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Effect of Computer-Assisted Instructional Package on Students' Ability Level and Performance in Basic Science in Two Instructional Settings in Nigeria.

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Abstracts: *The study investigated the effects of Computer-Assisted Instructional Package(CAIP) on students' ability level and performance in basic science in individualized and cooperative instructional settings. Three hypotheses were formulated and tested at 0.05 level of significance. A quasi-experimental pretest posttest control group design was adopted. A sample of 120 basic nine students (14-16 years of age) , purposively selected and grouped into high, medium and low ability levels based on their previous result in basic seven and eight (12-13 years of age), participated in the study. Basic Science Achievement Test (BSAT) constructed by the researcher was used for data collection. Data collected were analyzed using Analysis of Covariance (ANCOVA) and Multiple Classification Analysis (MCA). Findings revealed a significant difference in the performance of high, medium and low ability level students in the individualized CAIP classroom with the medium ability group outperforming the high group: 75.37 (66.53 + 8.84) followed by the low group: 66.98 (66.53 + 0.45), 54.29 [66.53+(-12.24)]. In the cooperative CAIP classroom, there is no difference among the three ability groups while an interaction effect existed between the CAIP and the ability level on students' performance. Recommendation stressed the need to identify CAIP as an adjunct resource in enhancing students' learning of basic science.*

Keywords: *Ability levels, CAIP, academic performance, instructional settings*

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I. Introduction

In a normal classroom setting, students are lumped together in classes not minding their various ability levels, rate of absorption or their intelligent quotients. The teacher needs to discover new ways of motivating and stimulating the diverse abilities of the science students, many of whom have different learning styles and different orientations to life. Among the strategies teachers implement in order to cater for the diverse needs of the classroom is the use of ability grouping and the incorporation of differentiated tasks (Attard, 2015).

Ability means a certain amount of intelligence that individuals are thought to possess (Boaler 2014). Sadka and Sadka (2005) defined ability grouping as the assignment of pupils to homogenous group according to intellectual ability or for instructional purposes; so each level refers to Sector of the grouping. For example, if students are stratified and grouped into three (3) ability groups (High, medium and low where 70% and above is regarded as high, 50-69% is regarded as medium and 0-49% is regarded as low) each of the groups is regarded as level. Clarke 2003 as cited in Attard (2015) maintains teachers need to think carefully about reasons for choosing to place students into groups according to perceived ability.Swiatek (2001) refers to ability grouping as the practice of placing children of similar academic ability together for instruction. Boaler (2014) viewed ability grouping as a generic term that encompasses any grouping, whether it is within class or between classes, flexible or inflexible, that involves students being separated according to perceptions of their ability. Also in 2013, a report was given by Brown Centre on American education about the resurgence of ability grouping and tracking. In their report, ability grouping typically is an elementary school practice.

Most elementary classes feature a single teacher with a classroom of students who are heterogeneous in ability. To create more homogeneity, teachers may divide students into small instructional groups reflecting different levels of ability, most often for reading in the primary grades (Age 9) and perhaps for reading or math in later grades (10-13years). While the teacher provides instruction to one group, the other students work independently—engaged in cooperative group activities or computer instruction or completing worksheets to reinforce skills. The teacher rotates among the groups so that each student receives a dose of teacher-led instruction in these small settings. Ability grouping, according to Westchester Institute for Human Services

Research (2002) is the practice of dividing students for instruction on the basis of their perceived capacities for learning.

In some cases, students who are assigned to different groups are exposed to different curricula and or educational methods; in other cases, students in all groups study the same material in the same way. Wheelock (1992) explained about the commonality that about 60 percent of elementary schools are breaking up students into different levels in every grade, or practicing some kind of whole-class grouping by ability — including creating Chapter 1 or gifted classes. While some schools institute rigid distinctions in the early grades — such as grouping students into transitional first-grade classes — others wait until fourth or fifth grade. Swiatek (2001) is of the opinion that ability grouping benefits gifted students. According to her, such students have unique characteristics requiring specialized instruction, such as the ability to learn quickly and to deal with abstract concepts at younger-than-usual ages. Given these special needs, perhaps it is not surprising that students who are grouped with other gifted individuals in school learn more in a year than students who have classmates of more varied ability. She stressed further that gifted students benefit slightly when the course content is not altered and gain much more when the curriculum is adjusted to suit their academic needs.

According to Swiatek (2001), ability grouping does not hurt average and below average ability students.Research suggests that lower ability students achieve at the same rate whether or not they are involved in ability grouping. Further, lower ability students experience few changes in self-esteem that are related to ability grouping. When changes are experienced, they are likely to be positive—that is, the self-esteem of lower ability students may increase when they are grouped with other students of similar ability. She stressed further that gifted children who are not exposed to ability grouping are at risk for problems.

In 1993 the U.S. Department of Education in its report, tagged National Excellence, noted that the regular school curriculum fails to challenge gifted students, most of whom have mastered up to half of the material before it is taught. When such students are forced to study material they already know and to spend much more time than necessary on each new topic, they become bored. Boredom is a risk factor for academic problems, including loss of interest, lack of motivation, and underachievement. Such problems may occur even with ability grouping, if the curriculum is inappropriate for gifted students. She buttressed her point further that social and emotional risks may be present in mixed-ability settings as well. The more outstanding a student's ability, the more likely that student will have difficulties fitting-in socially with fellow students in a mixed-ability classroom. Therefore, highly gifted individuals often benefit socially, as well as academically, from ability grouping. The most common forms of ability grouping according to Westchester Institute for Human Services Research are:

- Within-class ability grouping consistently produces larger gains than mixed ability grouping especially in mathematics and in the upper elementary grades. The positive effects are slightly greater for low-achieving students than for average or high achievers.
- Cross-grade ability grouping (where students are regrouped for reading or math instruction across grade levels) and non-graded plans (where children are divided by performance rather than age) also produce greater gains in reading and mathematics than mixed-ability groups. Students of all achievement levels appear to benefit equally from these arrangements.
- Between-class ability grouping, where students spend most of the day in "high," "middle," or "low" classes and use the *sameor similar curricula*, do notresult in any achievementbenefits; the ability-groupedstudents learn the same amountas students in mixed abilityclasses.
- Between-class ability grouping, where students spend most of the day in ability tracks and use curricula substantially adjustedto their ability levels, yields consistently positive effects for high-trackstudents. For students in lower tracks, however, there is no appreciable effect on achievement, positive or negative. The end result of this differential impact is a widening of the achievement gap between high and low achievers. The magnitude of this gap, moreover, has been found to be greater than the achievement difference between students who stay in school and those who drop out.
- Between-class grouping for particular subjects such as reading or mathematics can produce greater achievement gains than mixed-ability groups if the level and pace of instruction are adapted to students' needs, and students are not regrouped for more than two subjects. These benefits, however, have only been observed for elementary school students; at the high school level, the findings are more equivocal.

Although there are arguments both in favour and against the use of ability grouping,to many educators, ability grouping is considered a sensible response to academic diversity. To others, the practice has harmful unintended consequences and should be abandoned. Indeed, research, logic, and emotion often clash when debating the topic of ability grouping. Ability grouping of students according to performance is the grouping of students in line with their persistent academic performance in school tasks.

Johnsons, David and Roger (1992), in their work defined and explained that classrooms are social settings where teaching and learning occur through social interaction between teachers and students. As teaching and learning takes place, they are complicated processes and are affected by peer-group relationships. The interactions and relationships between teachers and students, and among students, as they work side by side, constitute the group processes of the classroom.

According to them, group processes are especially significant in twenty-first century schools. Group projects and cooperative teamwork are the foundations of effective teaching, creative curriculum and positive classroom climate. Interpersonal skills, group work, and empathy are identified as important ingredients in teaching and learning. Group processes are also significant in modern global communities, where citizens must work together for a safe and secure world. Thus, along with teaching academic curriculum, teachers are expected to help students develop the attitudes, skills, and procedures of democratic community. This could be done by assigning them in groups to assess information and solve problems together.

The group based learning environment could be classified as co-operative or group instructional setting. Teachers give the same treatment to all the students under the same condition ignoring their differences. Some understand faster than others. When given the same test, some students perform better than others. As a result of this, it is a common belief, which is supported by Aluko (2004) and Yusuf (2004) that ability level of students affects their performance. Yusuf (1997) asserted that there was no significant difference between the high and medium ability level students, and between medium and low ability level students when taught social studies using videotaped instruction. Yusuf (1994) in his own study on the use of competitive instructional strategy on learning social studies deduced that ability level of students did not influence student's performance. This package may affect performance to favour one ability group than the other.

In a study conducted by (Boaler, William and Brown 2000 as cited in Attard, 2015) ,the grouping of students into ability 'sets' emerged as a significant factor that influenced students' ideas, their responses to mathematics, and their eventual achievement. The study found that students in the school that used ability grouping were significantly disadvantaged by their placement and this disadvantage was not restricted to students in the lower ability groups. Approximately one-third of students in the highest ability groups felt disadvantaged because of high expectations, fast-paced lessons and pressure to succeed. Students from a range of groups were 'severely disaffected' by the limits placed upon their attainment. Students reported that they gave up on mathematics once they discovered their teachers had been preparing them for examinations that gave access to only the lowest grades. Large numbers of students, in the study by (Boaler et al., 2000 as cited in Attard, 2015) experienced difficulties working at the pace of their particular class. For some the pace was too slow, resulting in disengagement, although for others it was too fast, resulting in anxiety. Both responses led to lower levels of achievement.

In addition to the findings above, there is research that claims ability grouping causes behavioral problems for some within the mathematics classroom (Attard, 2015). Teachers in a study conducted by Ventakatakrishnan and Wiliam 2003 as cited in Attard, 2015 found behavioral problems more common in mixed ability groups than in their fast-track, higher ability group. These behavioral problems were compounded by the weak literacy skills of some individuals in these groups in addition to peer self-management skills. Interestingly, placing students in 'tracked' groups had an effect on students' perceptions of themselves as learners of mathematics. Those who were fast-tracked perceived themselves as 'doing well' while those in mixed ability groups perceived themselves as 'low' in mathematical ability. The teachers involved in the study also noted they had problems motivating the higher attaining students within the mixed-ability groups – students who had 'just' missed out on being placed in the fast tracked group. Ventakatakrishnan and Wiliam 2003 as cited in Attard, 2015) also note that mixed-ability grouping decreases the opportunities for higher-achieving students to interact constructively with peers although ability groups have the same effect on lower achieving students. The study found that advantages of grouping by ability are limited and restricted to higher achieving students while causing disadvantage to those who are the lower ability level students.

Also Neihart (2007) as cited in Bolick and Rowgosky (2016) analyzed research that studied the social and emotional impact of ability grouping on gifted students. The review of research conducted by Neihart (2007) as cited in Bolick and Rowgosky (2016) found that various types of ability grouping generate consistent results for gifted students. Ability grouping appears to show positive social and emotional effects for certain gifted students, neutral effects for some, and then damaging effects for others (Neihart, 2007 as cited in Bolick and Rowgosky 2016). The research was limited, but evidence collected suggests that homogeneous grouping arrangements are more strongly associated with positive adjustments of highly gifted children.

Ability grouping and scoring level of students are mostly considered by foreign researchers. This research work grouped students as high, medium and low ability level students to see if the developed package could improve learners and move them from lower cadre to higher cadre.

Computer Assisted Instruction (CAI) is a new teaching- learning strategy in which the topics to be taught is carefully planned, written and programmed in a computer which could be run at the same time in several computer units and allows each student a computer terminal (Kumar and Chaturvedi, 2014). Computer-Assisted Instruction (CAI) was defined by Sanni and Osungbemiro (2003) as programmed instructional material presented by means of computer or computer systems. They stressed further that what makes CAI most interesting is the degree of information between the users and the machine as facilitated by colourful and attractive machine interphase. They are of the opinion that the problem of lack of interest shown in serious scientific studies could be minimized by the adoption of a more innovative approach based on information technology. They argued further that it is only this that is capable of evoking the exclusion of all other established teaching methods. The innovative approach mentioned by these researchers is the use of Computer-Assisted Instructional Packages or Computer-Aided Learning or Electronic- Learning. Traynor (2003) is of the opinion that CAI programs increase student learning by increasing motivation. Students may be grouped according to the number of computer sets in the school to learn through Computer-Assisted Instructional Package.

Before 1999,Basic science was taught as Integrated Science but in 1999 , Universal Basic Education (UBE) Programme was initiated which changed integrated science to Basic science in the first 9 years of the education system i.e. primary school and the junior secondary school. According to the designed curriculum for Basic Science (2008), the curricular are designed to allow curriculum planners and implementers to adequately target pupils' needs and interests in a rapidly changing society like Nigeria.

Since science is an indispensable phenomenon, it is imperative to look for better ways of teaching it. According to Agusiobo (2000), Basic Science curriculum planners stressed three basic strategies in teaching the subject. They are:

1. Use of discovery teaching tactics;
2. The inclusion of problem solving activities; and
3. The involvement of students in open ended laboratory exercise.

The use of discovering teaching tactics entails problem solving integration, analysis and interpretation of information and provision of feedback by learners and therefore allows them to explore their environment and actively participate in the learning process. If further encourages autonomy and creativity during learning.

The inclusion of problem solving activities corners a comprehensive approach where students are kept in challenging situation (Torp and Sage, 2002) i.e. building the problem base, analysis of the problem, sysnthesis of the findings and communication of the results (Farley, Erickson and Daly, 2005). It therefore makes learner stakeholders in the process.

The involvement of students in open ended laboratory exercise gives themoppurtunities to explore different approaches without resulting to alinear lock step by step method during learning. Activities here involves questioning, generation of hypothesis, exploration, experimentation, interpretation of data and result communication .

The problem facing the teaching and learning of Basic Science emanated from the curriculum planners. The syllabus drawn for the three years is too voluminous that teachers can hardly cover them within the duration given i.e. three periods per week of 40 minutes per period. As a result of this, teachers rush to finish the syllabus but not to achieve the set goals and objectives (Afolabi, 2006). Difficult concepts, especially those that are abstract in nature could not be taught with ease using conventional method as it will consume more time and teachers will need time to gather materials for demonstration at different intervals.

Odetoyinbo (2004) recommended that Basic Science teachers should be exposed to various teaching techniques, such as inquiry, problem solving, co-operative learning and concept mapping among others to carry out hand–on tasks and activities in order to maximize the gains of Science.

Instructional settings where learning takes place can assist the rate at which students' learn. Some students learn quickly when they sit alone to listen to the teacher while some learn faster amidst their peers in form of group work. Individualized instruction was defined by Mezieobi, Fubara&Mezieobi, (2008) as a learning process in which learners are given adequate and appropriate instructions purposely to help them learn the content of a subject through their own learning style and at their own pace. They stressed further that individualized learning takes place when a learner assumes some responsibility for his/her own perceptual strength in accord with his/her own learning style. Using computer for individualized instruction is an innovative and a learner centered technique that equips learners with the necessary information and material purposely to help them learn content of his subjects using computer as a medium of instruction, using their own learning style and working at their own pace. This can help to eliminate negative reinforcement as well as lack of student's interest in the topic being thought. Nnamani and Oyibe (2016) reiterated that individualized instruction recognizes differences in the learner's needs, capabilities and interests consequent upon their different socio-economic and cultural backgrounds.

Cooperative learning is a collaborative learning technique that requires students work together so as to achieve instructional objectives through the sharing and collaboration of ideas and experiences (Tran, 2014). It encourages and motivates students to learn by providing a constantly stimulating environment for them. It also promotes enthusiasm by presenting academic content in a way that is interactive, enjoyable and suitable. It enhances students learning from each other and motivating them to encourage others to learn.This may also lead to an academic competition among students. Consequently, students' interest and capacity are improved on the learning of content in social studies (Atlun, 2015). In cooperative instruction, students are thus exposed to different types of media that they otherwise might not have experienced or interacted with in a conventional situation. Cooperative Computer Assisted Instruction is therefore an innovative and interactive instructional package that divides students into different groups and each group is then equipped with a computer as a medium of instruction under the guidance of a teacher on order to bring about positive changes in learners' behaviour

This developed package (CAIP) was tested in two different instructional settings. That is, individualized and cooperative instructional settings. This study intends to find out the effect of ability level of students and their performance in Basic Science when exposed to Computer Assisted Instructional Package in two instructional settings.

Statement of the Problem

In Nigerian Secondary schools, (especially public secondary schools), students in each of the classes are lumped together not minding the ability levels and individual differences. Some are fast learners while some takes their time to absorb, requiring teachers to explain more than once or twice. Also, some students learn better when teacher gives them attention while some will prefer to learn from their colleagues. When mass teaching approach is adopted, it doesn't give room to consider individual differences.

CAIP was a self – developed instructional package which was found to enhance student's performance in Basic science (Laleye 2011). The study therefore intends to find out which ability group will benefit more when CAIP is used for learning and the instructional setting that aids learning better when the package is used for learning basic science.

Purpose of the Study

The study aimed at investigating the effect of CAIP on students' ability level and performance in Basic science in two instructional settings.

Research Hypothesis

The following research hypotheses were generated for the study:

$H_0$1. There was no significant difference in the post test scores of high, medium and low ability level students taught Basic Science with Computer-Assisted Instructional package in individualized classroom setting.

$H_0$2. There was no significant difference in the post test scores of high, medium and low ability level students taught Basic Science using Computer-Assisted Instructional package in cooperative classroom setting.

$H_0$3. There was no significant interaction effect of students' academic performance and their ability levels when exposed to Computer-Assisted Instructional Package.

II. Methodology

Quasi-experimental pre-test-post-test control group design was adopted. The target population for the study was made up of all basic nine students in Ondo state**.** A sample of 120 basic nine students, purposively selected and grouped into high, medium and low ability levels based on their previous result in basic seven and eight, participated in the study. The schools were selected purposively based on the availability of the required numbers of computers for each group.

Research Instruments

The instruments for this research were (1) Treatment instrument which is the Computer-Assisted Instructional Package (CAIP) and (2) Test instrument which is Basic Science Achievement Test (BSAT).

Test Instrument

Basic Science Achievement Test (BSAT) was developed by the researcher and is based on the content of CAIP. It is a diagnostic test that is made up of 25 multiple-choice objective items with four options. Four (4) marks are awarded to each item, giving a total mark of one hundred (100). It was administered twice to 30 students (not part of the study) and their scores were subjected to Pearson product moment correlation while the reliability index yielded 0.78.

Treatment instrument: This was the CAIP and the procedural guide by the researcher for the experimental groups.

Procedure and Administration of Treatment

The BSAT was administered to the students in the first week. The treatment lasted for six weeks in which the Experimental group 1 worked with 40 desktop computers with 18cm monitors individually while experimental group 2 used 10 desktop computers in a group of 4 students per computer. In the control group school, students were taught the topics on the CAIP using the procedural guide. Lessons were conducted after school hours in order not to disturb their normal school work. BSAT for the pre-test was rearranged and administered to the students as post-test after treatment.

III. Results

Ho1: There is no significant difference in the performance of high, medium and low ability level students taught Basic Science with Computer-Assisted Instructional Package in individualized classroom setting.

Table 1: Ability Level and Performance of Students Exposed to Individualized Learning Environment in Basic using ANCOVA

Source	SS	df	MS	F_{cal}	F_{table}
Corrected model	18892.65	3	6297.55	112.61	2.84
Covariate(Pre-test)	1101.35	1	1101.35	19.69	4.08
Ability Level	4092.09	2	2046.05	36.86	3.23
Error	2013.32	36	55.93		
Corrected	20905.98	39			
Total	197929.00	40			

$P<0.05$

The result revealed in table 1 that F_{cal} (36.86) is greater than F_{table} (3.23) at 0.05 level of significance. The null hypothesis is rejected. Therefore, there is significant difference in the performance of high, medium and low ability level students taught Basic Science with Computer-Assisted Instructional Package in individualized classroom setting.

In order to determine the magnitude of the significant effect, Multiple Classification Analysis (MCA) was used. The result is presented in Table 2.

Table 2: Multiple Classification Analysis of Ability Level and Performance of students Exposed to Individualize Instructional Setting in Basic Science.

Grand Mean = 67.56 **Variable + Category**	**N**	**U adjusted Δ evn**	**Eta**	**Adjusted for Independent + Covariate**	**Beta**
Individualized	40	-1.03		-2.77	
Cooperative	40	9.19	1.34	7.11	.82
Conventional	40	-8.16		-4.34	
MultipleR^2			.67		
MultipleR			.82		

The result shows that students in the medium ability level group had the highest posttest mean score of 75.37 (66.53 + 8.84). This is closely followed by the high ability level group with an adjusted posttest mean score of 66.98 (66.53 + 0.45) while the low ability group obtained the least adjusted posttest mean score of 54.29 (66.53 + (-12.24).

Hypothesis 2

There is no significant difference in the performance of high, medium and low ability level students taught Basic Science using Computer-Assisted Instructional Package in Cooperative Classroom Setting.

Table 3: Ability level and performance of students exposed to Cooperative Learning Environment in Basic Science using ANCOVA.

Source	SS	df	MS	F_{cal}	F_{table}
Corrected model	8607.22	3	2869.07	26.04	2.84
Covariate(pre-test)	2020.80	1	2020.80	18.34	4.08
Ability Level	311.05	2	155.53	1.41	3.23
Error	3966.28	36	110.17		
Corrected Total	12573.50	39			
Total	248196.00	40			

$P<0.05$

Table 3:shows that F_{cal}(1.41) is less than F_{table} (3.23) at level of significance. The null hypothesis is accepted. Therefore, there is no significant difference in the performance of high, medium and low ability level students taught Basic Science using Computer Assisted Instructional Package in Cooperative Classroom Setting.

Hypothesis 3

H_o3: There is no significant interaction effect of Computer-Assisted Instructional Package and ability levels on students' academic performance in Basic Science.

Table 4: Interaction effects ofComputer-Assisted Instructional Package and Ability Levels on students' performance in Basic Science using2 X 3 ANCOVA.

Source	SS	df	MS	F_{cal}	F_{table}
Corrected Model	29563.61	6	4927.27	59.88	2.17
Covariate (Pretest)	3094.88	1	3094.88	37.61	3.92
Ability Level	3203.25	2	1601.63	19.46	3.07
Group	2171.98	1	2171.98	26.40	3.92
Ability Level x Group	1466.39	2	733.20	8.91	3.07
Error	6006.87	73	82.29		
Corrected Total	35570.49	79			
Total	446125.00	80			

$P<0.05$

The null hypothesis is rejected ($F = 8.91$, $P<0.05$). Therefore, there is significant interaction effect of Computer-Assisted Instructional Package and ability levels on students' academic performance in Basic Science. Similarly, the main effect of treatment (individualized and cooperative learning environment) on students' academic performance ($F = 26.40$, $P<0.05$), ability level on academic performance ($F = 19.46$, $P<0.05$) is statistically significant at 0.05 level in each case.

IV. Discussion of Findings

The result revealed that n performance in Basic Science Achievement Test, student in the cooperative group performed significantly better than their colleagues in the individualized learning settings. This is in line with the findings of Dauda, Nwanse and Dung (2003), Daramola (2007), and Imhanlahimi and Imhanlahimi (2008) that students taught through cooperative or interactive Computer Assisted learning strategy achieved significantly higher than those taught in individualized learning setting. This may be as a result of the interaction with one another by the students in the cooperative group. This can encourage low ability level students to become more active participants in the class. Also, shy students and introverts can feel free in their own student-centred environment. This negate the findings of Jongur et al (2008) who claimed that individualized instructional setting enhanced better performance than cooperative group.

Based on ability levels, according to this finding, students performed relatively the same in the two instructional settings. Though learning took place in all the ability levels, all the students still maintained their groups. These findings are corroborated by the findings of Nwagbo (1999) that there is no significant difference in the performance of students after treatment. Though Njoku (2007) in his findings detected that low ability level students loose out easily in competitive environment, in this research work, low ability level students improved in their performance but not as in high and medium level groups. In the individualized instructional setting, medium ability level students outperformed their counterparts when their mean differences were considered individually but not to the extent of performing equally with high ability level students.

From the findings, it was realized that there is significant interaction effect of ability level on students' academic performance in Basic Science such that students with high ability level tended to outperform their counterparts with medium and low ability levels. The result also indicated that students who were exposed to cooperative instructional learning setting significantly outperformed those who experienced individualized learning setting.

V. Conclusion

The findings have shown that the students exposed to CAIP in the two instructional settings (individual and cooperative) significantly performed better than their colleagues taught using conventional method of teaching. This implies that CAIP could be effectively utilized to teach the students Basic Science since learning is enhanced. Also the ability levels of students were considered in relation to performance. Lower and middle ability level students performed better when taught with CAIP than in the conventional instructional setting. This implies that there is an increase in the subjects' knowledge after exposure to CAIP. This package could be used as an adjunct to support learning. It could be used for revision/remedial purpose and drill and practice.

VI. Recommendations

Based on the findings, it is recommended that the developed package should be used as an adjunct as it cannot replace textbooks and the computer system cannot replace the teacher. Best results would be achieved if teachers could monitor and assist students when using the package.

Cooperative learning should be encouraged in the learning of Basic Science in the schools using CAIP, since the finding of this research proved that the best academic performance took place in the cooperative learning setting, group work and assignment should be encouraged.

Teachers should have high expectations from all the students in all the ability levels and know their needs across all aspects of the Basic Science curriculum.

References

[1]. Afolabi, A. O. (2006). Effects of computer- assisted instructional package in biology in Oyo, Nigeria.*Unpublished Ph.D thesis,* University of Ilorin.

[2]. Agusiobo, B.C. (2000). The level of use (LOU) of resources in the integrated science master plan by the teacher. *41st STAN Annual Conference Proceeding.*

[3]. Attard, C. (2015). *Ability grouping and mathematics: Who benefits?* Engaging Maths: a blog retrieved from https://engaging maths.com/2015/08/16/ability-grouping-and-mathematics-who-benefits/

[4]. Altun, S. (2015).The effect of cooperative learning on students' achievement and view on the science and technology course.*International Electronic Journal of elementary education*, 7(3), 451-468.

[5]. Boaler, J. (2014) Ability Grouping in Mathematics Classrooms. In: Lerman S.(eds).*Encyclopedia of Mathematics Education*. Springer, Dordrecht DOI: https://doi.org/10.1007/978-94-007-4978-8_145

[6]. Bolick, K. N. and Rogowsky, B. A. (2016). Ability grouping is on the rise, but should it be? *Journal of Education and Human Development.*Vol. 5, No. 2, pp. 40-51 ISSN: 2334-296X (Print), 2334-2978 (Online)

[7]. Daramola, C.A. (2007). Information communication, Teaching and educational development in Nigeria. *Educational Thought.* Adekunle Ajasin University Journal.

[8]. Dauda, D.M; Mwanse, E.D, and Dung, C.J. (2003).Students' attitude to the use of the computer for learning and achievement in scientific concepts.*44th Annual Conference Proceedings of STAN.*Pgs 29–32.

[9]. Farley, J., Erickson, J., and Daly, H. (2005).*Ecological Economics: A workbook for problem based learning*. Washington, DC: Island-press

[10]. Imhanlahimi, E.O. and Imhanlahimi, R.E. (2008). An evaluation of the effectiveness of Computer Assisted learning strategy and Expository method of Teaching Biology: A case study of Lumen Christi International High School, Benin City, Nigeria. *Journal of Social Sciences,* 16(3): 215 – 220.

[11]. Johnson, D.W., and Johnson, R.T. (1992).*Learning together and learning alone*, 3rd edition. Englewood Cliffs, NJ: Prentice-Hall.

[12]. Jongur, I.U., Mohammed, A., and Abba, A.H. (2008). Learning strategies in teaching science through information and communication technology. *Journal of STAN.*(43), 1,2 .53-61

[13]. Kumar, R. &Chaturvedi, S. (2014). Effectiveness of computer assisted instructional package as remedial teaching for learning disabled children. *Learning Community*: 5(2&3). DOI: 10.5958/2231-458X.2014.00016.5

[14]. Laleye, Ademiotan Moriyike (2011): Development and Validation of a Computer-Assisted Instructional Package for Teaching Physics Concepts in Basic Science in Nigeria. University of Ilorin *Unpublished Ph.D. Thesis*.

[15]. Mezieoba, K.A., Fubara, V.R. &Mezieoba, S.A. (2008). Social studies in Nigeria: *Teaching methods, instructional materials and resources.* Oweri: Acade Peak Publishers.

[16]. Njoku, Z.C. (2007). Engendering learning equity in science and technology Classrooms for sustainable development.*50th Annual Conference Proceeding of STAN.* (24-31).

[17]. Nnamani, S.C. &Oyibe, O.A. (2016).Effects of individualized instructional method on secondary school students' achievement in Social Studies. British Journal of Education 4(3), 110-120. Retrieved www.eajournals.org

[18]. Nwagbo C.R. (1999). Enriching Senior Secondary School Biology Curriculum Through Integrating Entrepreneurship Activities. *39th Annual Conference Proceedings of STAN.* Pp. 128-130

[19]. Odetoyinbo, B.B. (2004). "Evaluation of the Nigeria Integrated Science Programme in Junior Secondary Schools".*An Unpublished Ph.D Thesis.university of Ibadan, Ibadan.*

[20]. Sanni, R.O. and Osungbemiro N.R. (2004). An Innovative, I.T based approach to the teaching of biological sciences at the SS level of education, *STAN: Ondo State Journal of STAN.* Pg. 94-100.

[21]. Slavin, R.E. (1987). Ability grouping and student achievement in elementary schools: a best evidence synthesis. *Review of Educational Research,* 57(3), 293-336

[22]. Swiatek, M.A. (2001). *Ability grouping: Answers to common questions.*reprinted from C-MITES New, Spring.

[23]. Torp,K. and Sage, S. (2002). *Problems as possibilities: Problem-based Learning for*

[24]. *K-16 Education*, 2nd edition. Alexandria, WA: Association for supervision and curriculum development.

[25]. Traynor, P. L. (2003). Effects of computer-assisted-instruction on differentlearners. *Journal of Instructional Psychology, 30*(2). Retrieved from http://www.questia.com

[26]. Westchester institute for human services' research (2002).*The balanced view: Research – based information on timely topics.* 7–11 south broadway white plains, NY 10601 (914) 682 – 1760. Vol. 6 (2). July 2002.

[27]. Wheelock, A (1992). *Does ability grouping help or hurt? report from meg bozzone in New Press.*Copyright © 2005 hedrick smith productions-all rights reserved. /PBS privacy policy/created.

[28]. Yusuf, M.O. (1997). Effects of videotape and slide-tape instructions on junior secondary students' performance in social studies.*Unpublished Ph. D thesis.*Curriculum studies and studies and educational technology university of Ilorin, Nigeria.

[29]. Yusuf, A. (2004). Effects of cooperative and competitive instructional strategies on junior secondary school students performance in social studies; in Ilorin, Nigeria*unpublished Ph.D Thesis curriculum studies and Educational Technology, University of Ilorin, Nigeria.*

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