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STUDENTS' PRIOR KNOWLEDGE OF INSTRUCTIONAL OBJECTIVES, INTEREST AND ACADEMIC ACHIEVEMENT IN COMPUTER STUDIES AMONG SENIOR SECONDARY SCHOOL STUDENTS IN IMO STATE

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Abstract

This study investigated on the effect of students' prior knowledge of instructional objectives, interest and academic achievement in Computer Studies. It adopted the quasi-experimental research design and used 96 students as the sample size. The instruments for data collection were Computer Studies Achievement Test (CSAT) and Computer Studies Interest Scale (CSIS), which had reliability index of 0.71 and 0.75 respectively. Data collected were analyzed using mean and standard deviation for the research questions, while t-test and ANCOVA were used to test the hypotheses at 0.05 level of significance. Results of data analysis showed that there was a significant difference between the mean achievement scores of Computer Studies Students with prior knowledge and those without prior knowledge of the instructional objectives; as those with had prior knowledge achieved higher. Thus, the researchers recommended among other things that Computer Studies teachers should state and explain the instructional objectives of every lesson to the students before delivering the actual lesson content(s).

Keywords: Prior knowledge, Instructional, Objectives, Interest, Achievement, Mathematics.

Introduction

In a bid to enhance learning outcomes in our schools and institutions of learning; academic achievement is a topic of regular discourse among stakeholders in the education system. As a variable of great importance in the teaching-learning environment, its influence on the economy via the quality of students' output cannot be over emphasized. As such, contributing factors should be investigated from time to time so as to evolve innovative strategies and proffer contemporary solutions.

By definition, academic achievement refers to the level of success a leaner attains in school subjects as indicted by the grade scores obtained in classroom test, examination, coursework and other teacher evaluation tools. It is the proficiency in performance of a learner in specific subject areas or in any given task meant to evaluate the quantity and quality of learning that has taken place as indicated in the test or examination scores obtained (Eluwa, 2017).

As a variable that plays a significant role in any teaching-learning situation, academic achievement is a key indicator of the effectiveness of the process. High academic achievement scores suggest that the instructional process was effective and learning objectives were achieved while the reverse is the case when scores are low. A combination of factors including students, teachers, school, home, environmental, societal and policy-related issues contribute to low academic achievement of learners in our educational institutions; as such the re-occurrence of the topic in most discourse.

Computer studies is one of the subjects taught at the Junior and Senior Secondary School levels in the Nigerian school system. One of the primary objective for teaching this subject within this pre-stated learning phase is skill acquisition to foster innovations, job creation and self-reliance after graduation. In addition, to enhance the interest, creativity and self-confidence of learners in the use of computer and computing devices at the end of basic and post basic education. As such, the teaching processes involves inculcating in learners the basic skills required to independently manipulate computers and computing devices in order to achieve desired educational goals.

In the research work by Omole (2016), computer study is defined as the subject aimed at making students conversant with terms and practices embedded in the world of computer and computing technology so that they can acquire requisite skills and competencies upon graduation. It is the subject taught to students to help them gain understanding of the functions and relevance of modern methods of information processing for effective communication as well as access to diverse educational tools and resources. More so, Computer Studies is the subject of study that teaches learners the basics of computers, their uses, principles and processes (Jegede and Owolabi, 2018; Okekeokosisi, 2021).

Other things taught in the Computer Studies curriculum include algorithms writing, hardware, software designs and impact on society (Jegede and Owolabi, 2018; Okekeokosisi, 2021). These different areas are taught in order to equip learners with essential digital skills needed for various human endeavour in the 21st century. Therefore, Computer Studies as a subject is

very important in modern society because it drives innovation, efficiency, productivity and connectivity across all sectors.

Furthermore, in present day realities, all aspects of human existence are automated and thrives on the basis of technology. For example, most household gadgets like microwave ovens, fridges, washing machines, door locks are now connected to Wi-Fi networks and personal assistants. In noting the importance of Computer Science related disciplines in job creation and provision; the United States Bureau of Labour and Statistics observed that there will be a 13% increase in computer science related jobs by 2026 (Olugbenga, 2020). Previously as documented in literatures; in the European Union, Information and Communication Technology specialists grew by 36.1% from 2007 to 2017 and Nigerian as a country is not an exception when this sector is being considered as a major fulcrum for economic development in this century.

As a school subject, computer studies enhances ICT skills development for job creation and self-reliance of all individuals and the curriculum contents include; a basic appreciation of how the computer works, an understanding of the basic principles of operating the computer, necessary competence in word processing, spreadsheet, database and different hands-on experience using pre-programmed packages relevant to enhancing the interest of the learner (FME, 2013; Okekeokosisi, 2022). Thus, it is expected that the teaching-learning environment will allow the learners interact with different computers and computing devices for a more enriching experience.

Furthermore, the objectives of teaching computer studies as highlighted by the National Policy on Education (FME, 2013) includes to stimulate further interest in computer science and computer related disciplines at higher educational levels, address the challenges of the digital divide and the dearth of computer programmes among others. This implies that every student should be given the opportunity to acquire knowledge of basic computer concepts, principles and skills. The question which then arises is - to what extent have these objectives been achieved by the institutions concerned?

Now for the institutions concerned (schools, government agencies and examining bodies) to achieve the objectives of Computer Studies curriculum; curriculum revamping and integration, teachers re-training, provision of modern facilities and infrastructure, supportive polices, partnerships, awareness campaigns, scholarships and incentives must be put in place. This is necessary because research evidence have shown that students' attainment of instructional objectives is affected by several factors (Mkpa cited in Mogbo and Okeke, 2019).

One of such factors is the set of cognitive processes. Cognitive processes are the activities in the brain which helps an individual to assimilate, process, retain and retrieve knowledge for possible use. Whenever an individual receives any information or simulation from the environment, it passes through several phases of processing necessary for producing the right stimulus response or building new capacity (Mkpa cited in Mogbo and Okeke, 2019). Learning is said to have occurred when the stimulus selected from the environment is processed, encoded, retrieved and applied to situations.

From literatures, an individual learns in two ways - meaningful learning and rote learning (Ausbel cited in Eze and Onyenwe, 2018). In meaningful learning, a learner consciously make effort to understand concepts and connect them to prior knowledge while in rote learning, the learner just memorizes the contents around the concept without understanding the meaning. Prior knowledge of instructional objectives presupposes that there is easy interpretation and assimilation of new knowledge when learning objectives are stored in existing mental model providing clear framework to both the teacher and the learners (Snead 2010).

Prior knowledge is the initial information, experience, skills or understanding a learner already has on a given subject matter which may help accelerate the speed of the teaching-learning process and greatly influence how the learning materials is comprehended. When students have initial information on what they are expected to learn within the lesson; it will enhance their engagement with the content and consequently impact on their interest as well as learning attainment in that subject.

Interest is the psychological state that drives a person to interact or engage with a thing, person or situation in order to learn and know more about it. By definition, interest is the feeling of curiosity, attention, enthusiasm like or dislike towards something, a person or an activity which can be intrinsic (driven by personal motivation) or extrinsic (driven by external rewards) in nature. However, whether intrinsic or extrinsic, interest is a motivating force through which learning effectively takes place and can be stimulated through using innovative instructional activities such as relevant set induction, motivation, engagement, instructional resources, teachers' adoption of innovative and creative teaching strategies and many others alternative techniques varied across gender (Aliyu, Isah, & Dikko, 2025; Frontier in Psychology, 2023, Idika, 2017).

The variable - gender and its influence on students learning achievement has been widely studied and findings showed that various factors (biological, social and cultural) play significant role at any given point in time in its manifestation. In other words, the influence of gender on students learning achievement in most previous research efforts is not skewed to any particular direction; as such, this study delved into it. From previous literatures, some researchers such as Jual and Moyet (2015), Samara (2016), Eze and Onyenwe (2018) as well as Aliyu, Isah, and Dikko, (2025) opined that gender has a significant effect on academic performance of students while a few others such as Idika (2017) and Abimbola (2016) and found that gender has no significant effect.

Regarding prior knowledge of instructional objectives; the central focus of this study, Akinbobola (2008) found that it enhances students learning achievement of difficult concepts in physics. The finding by Akinbobola (2008) agrees with that of Qarareh (2010), Fakhri (2017), Mogbo and Okeke (2019) who researched on other science subjects such as Basic Science, Basic Technology and Chemistry rewspectively. More so, Uhanova, Prokofyeva, Katalnikova, ZavjalovA, Ziborova, (2023) found a gap in achievement gain scores between students with prior knowledge and those without.

Therefore, this study investigated on the effect of students' prior knowledge of instructional objectives, interest and academic achievement in Computer Studies in Imo State taking into

consideration the students' gender as a factor. The following research questions and hypotheses were raised for the study:

Research Questions

1. What are the mean achievement scores of students taught computer studies with prior knowledge of instructional objectives compared to those taught without prior knowledge?
2. What are the mean interest scores of students taught computer studies with prior knowledge of instructional objectives compared to those taught without prior knowledge?
3. Do male and female students significantly differ in their mean achievement scores when taught computer studies with prior knowledge of instructional objectives?
4. Do male and female students significantly differ in their mean interest scores when taught computer studies with prior knowledge of instructional objectives.

Hypotheses

1. There is no significant difference between the mean achievement scores of students taught computer studies with prior knowledge of instructional objectives compared to those taught without prior knowledge.
2. There is no significant difference between the mean interest scores of students taught computer studies with prior knowledge of instructional objectives compared to those taught without prior knowledge
3. Male and female students do not significantly differ in their mean achievement scores when taught computer studies with prior knowledge of instructional objectives.
4. Male and female students do not significantly differ in their mean interest scores when taught computer studies with prior knowledge of instructional objectives.

Methods

This study employed a quasi-experimental research design, specifically the non-equivalent pretest - posttest control group design. The sample size used in this study was 96 SSI students purposively selected from the three education zones in Imo State. Purposive sampling was used because some of the criteria for selection the schools were co-educational schools, availability of well experienced computer studies teachers who are examiners, and the availability of well-equipped computer laboratory.

From the sample size of 96 students from two intact classes, 49 (21 males and 28 females) were assigned to the experimental group while 47(25 males and 22 females) were assigned to the control. The experimental group were exposed to the instructional objectives before they were taught the contents and afterwards, the research instruments were administered. However, students in the control group were taught the same contents but without prior exposure to the instructional objectives. The treatment lasted for a duration of six weeks after which the post-test was administered as well as the interest scale.

The achievement test used for this study was a 20-items multiple choice objective test adapted from past examination question papers of the West Africa Senior School Certificate

Examination (WASSCE). This achievement test titled "Computer Studies Achievement Test (CSAT) had reliabilities indices of 0.71 and 0.75 established using KR-20 and Cronbach Alpha respectively. Results of data analysis using covariance and t-test for independent mean at 0.05 level of significance are as presented in Tables 1 to 8.

Table 1: Pretest-posttest mean achievement scores of students taught with and without prior knowledge of instructional objectives

Groups	N	Pretest		Posttest		Gain Score
		$\bar{X}_1$	$\bar{X}_2$	$\bar{X}_1$	$\bar{X}_2$	
Exp. Group	49	25.65	1.49	72.29	6.56	46.63
Control Group	47	25.38	3.08	6.93	6.93	31.79

Data in Table 1 showed that the experimental group had mean achievement gain of 46.63 which is higher than 31.79 obtained by students in the control group with standard deviation of 6.93 against that of 6.56 obtained by students in the control group. In other words, the variability of scores among the control is higher than that of the experimental group.

Table 2: Analysis of covariance on the significant difference between the mean achievement scores of students taught computer studies with and without prior knowledge of instructional objectives.

Source	Type III sum of squares	DF	Mean Square	F	Sig.
Corrected model	5879.533	2	2939.766	70.532	.000
Intercept	1515.966	1	1515.966	36.372	.000
Pretest	398.431	1	398.431	9.559	.003
Error	3876.207	93	41.680		
Total	413927.00	96			
Corrected total	9755.740	95			

@ R Squared =.603 (Adjusted R Squared = .594

Data in the Table showed F value of 127.098 at df=1 where $p < 0.05$. This value indicates that there is a significant difference between the mean achievement scores of students taught computer studies with and those without prior knowledge of instructional objectives.

Table 3: Mean interest scores of students taught computer studies with and without knowledge of instructional objectives.

Groups	N	$\bar{X}$	SD

Experimental group	49	2.86	1.05
Control group	47	2.42	0.63

Data in Table 3 showed that the mean interest scores of students taught with prior knowledge of instructional objectives was higher than those taught without prior knowledge of instructional objectives.

Table 4: t-test analysis of mean interest scores of students taught computer studies with and without prior knowledge of instructional objectives.

Groups	N	$\bar{X}$	SD	tcal.	p.value
Experimental Group	49	2.86	1.05	2.474	0.015
Control Group	47	2.42	0.63		

Data in Table 4 showed a t-calculated value of 2.474 with a p value of 0.015 which is lower than 0.05 at 0.05 level of significance. This implies that the null hypothesis is rejected and the alternative hypothesis holds

Table 5: Pretest-posttest mean achievement scores of male and female students taught computer studies with prior knowledge of instructional objectives.

Groups	N	Pretest		Posttest		Gain Score
		$\bar{X}_1$	$\bar{X}_2$	$\bar{X}_1$	$\bar{X}_2$	
Exp. Group	21	25.62	1.63	75.24	2.45	49.62
Control Group	28	25.68	1.42	70.07	7.75	44.39

Data in Table 5 showed that the male students taught with prior knowledge of instructional objectives had higher mean achievement score of 49.62 while the female students taught with prior knowledge of instructional objectives had lower mean achievement score of 44.39.

Table 6: Analysis of Covariance on the significant difference between the mean achievement scores of male and female students taught computer studies with prior knowledge of instructional objectives.

Source	Type III sum of squares	DF	Mean Square	F	Sig.
Corrected Model	323.902	2	161.951	4.281	.020
Intercept	749.336	1	749.336	19.809	.000
Pretest	3.569	1	3.569	.094	.760
Gender	321.555	1	321.555	8.500	.005

Error	1740.098	46	37.828
Total	258100.000	49	
Corrected total	2064.000	48	

@. R Squared =.157 (Adjusted R Squared = .120)

Data in Table 6 showed F value of 8.500 at df = 1 where $p<0.05$. This value shows that there is a significant difference between the mean achievement scores of male and female students taught with prior knowledge of instructional objectives.

Table 7: Mean interest scores of male and female students taught computer studies with prior knowledge of instructional objectives.

Gender	N	$\bar{X}$	SD
Male	21	3.87	0.07
Female	28	2.10	0.74

Data in Table 7 showed the mean interest scores of male and female students taught computer studies with prior knowledge of instructional objectives. The male students obtained mean scores of 3.87 which is higher than the mean score of 2.10 obtained by the female students.

Table 8: t-test analysis of mean difference between the mean interest score of male and female students in computer studies with prior knowledge of instructional objectives.

Groups	N	$\bar{X}$	SD	t cal.	p.value
Experimental Group	21	3.87	0.07	10.89	0.001
Control Group	28	2.10	0.74		

Data in Table 8 showed a t - calculated value of 10.89 with a p - value of 0.001 which is lower than 0.05 ($p<0.05$) at 0.05 level of significance. This implies that the null hypothesis which states that there is no significant difference between the mean interest scores of male and female students taught computer studies with prior knowledge of instructional objectives is rejected.

Discussion

The result indicated that there was a significant difference between the mean achievement scores of computer studies students with prior knowledge of instructional objectives and those without prior knowledge of instructional objectives. This finding agrees with Mogbo and Okeke (2019) whose study revealed that students who had prior knowledge of instructional objectives achieved better results than students taught without prior knowledge of instructional objectives. Based on their findings they recommended that chemistry teachers in Nigeria should present instructional objectives in their lesson plans to their students ahead of instruction.

Similarly, Qarareh (2010) found that students exposed to lesson instructional objectives resulted to greater achievement and interest. The researcher therefore, recommended that teachers should always expose the students to the instructional objectives of each topic before the commencement of lessons in teaching basic science.

The present finding also showed that the male students obtained mean academic and interest scores more than the female students and were statistically significant. The findings also agreed with Mogbo and Okeke (2020) found that male students achieved better and showed more interest than their female counterparts when prior knowledge of instructional objectives was incorporated into the teaching. Providing students with prior knowledge of instructional objectives is essential for enhancing their academic achievement and fostering interest in learning.

The following recommendations were made in line with the findings:

1. Computer studies teachers should disclose the instructional objectives of every lesson before teaching
2. Teachers are encouraged to always state their instructional objectives in more precise and concise way for easy understanding by the students.
3. When students interest in computer studies is lacking the computer studies teachers should teach them by disclosing the instructional objectives of the lesson.

Conclusion

For improvement and excellent performance in computer studies, especially in Senior Secondary Schools, there is need to disclose the instructional objectives to students before being taught and examined. This will enable the students to understand precisely the focus of every lesson and concentrate on them while teaching is going on as well as serving as guides in preparation towards examination.

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