed citizenry, participation of the citizens in the day to day governance of the society and accountability to the citizens by those who exercise power on their behalf. According to Sewant (2000) [29] "none of the functions which the citizens have to perform in a democracy can be performed by them in the absence of truthful information".

The Curriculum of the Developed Multimedia Instructional Package

The information contained in this developed multimedia instructional package was extracted from INEC's website (www.inec.gov.ng), and demonstrated before of the students for easy assimilation of its contents. The information covered the following areas:

Voter Registration

- Step 1: A Nigerian citizen, who is eligible to vote must attain the age of 18 years and above.
- Step 2: She/he is expected to go to the INEC website to locate a Polling Unit closest to him/her
- Step 3: The citizen goes to the chosen Polling Unit to register
- Step 4: The citizen would have his/her picture taken and his/her details captured.
- Step 5: The citizen would be given a Voter ID card which makes him/her eligible to vote on Election Day

On Election Day

Stage 1: Accreditation Exercise

- Step 1: Go to the Polling Unit you were registered with your voter registration card and join the queue
- Step 2: Present your Voter registration card to the INEC officials and ensure that your name is ticked in the register
- Step 3**:** Your finger would be marked with ink to show that you have been accredited.

Stage 2: The Voting Exercise

- Step 1: Join the queue with the intention of casting your vote
- Step 2: When it gets to your turn, ensure your name is ticked in the voter register
- Step 3: You would be given a ballot paper listing the political parties
- Step 4: Enter the booth and select your preferred candidate
- Step 5: Drop your ballot paper in the ballot box

Fig 2: Voter Registration

Fig 3: Marking of Voter's Finger

Fig 4: Voting Activities

Fig 5: Ballot Paper

Methodology

Research Design

This study used an experimental research design. It was considered appropriate because the study sought to determine the influence of the multimedia instructional package on the students' abilities to participate in the electoral process. This is in agreement with Nelson (2001) [23] who explained that "experimental designs are methods by which a group of people or items are closely studied by collecting and analysing data from a few people or items considered as being representative of the entire group". The sampled population consisted of 194 students drawn from four secondary schools; two from Bauchi North and Bauchi South respectively, all within Bauchi Metropolis. The subjects from each school were randomly assigned to either a control group or an experimental group. Both groups were first subjected to pre-test to determine their levels of understanding of the electoral process prior to the application of the multimedia instructional package. Thereafter, the experimental groups in each school were exposed to the contents of the multimedia instructional package to educate them on the electoral process. In the bid to determine the levels of knowledge gained by the participants, the groups were then subjected to post-test. The results of the post-test were recorded and analysed. The independent variable was the multimedia instructional package while the dependent variables were the students' learning dispositions.

Study Area

This study was carried out in Bauchi Metropolis. Bauchi state is one of the states in the north-east geo-political zone of Nigeria, bounded by seven different states, which include Plateau on the south, Taraba on the south-east, Gombe on the east, Yobe on the north, Jigawa on the north-west, Kano on the west and Kaduna on the south-west.

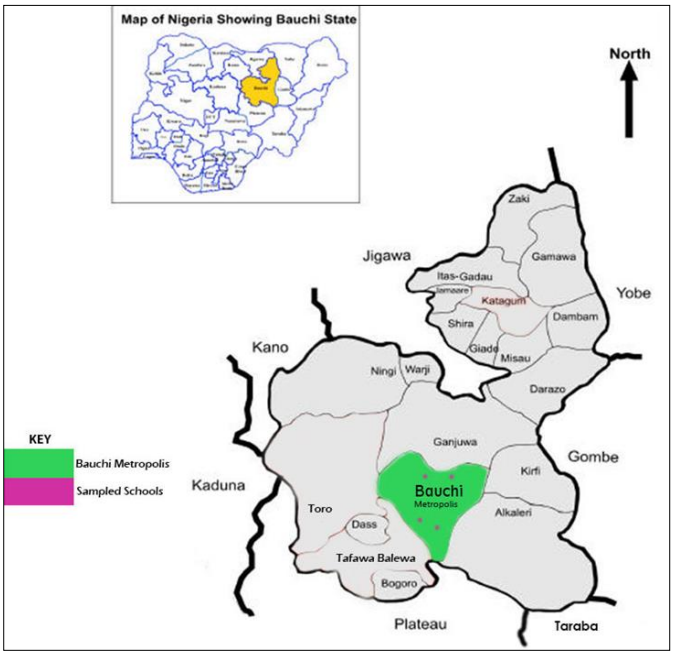

Fig 6

Population of the Study
The population of the study comprised of students in senior secondary schools between the ages of fifteen (15) and nineteen (19) years who have not registered as voters in any elections but are within Bauchi Metropolis.

Sampled Population
The sampled population comprised of 46 students from Government Comprehensive Day Secondary School Warinje, 48 students from Fariah Foundation School Fadaman Mada, 40 students from Government Day Secondary School Gwallameji, and 60 students from Divine International Academy Rafin Zurfi all within Bauchi Metropolis
The sample size was determined by the application of Taro Yamane's formula as used by Okwandu (2004).

$$n = \frac{N}{1+N(e)^2}$$

Where n = the sample size
N = the finite population
e = tolerable error (%)
1= constant

Sampling Techniques
This study used probability sampling technique with particular emphasis on stratified random sampling to generate its data. This technique was considered appropriate due to the fact that it minimized sample selection bias and ensured that certain segments of the population were not overrepresented or underrepresented. According Nwana (2007) [27] "stratified random sampling technique ensures equal representation of the sample relative to the population and it guarantees that minority constituent of the population are represented in the sample".

Instruments for Data Collection
This study used questionnaire as instrument for data collection. To measure the levels of participants' understanding of the electoral process prior and post-application of the multimedia instructional package, multiple choice questions for the pre-test and post-test were developed with three (3) options as test questions for the participants. Five (5) marks were awarded to every correct answer on the list of twenty items

Validity of the Instruments
The instruments used were carefully scrutinized and vetted by INEC officials, political scientists, educationists and other specialists in the field of Graphic Design before taking to the field after the necessary amendments were made in accordance with the recommendations of the experts. This helped in establishing the content and the face validity of the instruments.

Reliability of the Instruments
To determine the reliability of the instruments, a pilot study was conducted on seven (7) students from ATBU International Secondary School, Bauchi; this was to ascertain whether the questions were clear and understood by the respondents considering the format and the wordings. Furthermore, the reliability of the instruments was statistically determined using Cronbach's Alpha on SPSS to ascertain the internal consistency of the instrument. The value of Cronbach's Alpha was found to be 0.911 which is excellent according to the "rule of thumb".

Administration of Instruments
The instruments were administered by the researcher and the research assistants in all the sampled schools. Teachers in those schools were used as research assistants to facilitate the process. The multimedia instructional package in DVD was played and projected on the screen to enable the students watch it carefully. The students watched it repeatedly to assimilate its contents very well; this was done in all the schools sampled. At the end, both the treatment and the control groups were subjected to post-test to ascertain the effect of multimedia instructional package on the students.

Methods of data Presentation and Analysis
The data obtained for the study were presented in tables and analysed using inferential statistics based on the nature of the research objectives. Independent samples t-test was implemented through the use of SPSS 22 to observe whether there were any significant differences in the pre and post-performances of the experimental and the control groups in each case.
The hypotheses were tested using T-test at the 0.05 level of significance. This statistical tool was chosen to determine whether the means of the different groups of participants were significantly different or not.

Results and Discussion
Objective One
To determine the significant differences between the performances of the experimental (treatment) and the control groups in the pre-test

Hypothesis
H0: There are no significant differences between the performances of the experimental (treatment) and the control groups in the pre-test.
H_1: There are significant differences between the performances of the experimental (treatment) and the control groups in the pre-test.

Table 1: Group Statistics of the Pre-assessment

	Groups	N	Mean	Std. Deviation	Std. Error Mean
Pre-test	Experimental	194	41.0825	10.94562	.78585
	Control	194	40.6443	10.11449	.72618

Source: Field Experiment 2017

Table 1 shows the statistics of the post academic achievement test of the experimental group (M = 41.08, SD = 10.95, N = 194, SEM = 0.79) and the control groups (M = 40.64, SD = 10.11, N = 194, SEM = 0.73).

Table 2: T-Test of the Pre-performances of the Experimental and the Control Groups

	t-test for Equality of Means						
	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
						Lower	Upper
Pre-test	.409	386	.682	.43814	1.07000	-1.66561	2.54190
	.409	383.618	.682	.43814	1.07000	-1.66565	2.54194

Source: Field Experiment 2017

To test this hypothesis, independent samples t-test was employed to determine the significant differences or otherwise between the pre-performances of the experimental and the control groups.

From the results of the T-test as shown in table 1 and 2, it is obvious that there were no significant differences between the scores of experimental group (M=41.08, SD=10.95, N = 194, SEM = 0.79) and the control group (M=40.64, SD=10.11, N = 194, SEM = 0.73) conditions; t (386) = 0.409, p = 0.682. Since the P-value for the equality of means was greater than the 0.05 level of significance, there were no significant differences between the performances of the experimental and the control groups in the pre-test. Consequently, the study failed to reject the null hypothesis in favour of the alternative hypothesis. This shows that their levels of understanding of the electoral activities prior to the application of the multimedia instructional package were the same. This finding agrees with that of Barlett & Strough (2003) [3], and Susskind (2005) [30]. The differences between the condition means were likely due to chances but not the independent variable manipulation.

Objective Two

To determine the significant differences between the post-performances of the experimental (treatment) and the control groups in the post-test.

Hypothesis

H0: There are no significant differences between the performances of the experimental (treatment) and the control groups in the post-test.

H_1: There are significant differences between the performances of the experimental (treatment) and the control groups in the post-test.

Table 3: Group Statistics of the Post-assessment

	Groups	N	Mean	Std. Deviation	Std. Error Mean
Post-test	Experimental	194	64.2784	11.97990	.86011
	Control	194	42.2423	10.17963	.73086

Source: Field Experiment 2017

Table 3 shows the statistics of the post academic achievement test of the experimental group (M = 64.28, SD = 11.98, N = 194, SEM = 0.86) and the control groups (M = 42.24, SD = 10.18, N = 194, SEM = 0.73).

Table 4: T-Test of the Post-performances of the Experimental and the Control Groups

	t-test for Equality of Means						
	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
						Lower	Upper
Post-test	19.524	386	.000	22.03608	1.12869	19.81694	24.25522
	19.524	376.198	.000	22.03608	1.12869	19.81676	24.25541

Source: Field Experiment 2017

To test this hypothesis, independent samples t-test was employed to determine the significant differences or otherwise between the post-performances of the experimental and the control groups.

From the results of the T-test as shown in table 3 and 4, it is unequivocally clear that there were significant differences between the scores of experimental group (M=64.28, SD=11.98, N = 194, SEM = 0.86) and the control group (M=42.24, SD=10.18, N = 194, SEM = 0.73) conditions; t (386) = 19.524, p = 0.000. Since the P-value for the equality of means was less than the 0.05 level of significance there were significant differences between the performances of the experimental (treatment) and the control groups in the post-test. Consequently, the null hypothesis was rejected in favour of the alternative hypothesis. This shows that their levels of understanding of the electoral activities in the post application of the multimedia instructional package were not the same. The differences in the results between the two groups were due to the effect of the developed multimedia instructional package on the experimental (treatment) group. This means that the multimedia instructional package had significant positive effect on the students' electoral dispositions. This finding agrees with Liao, (2007) [15]; Hwang & Chang, (2011) [11] who asserted that "multimedia has significant effects on the treatment groups". But differ from Barlett and Strough (2003) [3], and Susskind (2005) [30] who indicated that "the DVD applied has no effect on the treatment group".

Conclusion

The rapid advancement in technology and students' affinity to it has made the technology of multimedia so effective, coupled with the fact that it integrates pictures, audio and texts. By implication, multimedia instructional package is a veritable tool for sensitizing the secondary school students and other prospective voters on the subject of electoral process in Nigeria.

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