
EFFECT OF COGNITIVE ACCELERATION TRAINING PROGRAMME ON THE ACHIEVEMENT OF UPPER BASIC TWO STUDENTS IN HOME ECONOMICS

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ABSTRACT: *This study examined the effect of cognitive Acceleration Training Programme on the Achievement of Upper Basic Students in Home Economics. The study adopted quasi-experimental design of non- randomized pre-test post-test control type. The sample consisted of 390 (196 males and 194 females) upper basic two Home Economics students drawn from eight schools, using purposive sampling technique. Cognitive Acceleration Training Programme (CATP) was used for the treatment, while Home Economics Achievement Test (HEAT) was used for pre- and post- test. Data collected were analyzed using mean and standard deviation to answer the research questions. Analysis of covariance (ANCOVA) was used to test the hypotheses at 0.05 level of significance. Findings of the study revealed that students who were exposed to CATP, in addition to conventional method of teaching, exhibited higher achievement ($F_{1,379} = 214.961$, $P = 0.00 < 0.05$). It was also found out that the difference in the achievement score of male and female students exposed to CATP is not significant ($F_{1,212} = .092$, $P = .762 > 0.05$). It was recommended that Cognitive Acceleration Training Programme be introduced into upper basic curriculum, so as to enhance academic achievement, especially in Home Economics.*

KEYWORDS: home economics, cognitive acceleration, achievement, gender

INTRODUCTION

Home Economics is a field of study that encourages the acquisition of knowledge and skills that can be applied for purposeful living (Anyakoha, 2012). Before the coming of the missionaries to Nigeria, there were no formal schools so, young girls were taught the art of cooking, sewing, trading, among others, by their mothers or older women. Learning at this stage was through observation, imitation and practice. The wives of the non-Catholic missionaries taught young women how to cook modern dishes, sew and keep houses clean. This was called domestic science. It was taught in special centres and teacher training colleges. As domestic science increased in scope covering craft, its name was changed to Home Economics. Today in Nigeria, it is taught at the lower, middle, Upper Basic Levels as well as Senior Secondary schools. It is also taught in tertiary institutions like the colleges of education, polytechnics, and universities. At most of these levels, there are evidences to show that all is not well in the performance of the learners. The rate of poor enrolment and under achievement in the Junior Secondary Examination (JSE) in Home Economics in the past years (2005-2014) cannot be over- emphasized and this calls for concern.

Cognitive Acceleration is an approach to teaching designed to develop students' thinking ability. This intervention programme was first developed by Shayer and Adey (1981) at Kings' College, London. The approach builds on the work of Piaget (1956) and Vygotsky (1978) and takes a constructivist approach. Cognitive Acceleration (let's think) is a programme which is aimed at the development of students' thinking so that they become more intelligent, and faster at problem solving. Cognitive Acceleration is aimed at improving progress towards higher-order thinking skills, or what Piaget terms "formal operations". It is a programme that focuses on enhancing pupils' capabilities in thinking, critiquing, selecting and updating information.

Although cognitive acceleration programmes could be considered as a potential solution for the prevalent poor development of thinking skills in many schools today, the problem is complex due to factors such as teachers' preparedness and curriculum content. Some teachers may have not yet developed these thinking skills, and thus, may feel uncomfortable or threatened when trying to work with activities that they, themselves find challenging. Thinking skills have also not had a strong presence in most schools or subject curricula, as emphasis is on content knowledge rather than skills. This has led to most teachers working in classrooms to have limited idea about the meaning of thinking skills, and that such skills could be promoted in the classroom, with just a small group, claiming that promoting thinking is an important objective of teaching. Cognitive acceleration programme consists of 15 to 30 activities intended to be used over three or six months as the case may be. The activities are grouped into particular types of thinking called reasoning "patterns", which underlie all high-level thinking and can be applied to many different contexts. Each activity has detailed instructions for the teacher and may have sample materials that can be copied for learners. Cognitive acceleration is like creating knowledge model where the teacher plays the role of a motivator, facilitator and manager (Samba, 2012).

It is the process through different stages of thinking ability towards the type of abstract, logical and multivariate thinking which Piaget describes as formal operations. Formal operational thinking is characterized by the ability to hold a number of variables in mind at once such as to be able to weigh up two sides of an argument, to consider even-handedly the advantages and disadvantages of a particular course of action. The purpose of cognitive acceleration is to increase the ratio of semi- abstract and abstract thinking which become possible, according to Piaget, between 14-15 years old (Shayer & Adey, 2002).

It should be noted, however, that factors that affect performance go beyond cognitive acceleration, but may depend on other variables such as the sex of the learner. Gender consideration is relevant in this study as males are under-represented in Home Economics world over, including Nigeria (Beths & Goldley, 2008). Gender factor is equally important in cognitive studies as socialization and sex role stereotypes are found to wield influence in students' cognitive abilities and achievement. It suggests, for instance, that a given student is best taught by person of a certain sex or culture.

Statement of the Problem

The present decline in enrolment and under achievement in Home Economics at the Upper Basic three Examination over the years have called for concern. The problem shows the students inability

to cope with the cognitive demand of the Home Economics Curriculum for upper basic two. If the students are unable to cope with the conceptual demand, certainly they will not achieve much. So, something needs to be done to change this situation, and that something hopefully is to accelerate the cognitive ability of the students through a well-designed programme that teachers should use to help the students. Although there has been a great deal of work in the last decade with regards to effect of selected cognitive acceleration programmes on cognitive ability, there seems, however, to be few or none specific to Home Economics known to the researchers, especially in Eastern Senatorial District of Kogi State.

Purpose of the Study

The purpose of the study was to find out the effects of cognitive acceleration training programme on Upper Basic two students' achievement in Home Economics. Specifically, the study intended to:

1. Determine the effect of cognitive acceleration training programme on the mean achievement of Upper Basic II Students in Home Economics.
2. Determine the difference in the mean achievement of male and female Students in Home Economics when exposed to cognitive acceleration training programme.

Research Questions

The following research questions were raised to guide this study:

1. What is the difference in the mean achievement score of Upper Basic II students exposed to cognitive acceleration training programme and those taught Home Economics using only the conventional strategy?
2. What is the difference in the mean achievement scores of male and female students in Home Economics when exposed to cognitive acceleration training programme?

Hypotheses

The following hypotheses were formulated and tested at 0.05 level of significance:

Ho₁ There is no significant difference in the mean achievement scores of upper basic II students exposed to cognitive acceleration training programme and those taught Home Economics using only conventional strategy.

Ho₂ There is no significant difference in the mean achievement scores of male and female students in Home Economics when exposed to cognitive acceleration training programme.

METHOD

The study adopted a quasi-experimental, the non-randomized pre-test to post-test type of research, which consisted of two groups experimental and control. Both groups were pre-tested and post-tested on HEAT and ACER but only the experimental group received treatment. This design was adopted because it is the most appropriate in determining the effect of independent variable (cognitive acceleration) on the dependent variable (achievement). The population consisted of 7,800 Upper Basic II Home Economics students drawn from 195 secondary schools that offer Home Economics out of the 225 grant aided secondary schools in the Eastern senatorial district. The sample for the study consisted of 390 Upper Basic II students made up of 196 males

and 194 females. The sample size of 390 students is 5% of the total population, was based on the view of Achor and Ejigbo (2006), that a sample size of 10% of the population is adequate for a large population but sample could be lower or higher, say 5% or 20%, depending on the population. Purposive sampling technique was used to select eight schools from the study area. Two instruments were used for the study; they included the Cognitive Acceleration Training Programme (CATP), Home Economic Achievement Test (HEAT). The reliability coefficient of HEAT was found to be 0.82, while ACER was found to be 0.95, using descriptive statistics. These instruments were therefore, adjudged to be reliable. Data for the study was drawn from the pre-test and post- test scores of HEAT. It involved the procedure for training of research assistants, treatment procedure and intervention procedure. The data was analyzed based on the research questions and hypotheses, using means and standard deviation to answer the research questions while hypotheses were tested using Analysis of Covariance (ANCOVA) at 0.05 level of significance. The result revealed 19.14 as the mean gain of the experimental group and 4.69 as that of the control group, which indicated that cognitive acceleration training programme is very effective for learning at the Upper Basic II level. In gender factors differences of means achievement scores among students in Home Economics exposed to cognitive acceleration training programme, the results showed a mean gain of 19.04 and 19.25 for male and female students respectively. These means that the female students in Home Economics have slightly higher mean gain than the male in Home Economics students when exposed to cognitive acceleration training programme.

RESULTS

Research Question 1: What is the difference in the mean achievement score of Upper Basic II students exposed to cognitive acceleration training programme and those taught Home Economics using only the conventional strategy?

Table 1: Difference in the Mean Achievement Scores and Standard Deviation of Upper Basic II Home Economic Students Exposed to CATP and Conventional Strategy

Group		Preheat	Post-heat	Mean gain
Experimental	Mean	41.20	60.34	19.14
	N	215	215	
	Std. Deviation	11.09	12.32	
Control	Mean	44.50	49.19	4.69
	N	167	167	
	Std. Deviation	10.14	11.28	
Mean difference			11.15	14.45

Table 1 reveals 19.14 as the mean gain of the experimental group and 4.69 as that of the control group. The difference in the mean gain is 14.45. The mean gain of students in the experimental group is greater than the mean gain of the students in the control group. This indicated that cognitive acceleration training programme is very effective for learning at the Upper Basic II level.

Research Question 2: What is the difference in the mean achievement scores of male and female Home Economics students exposed to cognitive acceleration training programme?

Table 2: Mean and Standard Deviation of Home Economics Achievement Test Score of Male and Female Students Exposed to Cognitive Acceleration Training Programme

Gender		Preheat	Post-heat	Mean Gain
Male	Mean	40.89	59.93	19.04
	N	108	108	
	Std. Deviation	11.12	12.47	
Female	Mean	41.50	60.76	19.25
	N	107	107	
	Std. Deviation	11.10	12.20	
	Mean difference		0.83	0.21

Table 2 shows a mean gain of 19.04 and 19.25 for male and female students respectively. These show that the female students in Home Economics have slightly higher mean gain than the male in Home Economics students when exposed to cognitive acceleration training programme. Thus, the difference between the mean achievement of male and female students is 0.21 in favour of the female students.

Hypothesis 1

There is no significant difference in the mean achievement scores of upper basic II students exposed to cognitive acceleration training programme and those taught Home Economics using only conventional strategy.

Table 3: ANCOVA Result for effect of CATP on Upper Basic II Home Economic students' achievement.

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	35338.631 ^a	2	17669.315	224.086	.000
Intercept	11880.763	1	11880.763	150.674	.000
Pre-HEAT	23657.656	1	23657.656	300.031	.000
GROUP	16949.806	1	16949.806	214.961	.000
Error	29884.427	379	78.851		
Total	1240436.000	382			
Corrected Total	65223.058	381			

a. R Squared = .542 (Adjusted R Squared = .539)

Table 3 reveals that there is a significant difference in the mean achievement scores of students exposed to CATP [$f(1,381) = 214.961$]; $P = .00 < 0.05$ and those that were exposed to conventional strategy. The null hypothesis is therefore, rejected. This means that there is a significant difference between the mean achievement scores of students exposed to CATP and those taught using conventional method only. This implies that there exists a significant difference in the mean scores of Home Economics students exposed to CATP and those who were not exposed to CATP (Experimental and control)

Hypothesis 2

There is no significant difference in the mean achievement score of male and female Home Economic students exposed to cognitive acceleration training programme.

Table 4: ANCOVA result of difference between male and female mean achievement score when exposed to CATP

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	13379.886 ^a	2	6689.943	74.347	.000
Intercept	13876.681	1	13876.681	154.215	.000
Pre-HEAT	13342.761	1	13342.761	148.281	.000
Gender	8.269	1	8.269	.092	.762
Error	19076.328	212	89.983		
Total	815241.000	215			
Corrected Total	32456.214	214			

a. R Squared = .412 (Adjusted R Squared = .407)

Table 4 shows that the ANCOVA result is not significant [$F(1,21) = .092$ at $P = 0.762 > 0.05$]. Therefore, the null hypothesis is not rejected. This means that there is no significant difference

between the mean achievement scores of male and female students exposed to CATP. Therefore, gender has no effect on students' achievement scores in Home Economics when exposed to CATP.

DISCUSSION

The finding on the effect of cognitive acceleration training programme on students' achievement in Home Economics revealed that the mean achievement scores of students in experimental group were higher than those in the control group. This implied that students who were exposed to CATP in addition to the conventional method of teaching performed better than those taught using only conventional method of teaching. This finding is in agreement with the findings of Oliver and Venville (2014) who found that thinking science intervention improved all participating students' cognition significantly. The activities that the students are exposed to during the intervention give rise to classroom work which focuses directly within the different schema. CATP provides the facilitators with specific strategies, such as appropriate questioning skills and activities for social construction and metacognition that could be used within the thinking lessons (CATP) to stimulate the cognition of the high achieving students in their classes. This explanation is consistent with Vygotskian notions of the zone of proximal development that high quality interactions with the teacher (facilitator) and peers is the way that development occurs, and findings in literature that metacognition supports critical thinking, Margno (2010); problem-solving Lai (2011) and persistence (Martinez, 2006), as cited in Oliver and Venville, (2014).

The finding on effect of gender on students' achievement when exposed to CATP Showsthat there is a difference between the mean achievement score of the male and female students in Home Economics when exposed to CATP in favour of the female, which indicates that there are differences. This finding agrees with Chesiment, Githua and Ngeno (2016), who found out that there was a significant difference in the mean mathematical creativity scores of male and female students in favour of male students in the ELA group a study on the effects of experimental learning approach on students' mathematical creativity. The difference could be due to the fact that the activities that male and female students were exposed to right from their birth gave the female students upper hand in Home Economics which could motivate them to do better in the subject. Olaoye (2012) reported that relating to gender, there was significant difference in the mean achievement of male and female Upper Basic II students when exposed to Cognitive Acceleration in Mathematics Education lesson (CAMEL) in Nigeria.

CONCLUSION

It was concluded from the findings that students' achievement in Home Economics was greatly influenced by CATP and it was significantly higher than their counterparts who were exposed to only the conventional method of teaching Home Economics. The study also revealed that the female students achieve more when exposed to CATP but the difference between the male and female achievement was not significant.

Recommendations

Based on the findings of the study, the following recommendations were made.

1. Cognitive acceleration training programme should be introduced into the upper Basic school curriculum so as to uplift student's cognitive ability which could in turn elevate their academic performance.
2. Provision of Home Economics teachers' guide and work book on the use of CATP is recommended.
3. To maximize the achievement of students in Home Economics teachers are encouraged to expose their students to CATP.

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