Effects of Games Teaching Strategy on Primary School Pupils' Academic Achievement in Basic Science in Adamawa State, Nigeria

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ABSTRACT

The study determined the effect of game teaching strategies on primary school pupils' academic performance in basic science and technology in Adamawa state, Nigeria. Three objectives achieved which are; effects of quiz game strategy on primary school pupils' performance in basic science and technology in Adamawa state. Effects of simulation game strategy on primary school pupils' performance in basic science and technology in Adamawa state. Effects of puzzle game strategy on primary school pupils' performance in basic science and technology in Adamawa state. The design of the study was a quasi-experimental pretest and a posttest consisting of 413 primary five pupils randomly selected within the state. Instrument used for data collection was Basic science and technology and technology teacher-made performance test. The instruments were content validated by three experts. The instrument was also tested for reliability, using Cronbach alpha. A reliability coefficient of 0.75 was obtained. The data collected were analyzed using descriptive statistics for the research questions and ANCOVA for the hypotheses. The result revealed that, there are significant differences among the game methods, quiz game is the best followed by puzzle games, simulation and lecture are the least effective in improving pupils' academic achievement in primary school basic science. There is a significant difference in the performance of pupils taught basic science and technology with quiz games and those taught with lecture methods in favour of groups taught with quiz games. A significant difference in the performance of pupils taught basic science and technology with puzzle games and those taught with lecture methods in favour of groups taught with puzzle game. There is significant difference in the performance of pupils taught basic science and technology with simulation games and those taught with lecture methods in favour of groups taught with simulation games. It was concluded that, games strategies significantly improve pupils' academic performance in primary schools in Adamawa state. The study recommended that; the Adamawa state government should recommend game strategies in primary school teaching. Curriculum planners should incorporate game strategies in teaching primary school science into the curriculum. Adamawa state government should organize a training workshop for primary school teachers on how to inculcate game strategies into their teaching.

Key Word: Game Strategy, Teaching, Academic Performance, Basic Science, Primary School.

INTRODUCTION

A critical examination of the Nigerian primary science curriculum reveals that science is an activity-oriented subject. Greater emphasis should be placed on doing than telling. The children should be immersed in an extended series of enriched experiences that could help to give them ample opportunity for self-discovery. However, as Lederman, (2022) has noted, the transaction in primary science classrooms does not reflect the activity orientation, but read-about and tell-about teacher demonstration-oriented course. The changing nature of scientific knowledge calls for a need to de-emphasize science as dogma. Science should be made more relevant to everyday life. James, (2018) opined that in the teaching-learning process, we must remember that those at the receiving end i.e. learners must take delight in what we are teaching, and in teaching science to students in particular, we must go the extra mile with them involving all that is good in science.

The use of games in teaching primary science according to Maduabum, as cited in Aina (2013), is a resource or

a piece equipment and material which that the teacher can use to help the achievement of lesson objectives. The game in teaching/learning process is a scientific skill such as observation, identification and classification that is very important for laying a sound foundation for subsequent science. A game can be defined as an activity that contains some or all of the following elements: rules, goals, challenges, fantasy, mystery, curiosity, competition and skill (Aina, 2013). Games that are adapted and used for educational purposes aim to have players achieve a specific learning outcome as the goal of the game. Over the past decade, educators have reported using games as instructional tools for varieties of disciplines. Koether (2003) described using a named game to teach students chemical information. Gulo (2003) used a trivia game to teach laboratory safety methods and Deck (2012) developed individual variations of a science-themed jeopardy to improve student retention of content in the field of organic, general, and biochemistry. Games have also been used in psychology courses to teach students abnormal psychology diagnoses, theories of personality, and research methods (Merwin, 2003). For example, at Owens Library, Northwest Missouri State University, students engaged in a word find exercise or jeopardy-style game at the end of a two-week library orientation instruction program to reinforce the material that has been taught (Ury and King, 2015). Krajewski and Piroh (2012) described how freshmen at Simmons College played a game of library jeopardy during the second of two-library Session to find out about library services in a non-intimidating, fun manner. Interestingly, Rendell et al (2012) surveyed published research from 2003-2021 and found 67 empirical research studies that address the effectiveness of games versus traditional instruction in the areas of social sciences, math, language arts, physics, biology, and logic. Slightly more than thirty percent of these studies showed increased students learning from games in contrast to conventional instruction. After the Rendell survey, studies showed increased knowledge retention by those using an educational game compared to those receiving traditional instruction (lecture and paper-based materials). Educational games are beneficial to students because they address different learning styles or preferences, provide immediate feedback, increase student motivation, and enhance a student's overall learning experience, all of which increase the chance of a positive learning outcome for the student. Other disciplines such as biology, nutrition, and psychology have incorporated various games, such as Wheel of Fortune, bingo and crossword puzzles, quizzes, and simulations into postsecondary classroom instruction. Science games can be grouped into competitive and non-competitive games. The competitive science games involve scoring the scoring system has a fixed number of points. One player's success automatically leads to another player's loss. Non-competitive science games involve no scoring but self-developed skill and mastery of subject matter to solve related problems.

However, Games show mixed effects across some sectors, such as student performance, engagement, and learning motivation. However, as these studies focus only on certain disciplines, there remains a gap in the literature concerning a clear framework of use across academic programs. As a result, the issue of efficiently integrating games into the educational process is often up to the instructor's discretion. Accordingly, this research aims to determine the effects of game strategies on primary school pupils' performance in basic science and technology in Adamawa state.

LITERATURE REVIEW

Tham and Tham (2012) examined the effectiveness of game strategies in engaging and motivating Singaporean higher education students. The findings indicated that game-based learning is very useful for engaging and motivating students, to learn because challenges in games foster competition between groups and collaboration within groups. Sowunmi and Alade Jana (2013) evaluated the comparative effectiveness of Simulation Games and Computer Assisted Instruction on Nigerian learners' achievement in the sciences and found out that there was no significant difference in the performance of the learners based on their separate exposures to simulation games and computer assisted instruction. Liu and Chen (2013) verified the significance of educational card games on science learning on Taiwanese students' attitudes to learning and revealed that the learners not only developed positive attitudes but also improved their scientific knowledge.

Using a quasi-experimental design, Akinsola and Frederick-Jonah (2014) surveyed the impacts of game-enhance instruction on students' achievement in mathematics in Nigeria. The results revealed that learners exposed to game-enhanced instruction had better mean achievement scores than the control groups. Chin and Zakaria (2015) investigated the impact of game-based learning activities on positive learning and pro-social behaviors among

young Malaysian learners and the result suggested that the activities were very effective in nurturing positive learning and pro-social behaviors. Iwu Anyanwu, et al (2016) applied a quasi-experimental approach towards probing the influence of simulation game strategy on performance among Nigerian secondary school students and reported that subjects taught using the simulation game strategy performed significantly better than those taught using the lecture method.

Ellahi, et al (2016) examined the impact of using digital games on learning among Pakistani undergraduates and observed a significant impact of game design on learning outcomes. Fatou, et al (2016) investigated the effect of the games teaching approach on Nigerian chemistry students' achievement and retention. The results showed that those taught using the game method achieved and retained better than those taught with the conventional method. Ezeugwu, et al (2016) investigated the effect of the game-based instructional techniques on the achievement and interest of Nigerian students in Algebra at the basic educational level and discovered that the use of the technique did have a significant effect on achievement and interest in Algebra. Dreyer (2017) investigated the use of Game-Based Learning (GBL) in comparison to traditional teaching methods when used to teach South African undergraduate Computer Information Systems (CIS) students and revealed no significant difference between the usage of the two methods.

Dele-Ajayi, et al (2019) determined the impact of a digital educational game on interest and engagement with mathematics among Nigerian students. The results showed significant improvements in attitude to and engagement with mathematics in a way that within a short period of learning with the digital educational game, learners became co-creators of their knowledge, sharing ideas, forging new learning pathways and computing. Chayana, et al (2017) ascertained the effect of mobile game-based learning (M-GBL) on student learning outcomes in association with student's learning independence among Indonesian high school students. M-GBL was found to have a positive effect on students when applied to groups of students with high learning independence but no positive effect on those with low learning independence.

Okanlawon, et al (2017) verified the relationship between Nigerian secondary school students' attitudes towards instructional games on peace education and their achievement in the subject and reported a significant relationship between the investigated phenomena. Hwa, (2018) surveyed pedagogical change in mathematics learning among Taiwanese students and the findings corroborated with the hypothesis that digital game-based learning is more effective than traditional class-based learning in acquiring mathematical knowledge. Chen, et al (2019) explored the effects of scenario simulation games and e-textbooks on the learning outcomes of young Taiwanese learners and found that the learning outcomes for those taught with e-textbooks had a less positive effect than those taught with scenario simulation game-based instruction.

STATEMENT OF THE PROBLEM

Despite the importance of science education as a pre-requisite to enhancing a nation's growth and development; pupils' learning outcomes in the subject had been so disappointing. This is manifested in students' negative values such as poor academic performance, lukewarm attitude to work, disrespect to constituted authority, and absence of a sense of patriotism among others. This has been a concern to various authorities particularly the science specialist, over the years new strategies that could improve the teaching of the subject to enhance pupils' performance and retention were ignored. The different instructional strategies employed in teaching the subject have yielded little improvement. However, game strategies have been used to improve learning outcomes in other subjects with relative success. It is on this note that this study aims to investigate the effect of game strategies on pupils' performance and retention in science.

PURPOSE OF THE STUDY

The study aims to determine the effects of game strategies on primary school pupils' performance in basic science and technology in Adamawa state. Specifically, the study determined the following objectives: -

1. Effects of quiz game strategy on primary school pupils' performance in basic science and technology in Adamawa state

2. Effects of simulation game strategy on primary school pupils' performance in basic science and technology in Adamawa state
3. Effects of puzzle game strategy on primary school pupils' performance in basic science and technology in Adamawa state

RESEARCH QUESTIONS

1. What are the effects of quiz game strategy on primary school pupils' performance in basic science and technology in Adamawa state?
2. What are the effects of simulation game strategy on primary school pupils' performance in basic science and technology in Adamawa state?
3. What are the effects of puzzle game strategy on primary school pupils' performance in basic science and technology in Adamawa state?

HYPOTHESES

1. There is no significant difference in the mean scores of primary school pupils' performance in basic science and technology when taught using quiz games and conventional lecture method.

2. There is no significant difference in the mean scores of primary school pupils' performance in basic science and technology when taught using simulation game and conventional lecture methods.

3. There is no significant difference in the mean scores of primary school pupils' performance in basic science and technology when taught using puzzle games and conventional lecture methods.

METHODOLOGY

The study adopted the quasi-experimental pretest, post-test non-equivalent non-randomized control group design, which aims to establish a cause-and-effect relationship between independent (games strategies) and dependent (pupils' performance) variables. The design involves a non-randomized control group, pretest-posttest (Ary, Jecob & Sorensen, 2017). The design was used because there was no randomization of subjects into groups, instead intact classes were used and assigned into experimental and control groups. Therefore, this design was considered appropriate for the study because the intact class will be better to avoid disruption of normal class lessons.

Group1 EG →O1→ X1→ O2
Group2 EG → O1→ X1→ O2
Group3 EG → O1→ X1→ O2
Group4 CG → O1→ X2→ O2

EG stands for the Experimental groups
CG stands for the Control group
O1 represents the pretest score,
X1 represents the treatment (simulation, puzzle game, and quiz game)
O2 represents the post-test scores
X2 represents the controlled treatment (Lecture Method).

The study was conducted in Adamawa State, Nigeria. Adamawa State lies geographically between latitudes 70o 281 and 10o 551 North and longitudes 111/20 and 133/40 East. The State capital Yola, lies on latitude 90o 141 North and longitude 12o 281 East. The state is divided into five Education zones namely: Mubi zone, Gombe zone, Yola zone, Ganye zone, and Numan zone.

The population of the study consists of 28012 primary school pupils from 8233 primary schools in Adamawa state. The sample of this study comprised 413 primary 5 pupils drawn from four primary schools in Adamawa state. Multi-stage sampling technique was employed for the study, at the first stage random sampling technique

was used to select one educational zone out of five, in the second stage same random sampling was employed to select one LGA from 3 LGAs within the zone, at the third stage a purposive sampling technique was used to select 4 primary schools within the local government area, at the fourth stage two intact classes were randomly selected from each school. The schools selected must have at least two arms in primary five, must be coeducational, the basic science and technology teacher must be computer literate, with a minimum of NCE, and at least have five years post-qualification experience. At the end of the sampling process, four intact classes from four primary schools were selected and participated in the study. The classes were assigned randomly to three experimental (simulation game, quiz game, and puzzle game) and one control (conventional lecture) group.

The instrument used for data collection is an achievement test tagged "Basic Science Teacher-made Performance Test". The instrument was developed by the researcher, hence the name teacher-made test, Basic Science Teacher-made Performance Test is a 50-item multiple-choice objective test item with four options (A, B, C, and D). The items covered six cognitive domains of educational objectives developed by Benjamin Bloom, Blooms' taxonomy of educational objectives. Knowledge took 25% of the items, comprehension 25%, application 15%, analysis 15%, synthesis 10%, and evaluation made 10%.

The Basic Science Teacher-made Performance Test underwent face, content, and criterion validation by three experts who were all PhD holders from the faculty of education at Modibbo Adama University, Yola. The validators were carefully selected as they have comprehensive knowledge of primary school curriculum, content, good knowledge of measurement and evaluation. The validators checked the appropriateness of the items and ensured that the achievement test items sample the content areas adequately.

The instrument was administered to one non-participating school who have an educationally similar background to the four schools that participated in the study, one intact class participated in the pilot study. Spearman- Brown Formula method was used in determining the reliability of the instrument. In the split-half approach of the reliability test, the responses were divided into odd and even numbers. The data was correlated using Spearman-Brown Formula for a complete reliability index. 0.75 reliability coefficient was obtained.

The data for the study was collected using Basic Science Teacher-made Performance Test. The study involved two main stages, which were the administration of pre-test and post-test that contained the same questions arranged in a different order. The study was conducted within six weeks. The pre-test was administered to the experimental and control groups, in the first week of the research exercise before the experimental and control groups were subjected to treatments. The purposes of the pretest are to ascertain pupils' entry behavior on the topics to be taught, control selection bias, ascertain that the groups are equivalent at the beginning of the experiment, and also to control extraneous variables that might come as a result of selection maturation.

Only the experimental groups were given treatment, the control group was taught using the conventional lecture method. The test item was strictly done on selected topics drawn from the primary five syllabi which include: football, volleyball, and basketball. The topics were broken down into teachable units of instruction. The teaching in the experimental group was done by the researcher while that of the control group was done by research assistants (NCE with at least five years working experience). Lesson plans were written in four different forms, three of the lesson plans are from game strategies (puzzle game, quiz game, and simulation game) and one for the conventional lecture method (control group). The treatment was done by the researcher during normal school lesson periods at an appropriate time hence, this reduced extraneous variables which was a result of historical contamination and teacher variables. The post-test was administered to all the experimental and control groups after six weeks of instruction. Each question in the instrument carries one mark.

The research questions were analyzed using descriptive statistics of mean and standard deviation while, the null hypotheses were tested at 0.05 level of significance using ANCOVA. The decision to use ANCOVA was based on the fact that, ANCOVA removes differences in the initial status of the experimental and control groups, if the pretest score is used as a covariate (Cohen, Manion & Morrison, 2007). The decision to be taken on testing the null hypotheses was based on comparing the computed p-value with a 0.05 level of significance. When the p-value is greater than 0.05 level of significance, the null hypothesis was rejected and concludes that, there is no significant difference between the variables compared. When the computed p-value is less than 0.05 the null

hypothesis is rejected, and concluded that, there is a significant difference between the variables compared.

RESULTS

The data were analyzed using descriptive statistics for the research questions and Analysis of Covariance (ANCOVA) for the hypothesis at a 0.05 level of significance.

The results of the research questions indicated that, the group taught with quiz game has the highest mean score of 24.46 a standard deviation of 9.72, followed by the group taught with puzzle game with a mean score of 22.24 and standard deviation of 9.95, the group taught with simulation game became third among the groups with a mean score of 20.98 and standard deviation of 9.67, conventional lecture method became the least among the groups with a mean score of 18. 04 and a standard deviation of 7.04. The graph plotted below clearly indicates how the group taught with quiz game outperformed the remaining two game strategies and lecture method, followed by the group taught with puzzle game, then the group taught with simulation game, the group taught with the lecture method the least.

Table 1. Means and Standard Deviation of groups taught with Game Strategies and Lecture Method

Games	N	Mean	Std. Deviation
Quiz Game	114	24.4561	9.72192
Puzzle Game	111	22.2432	9.95464
Lecture Method	105	18.0476	7.90494
Simulation Game	83	20.988	9.97985
Total	413	21.5351	9.67641

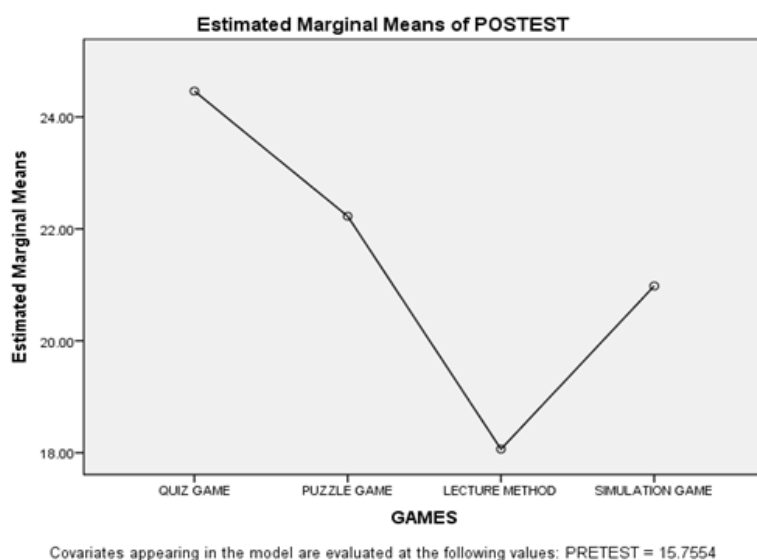Covariates appearing in the model are evaluated at the following values: PRETEST = 15.7554

Table 2. ANCOVA of games (puzzle game, simulation game, quiz game, and lecture) on primary school pupils' basic science and technology performance in Adamawa State.

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	2331.354a	4	582.838	6.561	0	0.06

Intercept	23876.88	1	23876.88	268.773	0	0.397
Pretest	1.076	1	1.076	0.012	0.912	0
Games	2294.79	3	764.93	8.611	0	0.06
Error	36245.39	408	88.837			
Total	230110	413				
Corrected Total	38576.74	412				
R Squared = .060 (Adjusted R Squared = .051)						

The hypotheses were analyzed using ANCOVA and Bonferroni Multiple Comparison Analysis (BMCA). The results of the analysis in Table 2 show that, there is significant significant effect of games (puzzle games, simulation game, quiz games and lectures) on primary school pupils' basic science and technology performance in Adamawa State F = 8.61 (df 4, 408), P = 0.00. Since the computed p-value (0.00) is less than 0.05 level of significance, therefore, the null hypothesis of no significant effect is rejected, and concludes that there is a significant effect of games (puzzle game, simulation game, quiz game, and lecture method) on primary school pupils' basic science and technology performance in Adamawa State. Therefore, there is a need for another analysis to determine the group that performs better than the other, hence the need for Bonferroni multiple comparison analysis.

Table 3. Bonferroni Multiple comparison Analysis of games (puzzle game, simulation game, quiz game, and lecture) on primary school pupils' basic science and technology performance in Adamawa State.

I) Games	(J) Games	Mean Difference (I-J)	Std. Error	Sign	95% Confidence Interval for Difference
					Lower Bound
Quiz Game	Puzzle Game	2.235	1.273	0.479	-1.14
	Lecture Method	6.397*	1.279	0	3.005
	Simulation Game	3.481	1.365	0.067	-0.138
Puzzle Game	Quiz Game	-2.235	1.273	0.479	-5.61
	Lecture Method	4.162*	1.319	0.01	0.664
	Simulation Game	1.246	1.37	1	-2.386
Lecture Method	Quiz Game	-6.397*	1.279	0	-9.788
	Puzzle Game	-4.162*	1.319	0.01	-7.66
	Simulation Game	-2.916	1.403	0.23	-6.634
Simulation Game	Quiz Game	-3.481	1.365	0.067	-7.101
	Puzzle Game	-1.246	1.37	1	-4.879

	Lecture Method	2.916	1.403	0.23	-0.803
a. Based on estimated marginal means					
*. The mean difference is significant at the .05 level.					
b. Adjustment for multiple comparisons: Bonferroni.					

Table 3 shows the results of Bonferroni multiple comparisons analysis. The result revealed no significant mean difference between a puzzle game and quiz game teaching strategies (p = 0.49) with a mean difference of 2.23. There is no significant difference between the quiz games and the simulation games (p = 0.067) with a mean difference of 3.5. There is a significant difference between the quiz game and lecture (p = 0.00) with a mean difference of 6.39 and there is a significant mean difference between the puzzle game and lecture method (p = 0.01) with a mean difference of 4.16, there is no significant mean difference between simulation game and lecture (p = 0.23) with a mean difference of 2.92 and there is no significant mean difference between simulation game and puzzle games (p = 1.00) with a mean difference of 1.22. It can be concluded that, quiz game is the best followed by puzzle games, simulation games and lectures is the least effective in improving pupils' academic achievement in primary school basic science.

FINDINGS OF THE STUDY

The study generated the following findings: -

1. There are significant differences among the game methods, quiz games are the best followed by puzzle games, simulation and lecture are the least effective in improving pupils' academic achievement in primary school basic science.

2. There is a significant difference in the performance of pupils taught basic science and technology with quiz games and those taught with lecture method in favour of group taught with quiz game

3. There is a significant difference in the performance of pupils taught basic science and technology with puzzle games and those taught with lecture method in favour of group taught with puzzle game.

4. There is a significant difference in the performance of pupils taught basic science and technology with simulation games and those taught with lecture method in Favor of group taught with simulation game.

DISCUSSION OF THE STUDY

The findings address the objectives, research questions, and hypotheses of the study in determining the effect of games (puzzle games, simulation games, quiz games, and lectures) on primary school pupils' basic science and technology performance in Adamawa State. Firstly, the result revealed a significant effect of games (puzzle games, simulation games, quiz games, and lectures) on primary school pupils' basic science and technology performance in Adamawa State. Findings collaborate with those of Udeani, and Akhigbe (2020) this study investigated the use of a designed and developed concept game via mobile phone under individualized, individualized competitive, collaborative, and collaborative competitive learning modes. The study revealed that incorporation of game elements such as leader board, points, badges, and game challenges significantly improved pupils learning engagement, achievement, and attitude towards learning respectively. Similarly, Mohammed, (2012) in his study investigated the use of a designed and developed concept game using instructional materials on pupils' academic performance. Similarly, Hakulinen, and Auvinen, (2014) in their study examined the effects of game teaching in the use of computer-based game teaching instructional packages on the academic achievement of pupils in primary schools and revealed that, game-teaching instructional packages significantly enhanced pupils learning concepts than the conventional strategy, regardless of gender

and the preferred learning style of students. Contrarily, Eseryel et al, (2014) found that the participants' engagement was negatively related to their interest and competence during the game. They found that participants' engagement positively relates to their change in self-efficacy while playing the game. Additionally, the researchers found that social interaction during gameplay can have a significant effect on student engagement.

Falguna and Sababa (2017) in their study investigated the use of a game teaching on enrolment and poor academic achievement of female pupils in comparison to their male counterparts in primary schools the study revealed that female pupils exposed to learning through mastery learning strategy performed better than their male. Özen, (2017) examined the effect of gender on the achievement of pupils in using the game teaching method. The results showed a significant difference between the mean scores in favor of the males. This showed that the males gained more from the jigsaw method in comparison with the females. It was recommended that to get the best out of instruction, various method, or a combination of them must be employed.

Along the same vein Falguna, Sababa, and Falguna, (2016) in their study investigated the use of game teaching propelled by the poor performance of primary school pupils recorded in practical examinations. The findings of the study revealed that there was a statistically significant difference in the mean scores of pupils taught topographical maps using a hands-on learning strategy and lecture method. There was a statistically significant difference in the retention scores of pupils taught topographical maps using a hands-on learning strategy and lecture method. There was no significant effect of gender on the achievement of pupils taught topographical maps using a hands-on learning strategy. There was no significant interaction effect of treatment and gender on pupils' achievement in basic sciences topographical map studies. Along the same vein, Korkmaz, and Öztürk, (2020) in their study determined the effects of educational games on students' academic achievement, attitudes towards the course, and cooperative learning skills, it was revealed that, social studies education, which is reinforced by educational games, contributes significantly more to students' learning skills than the traditional method. Social studies education, reinforced by educational games, contributes more to students' academic achievement in social studies courses than the conventional method. Similarly, Ahmad, Zeshan, Khan, Marriam, Ali, and Samreen, (2020) in their research, game teaching is increasingly employed in learning environments as a way to increase student motivation and consequent learning outcomes revealed that, the challenge-based game teaching had a positive impact on student learning compared to traditional teaching methods (compared to having no treatment and treatment involving reading exercises).

Wehrwein, Lujan, and DiCarlo, (2007) in their study examine the effects of game teaching on pupils' achievement of individual learning style preferences including visual (V; learning from graphs, charts, and flow diagrams), auditory (A; learning from speech), read-write (R; learning from reading and writing) and kinesthetic (K; learning from touch, hearing, smell, taste, and sight). The results indicate that the intervention student scores had a negative correlation, and we fail to reject the null hypothesis as (p>.246). As such, the intervention did not statistically improve pupils' performance in the long-term. The findings from the attitude analysis revealed that pupils in the gamified group had a more positive attitude towards basic science and technology at the beginning of the year.

CONCLUSION

It was concluded that, teaching basic science and technology with game strategies in primary school enhances pupils' academic performance, however, quiz games appear to be the best game strategy, followed by puzzle game sand simulation games.

RECOMMENDATION

Based on the findings of the study it was recommended that:

1. Adamawa state government should recommend game strategies in primary school teaching

2. Curriculum planners should incorporate game strategies in teaching primary school science into the curriculum.

3. Adamawa state government should organize a training workshop for primary school teachers on how to inculcate game strategies into their teaching.

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