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# Effects of Modes of Computer Animation Instructional Packages on Students' Achievement in OSUN State Secondary Schools' Biology

**Dr. Bamidele E. F. and Yoade F. B. (Mrs.)***
*Corresponding author email id: yoadenifemi@gmail.com

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***Abstract*** **– This study examined the relative effectiveness of animation combined with narration, animation combined with narration and On-screen text instructional packages, and the conventional method in improving students' achievement in Biology in Secondary Schools in Osun State. The Study adopted a Pretest-Posttest Control Group, Quasi Experimental research design. The population for the study consisted of Osun State Secondary School II (SSSII) students in Biology. The sample was made up of 100 SSSII students in three intact classes from three randomly selected secondary school in Ife central Local Government Area of the State. The three classes were randomly assigned to Animation combined with Narration (A+N), Animation combined with narration and on- screen text (A + N + T) group and Control Groups. Ovne instrument was used for the study namely, Biology Achievement Test (BAT). Data were analyzed using Analysis of Covariance and Scheffe Post-hoc test at 0.05 level of significance. There was a significant Main effect of treatment on Students' Achievement in Biology concepts in Biology {F (2, 98) = 15.471, P < .05} Animation combined with narration and on-screen text (A + N + T) package produced the highest mean score (mean = 16.67), followed by the Animation combined with Narration (A + N) package (mean = 15.42) and the lowest mean score (mean = 12.75) was recorded for the conventional teaching method. There exist no significant difference in the retention abiity of students exposed to A + N and those exposed to A + N + T (F = 24.96, p > 0.05). The study concluded that computer Animation Instructional Packages are more effective in enhancing students' achievement in Biology.**

***Keywords*** **– Animation Combined with Narration, Animation Combined with Narration and On-screen Text, Retention and Achievement in Biology.**

## I. INTRODUCTION

Biology is an important subject among the core science subjects taught at senior secondary school level in Nigeria. Biology as a subject occupies a unique position in the School curriculum. Biology is introduced to students at secondary school level as a preparatory ground for human development where career abilities are groomed (Federal Republic of Nigeria, 2008). The importance of Biology in the industrialization and other sector of the economy cannot be overemphasized. As a matter of fact, it is a prerequisite for pursuing a number of careers in sciences which include medicine, pharmacy, biochemistry, botany, nursing, zoology among others. The learning of Biology provides an individual with useful information in solving everyday life challenges. Studies have shown that the knowledge of Biology contributes towards the socio-economic development of a country (Odubunmi, 2005).

However, the teaching of Biology should be one that encourages active participation of students for better understanding of its concepts. It is a natural subject which requires the use of appropriate and effective instructional strategy to understand nature, the environment and the application of Biological concepts for everyday use. One of the ways to bring about a change of emphasis in teaching from the teacher directed approach to a facilitated approach, is to change the medium of instruction (Kearsley, 2000; Kiili, 2005). For example, there is a common saying that if a child cannot learn in the way we teach, we must teach in the way the child will learn. Although, it has been observed that teachers have employed different instructional strategies to assist students during teaching and learning process of the subject to improve their learning outcomes and this to some extent has proven to be effective as students' performance improve. However, majority of these students still perform poorly in this subject during examinations as shown in Table I.

Table I. West African Senior School Certificate Examination (WASSCE) in Biology from 2004 to 2014

| Year | Total No.of candidate released | No.of candidate with Credit Pass(A1-C6) | % of candidate with credit Pass | No. of candidate with ordinary passes and Failure (D7-F9) | % of candidate with ordinary passes and failure |
|---|---|---|---|---|---|
| 2004 | 832,689 | 287,484 | 34.52% | 545,205 | 65.48% |
| 2005 | 1,055,710 | 377,693 | 35.77% | 678,017 | 64.23% |
| 2006 | 1,149,400 | 568,202 | 49.43% | 581,153 | 50.17% |
| 2007 | 1,239,829 | 414,408 | 33.42% | 825,421 | 66.58% |
| 2008 | 1,244,242 | 420,923 | 33.82% | 823,319 | 66.18% |
| 2009 | 1,340,206 | 591,229 | 44.12% | 748,907 | 55.88% |
| 2010 | 1,300,418 | 948,684 | 43.19% | 729,404 | 56.09% |
| 2011 | 1,400,390 | 694,033 | 49.56% | 706,357 | 50.44% |
| 2012 | 1,443,545 | 577,129 | 39.98% | 866,416 | 60.02% |
| 2013 | 1,487,080 | 723,726 | 48.67% | 763,318 | 51.33% |
| 2014 | 1,501,263 | 552,615 | 36.81% | 948,648 | 63.19% |

***Source****: West African Examination Council, Research and Statistics Unit*

Table I summarizes the trend of students' performance in Biology in West Africa Senior Secondary Certificate Examination (WASSCE), from 2004 to 2014. It was observed from this Table that the number of students that passed Biology at credit level (A1-C6) was consistently less than 50% over the past ten years with the percentage ranging between 33.42% and 49.56% over the year. This shows that students' performance in Biology in the past ten years has not been impressive. However, studies have been conducted to identify some of the more specific factors contributing to the poor performance of students in Biology

the results of which have been linked to the poor performance, to poor quality of science teachers, inadequate science equipments and poor teaching methods (Salami, 2012).

It has been observed that the current mode of learning in Nigeria is principally structured on traditional chalk-and-talk methods. Aladejana (2008) explains that teaching still retains the old conservative approach of teachers acting as repertoire of knowledge and students the dormant recipients. The teacher-centred method emphasizes learning through the teachers' guardians at all times which favours passive reception of knowledge by the students hence limiting students from learning from variety of sources.

Interestingly, technology in many ways is expanding globally and the need to adopt technology based packages to improve the teaching and learning of Biology for effective performance of students cannot be overemphasized. The use of technology in the classroom has proven to be effective in the teaching and learning of sciences. It offers new, creative and the most engaging ways of teaching. Technology such as computer Animation instructional packages makes teaching effective as learning is enhanced with images, video and sound. Also the use of technology provides an enabling environment through which different types of learners (visual, audio, kinesthetic etc) learn.

Animation, which is basically a form of pictorial presentation, has become the most prominent feature of technology-based learning environments. It refers to simulated motion pictures showing movement of drawn objects. Recently, educational computer animation has turned out to be one of the most elegant tools for presenting multimedia materials for learners, and its significance in helping to understand and remember information has greatly increased since the advent of powerful graphics-oriented computers. Computer animation instructional packages are tools that have the capacity to improve quality learning. It seeks to arouse students' interests, stimulates thinking and concretizes knowledge that could otherwise only be explained in abstract terms.

Literally, animation is moving something that cannot move by itself. It is the technique of photographing successive drawings or positions of puppets or models to create an illusion of movement when the film is shown as a sequence (Mayer and Moreno 2002). This aspect of multimedia learning supports student-centred strategy whereby learners take responsibility in their own learning process (Clark and Mayer, 2003). The liberty to proceed or recede allows self-pacing, an important facet to enable learners to learn according to their individual pace and that will ensure both group of students may perceive information equally (Moreno and Mayer, 2000). Online Animation is a subset of computer animation which literally connotes the animation of concepts that are available on the internet.

Nowadays, the use of online animation or video is generally becoming more popular in the teaching and learning process. Animation of concepts when viewed on the internet provides learners with insight of some abstract concepts. Agommuoh and Nzewi (2003) reported that videos have the potentials of increasing the probability that students will learn more, retain better and even improve their performance of the skills they are expected to develop. Online animation instructional packages are learner-centred strategies and a learning environment in which they are employed can promote interaction, interest and attentiveness etc. Kearsley (2002) studies show that students who learn from animation have greater self-esteem and motivation. His studies also show that students retain information and the ability to sustain the learning process increases. These learner – centred instructional strategies can enhance a stimulating learning environment in which learners interest can increase positively and this can lead to increased attention, retention, concentration, knowledge and learning (Davis., and McGrail, 2009). This form of technology helps in representing information visually which help students understand concepts effectively as a result, it helps students to construct their own meaning and also to develop deep understanding of the subject content through what they see. It makes learning to be more interesting within students' zone of proximal development (Vygosky, 1978). There is therefore the need to explore Technology based teaching in enhancing and facilitating acquisition of the knowledge of what is being taught using online animation instructional packages.

Sousa, (2011) defines Retention as "the process whereby long term memory preserves learning in such a way that it can locate, identify, and retrieve it accurately in the future''. He suggested that learning and retention are not the same and that learning does not necessarily result in long term retention. For example, one can learn information for a short period of time and forget such information. Many students have difficulties in learning Biology. They think that learning Biology simply involves memorizing the contents of the subject and regurgitate them during their examinations. According to Tekkaya, Ozkan and Sungur (2001), students have difficulties in learning Biology and have no interest in the lesson due to the fact that students' motivation to learn this subject was low. Researchers (Lawal, 2007; Atadoga and Onaolapo 2008) found that the persistent low in academic achievement is attributed to teacher instructional strategies among others. Thus, instructional strategies used by teachers in teaching-learning process have significant influence on learners' learning outcomes. Atadoga and Onaolapo (2008), states that, instructional strategies adopted by teachers at all levels of education in imparting knowledge and skills to the learners are determined by teachers abilities, topic to be taught, learners age, available resources and available space. Thus, Poopola (2010), ascertained that, academic achievement is a function of a various factors such as method of teaching, teachers' qualifications, child's home background, school environment, attitude, interest among others. Ogundokun and Adeyemo (2010) added that, academic achievement (low) is related to the decline in the availability of teaching resources in the school.

## II. Purpose of the Study

The purpose of this study is to establish the relative effectiveness of different modes of computer Animation Instructional Strategy on students' achievement in Biology. The specific objectives are to;

1. Examine the effect of different modes of computer animation on academic achievement of students in Biology.
2. Determine the effect of the different modes of computer animation on retention ability of the students in Biology.

## III. Research Hypothesis

The following research hypotheses were generated for the study;

$Ho_1$: There is no significant main effect of treatment on the academic achievement of students in Biology.

$Ho_2$: There is no significant main effect of the different modes of computer animation on retention ability of the students in Biology.

## IV. Methodology

This study adopted the non-equivalent pretest, posttest control group design. The population for the study comprised all public senior secondary school students in Ife central Local Government Area (LGA) of Osun State. The study sample was made up of 100 Senior Secondary School two (SSSII) Biology students from the three intact classes in three randomly selected senior secondary schools in the LGA. The schools were randomly assigned into three groups; and students were used in their intact classes. One research instrument was used to collect data for the study named Biology Achievement Test (BAT). The BAT was developed by the researcher and was used for the pretest, post-test as well as retention test. The test consisted of 25 multiple choice objective test items on the following topics digestion in mammals and digestive enzymes. The BAT was printed in different fonts for the pretest, post-test and retention test. This was to give the impression that they were not the same questions for the different tests. The items in the instrument were developed using test blue print for the purpose of ensuring proportional representation of the contents based on Bloom's taxonomy of cognitive domain as shown in Table II.

Table II. Specification for the Construction of BAT

| Content | Cognitive Level | | | Total |
|---|---|---|---|---|
| | Knowledge | Comprehension | Application | |
| Digestive system | 1 (4%) | 4 (16%) | 2 (8%) | 7 (28%) |
| Various functions of the Alimentary Canal | 6 (24%) | 6 (24%) | 1 (4%) | 13(52 %) |
| Digestive enzymes | 2 (8%) | 3 (12%) | - | 5 (20%) |
| Total Items | 9 (36%) | 13 (52%) | 3 (12%) | 25 (100%) |

The instrument was validated by experts in Biology. The reliability of the instrument was carried out by field-testing on 40 students in a randomly selected senior secondary school two (SSSII) outside the sample of the study. Their scores were analyzed to determine the level of difficulty and discriminating index of each test item. The difficulty indices obtained range between 0.39 and 0.67 while the discriminating indices range between 0.35 and 0.65. The scores of the students were subjected to split-half reliability test which yielded reliability coefficient of 0.82. Based on the validation process out of 35 questions that were initially set, 10 out of the questions were dropped, at the end of which a total of 25 questions were considered to be adequate for the study.

## V. Data Collection Procedure

Permission was sought from the principals of the school to allow the use of their schools. They were briefed about the purpose of the study and they in turn gave their full cooperation and assigned Biology teachers for assistance. Biology Achievement Test (BAT) as pretest in the first week of the research exercise to all the students before the experimental groups were subjected to treatments. This is to ascertain the academic equivalence of the students before treatments. A week after the pretest, the researcher introduced the Animation instructional packages which contained the Human Digestive system to the students that constituted the experimental groups. Group A was exposed to Animation combined with Narration (A + N) and the procedure is as follows:

- The teacher projected the downloaded video of Human Digestive system depicting Animation and Narration package on the screen via the LCD projector.
- The students sat, listened and watched the animation.
- The students put down notes based on narration of the animated video.
- The teacher paused the video to allow interactions between the teacher and the students as well as among students which was based on questions and answers.
- After class presentation, students had opportunities of interacting with the animation by clicking on Next, Previous, Pause, and Stop buttons at their convenience using standalone computer.

Group B was exposed to Animation combined with narration and on- screen text (A + N + T).

- The teacher projected the downloaded video of Human Digestive system depicting Animation, Narration with on-screen Text showing simultaneously on the screen via the LCD projector.
- The students sat, listened and watched the animation and also had the opportunity of reading the on-screen text.
- The students watched the screen text showing simultaneously with the narrated animation and were able to form good notes.

- The teacher paused the video to allow interactions between the teacher and the students as well as among students which was based on questions and answers.
- After class presentation, students had opportunities of interacting with the animation by clicking on Next, Previous, Pause, and Stop buttons at their convenience using standalone computer.

Group C was exposed to the conventional teaching method using teachers' expository method.

The students were exposed to two contacts lessons one lesson per week for two weeks. At the end of the two weeks intervention by the researcher which was two contacts with each of the selected schools, a post-test was administered on the students for their achievements in Human Digestive system. The post-test was 25 point scores. Two weeks after the post-test, a retention test was administered to assess the level of their retention. Altogether, the study lasted for six weeks.

The Data collected were analyzed based on the stated Hypotheses using Descriptive statistics, one way Analysis of covariance (ANCOVA) and Scheffe posthoc test. Descriptive statistics were used to analyze the estimated marginal means, standard deviation and standard error estimates, ANOVA and Scheffe posthoc test was applied to examine whether any significant differences existed among the three groups A, B and C. All the analyses were carried out at 5% level of significance (P = 0.05).

## VI. Results

*Hypothesis One*

There is no significant difference of the different modes of computer Animation and conventional Teaching Method on the academic achievement of students in Biology.

Table III. Descriptive Analysis on Achievement Pre and Post Test Scores

| Packages | N | Mean | Std. Deviation | Std. Error | 95% Confidence Interval for Mean | |
|---|---|---|---|---|---|---|
| | | | | | Lower Bound | Upper Bound |
| A+N | 33 | 15.4242 | 3.29801 | .57411 | 14.2548 | 16.5937 |
| A+N+T | 34 | 16.6765 | 3.18824 | .54678 | 15.5640 | 17.7889 |
| CTM | 32 | 12.7500 | 2.07908 | .36753 | 12.0004 | 13.4996 |
| Total | 99 | 14.9899 | 3.32122 | .33380 | 14.3275 | 15.6523 |

The dependent variable was students' academic achievement post- test scores generated from the Biology Achievement Test. Based on the teaching strategy applied (i.e. packages and conventional method), the estimated mean score revealed that comparing the mean scores of the three groups Animation combined with narration and on-screen text ( A + N + T) strategy produced the highest mean score (mean = 16.67), followed by the Animation combined with Narration (A + N) strategy (mean = 15.42) and the lowest mean score (mean = 12.75) was recorded for the conventional teaching method. The mean scores for all the packages and the conventional method fall within the 95% confidence interval bands.

To test whether there is any significance difference in the mean scores of the result, the result was then subjected to ANOVA test as presented in Table IV.

Table IV. ANOVA of achievement scores of students exposed to the animated packages (A+N and A+N+T) and those exposed to the Conventional Methods

| Sources | Sum of Squares | df | Mean of Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 263.488 | 2 | 131.744 | 15.471 | .000 |
| Within Groups | 817.502 | 96 | 8.516 | | |
| Total | 1080.990 | 98 | | | |

Result in Table IV revealed that $F_c = 15.471 >$ at $p<0.05$ level of significance. This indicated students' academic achievement differed significantly among the three strategies. Thus, the null hypothesis is rejected. This implies that there exist a significant difference in the academic achievement of students exposed to the animated packages and those exposed to the conventional method. The result obtained was then subjected to Scheffe multiple comparison.

The scheffe post hoc in Table 5 revealed that there exist no significant difference in the academic achievement of students exposed to animation combined with narration (A+N) and those exposed to animation combined with narration and on-screen text package (A + N + T) ($p> 0.05$). But there exist a significant difference in the academic achievement of students exposed to the conventional teaching method and the two packages i.e. (A + N), (A+N+T) at ($p<0.05$). It was however revealed that those exposed to A+N+T had better academic achievement than those exposed to the other package and the conventional method. Those exposed to A+N+T had a mean difference of 1.25 when compared with A+N and 3.93 when compared with the conventional Teaching Method.

Table V. Scheffe PostHoc test of the difference of academic achievement among the three groups

| Source of variation | Sum of Squares | Df | Mean of Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 266.514 | 2 | 133.257 | 24.962 | .000 |
| Within Groups | 512.476 | 96 | 5.338 | | |
| Total | 778.990 | 98 | | | |

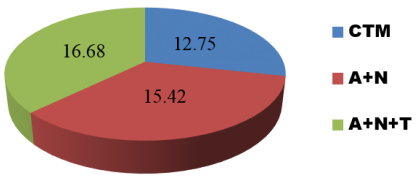


Fig. I. A Chart of the Means of the Groups in Homogeneous Subsets

*Hypothesis Two*

There is no significant difference in the retention ability of the Biology Students exposed to the different modes of computer Animation and Conventional method.

The dependent variable was students' retention test scores generated from the Biology Achievement Test. Based on the teaching strategy applied (i.e. packages and conventional method), the mean score revealed that

Animation combined with narration and on-screen text (A+N+T) package produced the highest mean score (mean = 14.64), followed by the Animation combined with Narration (A+N) package (mean = 13.48) and the lowest mean score (mean = 10.71) was recorded for the conventional teaching method. The mean scores for all the packages and the conventional method fall within the 95% confidence interval bands.

Table VI revealed that the computed value of $F_c$ is 24.96. This value is higher than F table value, $F_t$ is 3.15 observed at probability level of 0.05 Thus, the hypothesis is rejected. This indicated that a significant difference exists in the retention ability of the students exposed to the animated packages and those exposed to the conventional teaching method.

Table VI. ANOVA of the Retention Ability Scores of Students exposed to the Animated Packages and those exposed to the Conventional Method

| (I) Methods | (J) Methods | Mean Difference (I-J) | Std. Error | Sig. | 95% Confidence Interval | |
|---|---|---|---|---|---|---|
| | | | | | Lower Bound | Upper Bound |
| A+N | A+N+T | -1.25223 | .71310 | .219 | -3.0253 | .5208 |
| | CTM | 2.67424* | .72399 | .002 | .8741 | 4.4744 |
| A+N+T | A+N | 1.25223 | .71310 | .219 | -.5208 | 3.0253 |
| | CTM | 3.92647* | .71873 | .000 | 2.1394 | 5.7136 |
| CTM | A+N | -2.67424* | .72399 | .002 | -4.4744 | -.8741 |
| | A+N+T | -3.92647* | .71873 | .000 | -5.7136 | -2.1394 |
| *. The mean difference is significant at the 0.05 level. | | | | | | |

Table VII. Scheffe PostHoc Test of Retention ability Scores of Students in the three groups

| (I) Methods | (J) Methods | Mean Difference (I-J) | Std. Error | Sig. | 95% Confidence Interval | |
|---|---|---|---|---|---|---|
| | | | | | Lower Bound | Upper Bound |
| A+N | A+N+T | -1.16221 | .56460 | .126 | -2.5661 | .2416 |
| | CTM | 2.76610* | .57323 | .000 | 1.3408 | 4.1914 |
| A+N+T | A+N | 1.16221 | .56460 | .126 | -.2416 | 2.5661 |
| | CTM | 3.92831* | .56906 | .000 | 2.5134 | 5.3432 |
| CTM | A+N | -2.76610* | .57323 | .000 | -4.1914 | -1.3408 |
| | A+N+T | -3.92831* | .56906 | .000 | -5.3432 | -2.5134 |

* The mean difference is significant at the 0.05 level.

Table VII revealed that there exist no significant difference in the retention ability of students exposed to A+N and those exposed to A+N+T ($p>0.05$) but there exist a significance difference in the retention ability of students exposed to the packages and the conventional method ($p<0.05$). It was however revealed that those exposed to A+N+T had greater retention ability than those exposed to the other package and the conventional method with mean difference of 1.16 when compared with A+N and 3.93 when compared with CTM.

Table VII. Retention Score –the most effective of the three groups

| Strategy | N | Subset for alpha = 0.05 | |
|---|---|---|---|
| | | 1 | 2 |
| CTM | 32 | 10.7188 | |
| A+N | 33 | | 13.4848 |
| A+N+T | 34 | | 14.6471 |
| Sig. | | 1.000 | .130 |

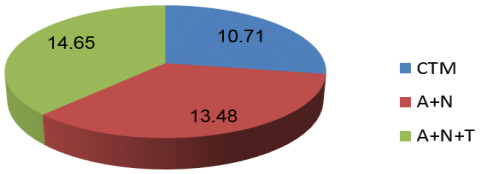


Fig II. A chart of the Means of the Groups in Homogeneous Subsets

Table 10 revealed that students exposed to A+N+T had the highest mean retention score (14.65) than those exposed to A+N (13.49) and those exposed to the conventional method have the lowest mean retention score (10.72). Therefore, the A+N+T package may be said to have significantly enhanced greater retention ability of the students in the subject when compared to A+N and CTM.

## VII. Discussion

From the results and analyses of the study, it was found that before the treatments were administered, there was no significant difference in the pretest scores of the two experimental groups and the control group. This indicated that students in the three groups had the same entry behaviour and there was an equivalent baseline for both the experimental and the control group.

Also, from the results of the analyses of this study, it was found that Animation, Narration and on-screen text package had the greatest significant effect on the achievement of the students more than Animation and Narration (A+N) and the Conventional Teaching Method (CTM). This showed that the concurrent use of animation, narration, and on–screen text in an instructional interface resulted in a significantly better learning outcomes when compared to using animation with narration or the conventional teaching method. The results of this research failed to validate Richard Mayer's (2001) multimedia redundancy principle. Moreover, these findings are not in consonance with the findings of Moreno and Mayer (2000) and Taber, Martens, and van Merrieboer (2004) who found that achievement of students who learnt Physics with course ware version of animation + narration was better than their colleagues who learnt Physics with animation + narration + on-screen text. In contrast, this results are in agreement with Adegoke (2010) who found that students' achievement in Physics were better with concurrent use of animation, narration and on-screen text, when compared to using animation and narration alone. This could be due to the fact that points missed from narration could be read from on- screen text and vice versa. These double opportunities might have not been available to students who were in animation + narration alone. It appears that the more the sources of information the better. The jottings could have been responsible for the observed differences in the mean scores of students in each group. Educational psychologists like Sprinthall, Sprinthall, and Oja (1998) said that jottings made while reading or listening to instructions in the classroom can enhance retention of information. They maintained that persons remember more after taking notes, even if they lose the notes, than do those who simply sit and

listen (probably because the act of writing also engages procedural memory). The implication of this is that when students are listening in the class to computer-based instruction they should be encouraged to take notes. Not only do they have the note to refer to later, but the act of note taking is a rehearsal strategy.

## VIII. Conclusion

Based on the outcomes of this study, it was concluded that Animation instructional packages was a better strategy in improving students' achievement in Biology than the conventional teaching method. More importantly, the animation combined with narration and on-screen text (A+N+T) package was seen as the best package for teaching and learning. The efficacy of this package, perhaps, establishes the need for the introduction, adaptation and use of a more effective learner-centred instructional strategy in teaching and learning situation, which will bring about the desired learning outcomes in the students. Furthermore, the study concluded that A+N+T was equally more effective in enhancing the retention ability of the students than the other the package and the conventional teaching method.

## IX. Recommendations

The following are the recommendations made based on the findings of this study:

1. The essence of teaching is that learners will learn. When learning takes place, academic achievement is automatically enhanced. Based on this fact, it is therefore necessary that this teaching strategy (online Animation Instructional Packages) be used in secondary schools. In order to achieve this, the federal and state governments should make computer and internet facilities available in the public schools because it was observed that only private schools have these facilities.
2. As a result of this global technological development, teachers at secondary school level should be exposed to computer training and also the use of the internet to facilitate their teaching and learning experiences.
3. All subject teachers at the secondary school level should be encouraged to download videos or animations from the internet most especially those ones relevant to their subjects and then incorporate them in their teaching.
4. To improve students' achievement in Biology, the researcher wish to also recommend that multimedia developers should take into consideration that their types of multimedia design should be the those that encourage jotting of important points as in the case of A+N+T package. As a result of this, the author wishes to suggest that, rather than removing what Mayer (2001) referred to as redundant materials, such materials can be incorporated. For example, Muller, Lee, and Sharma (2008) stated that, the addition of more interesting information via on-screen text in narrated animations tends to maintain the learners' attention in multimedia teaching and learning in the classroom situation. The author is of the view that addition of more interesting information tend to afford the students the opportunity to take more notes.

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