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## EDITORIAL DESK

**T**he Centre for General Nigerian Studies has continued to be a frontier for knowledge dissemination through her series of publications, among other activities being performed by the directorate.

This volume 5 journal of Contemporary Issues in Nigerian Economy of March 2025 housed a total of 18 well researched articles from scholars across the geographical boundaries of the Africa sub region. The team of experienced editors subjected the articles to peer review, and their plagiarism checks have satisfied the guild of editors.

The journal is recommended to researchers, scholars, lecturers, and students to read, and the planners can leverage on recommendations as panacea to the doldrums confronting the socio-economic and educational spheres of the Sub Sahara Africa nations

I wish all the contributors and readers Barka Eid Fitri and Easter in advance

**Prof. M.O.B Mohammed** FNAEAP  
*Lead Editor*

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## INSTRUCTIONAL RESOURCES AND STUDENTS' ACADEMIC ACHIEVEMENT IN PRACTICAL ASPECT OF BIOLOGY IN OYO STATE, NIGERIA

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### Abstract

*The study investigated the instructional resources as determinants of students' academic achievement in Biology practicals in secondary schools in Oyo State, Nigeria. Observation of academic achievement in Biology Practical was noticed, which a search of literature shows a scarcity of studies on the variable determining academic achievement in Biology Practical, which provided a gap in knowledge that this study was carried out to address. Three research questions were posed, and one hypothesis guided the study. The study population comprised all the SS2 (Senior Secondary School Students, 81,083) in Oyo State, Nigeria, Sample size consisted of 500 students. The Export Facto research design was employed. Data collection was conducted using the Instructional Resources Questionnaire (IRQ) and the Practical Biology Test (PBT), which had a reliability coefficient of  $\alpha = 0.78$ . Results showed a moderate level of achievement in Biology practical, low availability level of instructional resources ( $\bar{x}=1.69$ ), and low utilisation of instructional resources ( $\bar{x}=1.90$ ). and that instructional resources significantly influenced job performance ( $\beta = -0.106$ ,  $t = -2.380$ ,  $p < 0.05$ ). In conclusion, to enhance students' practical achievements in Biology in Oyo State, it is essential to increase both the availability and effective utilisation of instructional resources. Additionally, teacher training programs should be strengthened to ensure optimal use of these resources, fostering an environment conducive to improved academic performance in practical subjects.*

**Keywords:** Instructional Resources, Academic Achievement in Biology Practicals, and Senior Secondary Schools in Oyo State

### Introduction

Academic achievement is a core component of the educational system and has been a focal point of research for many years. This sustained interest is likely due to the recurring poor performance of students in both public and private school examinations. Academic achievement refers to the knowledge gained or skills developed in school subjects, often measured by test scores or marks assigned by teachers (Ackah-Jnr & Danso, 2019). Recently, there has been increased concern over the low academic performance of senior secondary school students in Biology, particularly in both internal and external examinations, where practical assessments form a significant portion of the overall score (Objective Questions – 60 marks, Theory – 60 marks, Practical – 80 marks).



Academic achievement is often seen as a reflection of students' abilities and indicates how well they perform in tests and examinations. Despite the strong emphasis on the objectives of science education in secondary schools and its crucial role in national development, students' performance in the West African Senior School Certificate Examination (WASSCE) has remained poor, particularly from 2019 to 2022 (Kassaw & Demareva, 2023). Additionally, despite various teaching strategies employed in Biology—a subject focused on the study of life and living organisms—student performance in Oyo State has shown a persistently fluctuating trend. For instance, WAEC's 2019 report revealed that around 58% of students in Oyo State failed to achieve credits in Biology (Abidoeye, Aliyu, Ahmed & Oluwole, 2022). This study, therefore, places particular emphasis on the practical component of Biology education, which is critical for student success in the subject.

According to Asad and Kramer (2024), practical work in Biology is essential for deepening students' understanding of biological concepts. Nkpordee and Ibinabo (2022) stated that students gain a better grasp of natural phenomena when science teachers actively involve them in hands-on, participatory, practical work. During these activities, students not only learn Biology more effectively but also discover foundational concepts, principles, and scientific laws. The Nigerian senior high school Biology curriculum, according to Ibrahim, Dauda and Jibrin (2022), is specifically designed to instil skills such as observation, measurement, hypothesis formulation, prediction, experimental design, investigation, data recording interpretation, conclusion drawing, and effective communication.

However, in many schools across developing countries, including Nigeria, this ideal approach is often compromised. Teachers frequently lack adequate training in science process skills, which limits their ability to conduct practical activities effectively in the classroom (Millar, 2004). Consequently, many avoid laboratory work and may not fully appreciate the importance of hands-on experiments. This gap highlights the need for this study, which aims to investigate instructional resources as determinants of students' academic achievement in practical Biology in secondary schools in Oyo State, Nigeria.

Instructional facilities refer to the physical spaces and resources provided in educational settings that support teaching and learning activities. This encompasses classrooms, laboratories, libraries, and specialised equipment designed to facilitate effective educational delivery. Soriano and Vargas (2021) found that moderately adequate instructional spaces contribute significantly to effective curriculum delivery. The availability and utilisation of instructional facilities in educational institutions significantly influence teaching effectiveness and student outcomes. Thus, this study focuses on physical facilities, Biology laboratory facilities and electronic facilities as indicators of instructional facilities.

Physical facilities refer to the general infrastructure available within an educational institution, including classrooms, libraries, offices, and auditoriums. These spaces provide foundational support for regular instructional activities and accommodate large groups for lectures, discussions, and various forms of collaborative learning. Studies have shown that well-maintained physical environments contribute positively to student engagement and academic performance by creating comfortable, distraction-free spaces for study and collaboration (Rahmanullah, Barliana, Meirawan & Maknun, 2021). On the other hand, Biology laboratories represent specialised instructional facilities designed to support practical, hands-on learning in life sciences.

A well-equipped biology lab includes microscopes, specimen samples, glassware, dissection kits, and other scientific tools necessary for experiments and observational learning. Ogbu (2015) highlight that practical laboratory sessions are crucial for the effective learning of scientific subjects, as they allow students to directly apply theoretical knowledge and develop essential skills in scientific inquiry and data analysis. Also, Electronic facilities include computers, projectors, smartboards, internet connectivity, and related electronic resources that support digital learning and instructional innovation. Electronic facilities allow teachers to incorporate multimedia presentations and real-time data into their teaching, thereby enriching the learning experience. Adelabu and Adu (2016) found that electronic facilities, while available in some institutions, are often underutilised due to a lack of digital literacy training among teachers. This study, therefore, investigates instructional resources as determinants of students' academic achievement in practical Biology in secondary schools in Oyo State, Nigeria.

### **Statement of the Problem**

The teaching of practical Biology in secondary schools is fundamentally dependent on the availability and effective utilisation of instructional resources. Practical Biology, by its nature, demands a hands-on, experiential approach to learning, which relies heavily on well-equipped laboratories, relevant materials, and appropriate teaching aids. However, in many secondary schools in Oyo State, instructional resources necessary for delivering practical Biology lessons are either inadequate, outdated or entirely unavailable. This lack of instructional resources undermines the core objectives of Biology education, which emphasise practical, inquiry-based learning to foster scientific understanding and critical thinking. The absence of essential tools such as functional laboratories, specimens, and audiovisual aids creates a significant gap between theoretical instruction and the practical application required for students to excel. As a result, students often struggle in practical examinations administered by the West African Examinations Council (WAEC) and the National Examinations Council (NECO), leading to consistently low academic achievement in practical Biology. Despite the critical role of instructional resources in achieving educational objectives, many schools in Oyo State lack the facilities and materials needed to support effective teaching and learning of practical Biology. While previous studies have acknowledged the importance of instructional resources in education, limited attention has been given to their direct impact on students' performance in practical Biology. This study, therefore, seeks to examine instructional resources as determinants of students' academic achievement in practical Biology in secondary schools in Oyo State, Nigeria.

### **Research Questions**

1. What is the level of academic achievement in Biology practical among senior secondary school students in Oyo state?
2. What is the availability level of instructional resources for teaching Biology practical in Oyo state Secondary Schools?
3. What is the level of utilisation of instructional resources for teaching Biology in Oyo State Secondary Schools?

### **Hypothesis**

H<sub>01</sub>: There will be no significant influence of instructional resources on students' academic achievement in Biology practicals in Senior Secondary Schools in Oyo State.

## Methodology

This study utilised a descriptive survey research design, focusing on collecting data from a sample representative of the broader population to achieve findings that can be generalised. The goal of this approach is to gather and analyse information without altering any variables. The population of this study consists of all eighty-one thousand and eight three students (81,083) in Senior Secondary School 2 in Oyo State. The study's sampling was conducted in three stages to ensure a representative and well-structured sample. In the first stage, five Local Government Areas (LGAs) were randomly chosen from the 33 in Oyo State: Afijio, Ibadan North, Ibadan South West, Ogbomoso South, and Oluyole. In the second stage, five secondary schools from each selected LGA, totalling 25 schools, were chosen based on specific criteria: a minimum of ten years in operation and at least 20 students enrolled in the science class offering Biology. In the final stage, 20 students were selected from each school using disproportionate stratified random sampling, leading to a sample of 500 students. This approach ensured that students from different strata within the science classes were well-represented in the study. The instruments used in this study were an adopted 80 -Practical Biology test items of the West Africa Senior Secondary Certificate Examination (WASSCE) and 30 items on a four Likert scale questionnaire titled “Instructional Resources Questionnaire” (IRQ). The first instrument consisted of 80 Practical Biology Test (PBT) items from GCE WASSCE items, adapted from the series of past GCE practical Biology items of the West African Examinations Council approved for publication by the West African Examinations Council, obtained from the head office in Ibadan, Oyo state. The second instrument consisted of three sections: A, B, and C. Section A consisted of items on the students’ bio-data, and sections B and C consisted of 30 items measuring the availability and utilisation of instructional resources. The survey underwent both face and content validity assessments, and the reliability index obtained was 0.78. The data gathered from the field were subjected to analysis through descriptive and inferential statistics. Descriptive statistics such as frequency, percentage, mean, and standard deviation were utilised to address the research questions. Inferential statistics of simple regression were used to test the hypotheses at a 5% level of significance.

## Results

### Presentation of Demographic Data

**Table 1: Showing the Demographic Data of Respondents**

<b>Gender</b>	<b>Frequency</b>	<b>Percentage</b>
Male	297	59.4
Female	203	40.6
<b>Total</b>	<b>500</b>	<b>100.0</b>
<b>Age Group</b>		
11-14 years	55	11.0
41-50 Years	94	33.8
19-Above years	0.6	1.2
<b>Total</b>	<b>500</b>	<b>100.0</b>
<b>Class Type</b>		
SS2	500	100.0
<b>Total</b>	<b>500</b>	<b>100.0</b>

Source: Researchers’ Field Survey, 2024

Table 1 shows the demographic data of the respondents in this study, which includes a total of 500 students. In terms of gender distribution, the sample consists of 297 male students, representing 59.4% of the group, while female students total 203, accounting for 40.6%. This indicates a higher proportion of male participants in the study. The age breakdown reveals a varied range among the respondents. A portion of the students, 11.0%, are between 11 and 14 years old, while 33.8% fall within the 41 to 50-year age group. Additionally, a very small fraction, 1.2%, are aged 19 and above. This distribution suggests that there is a broad age span, which may reflect diverse enrollment or progression rates within the student population. All respondents are in the Senior Secondary 2 (SS2) class, indicating that the study specifically focuses on students at this educational level.

### Answers to Question

**Research Question One:** What is the level of academic achievement in Biology practicals among senior secondary school students in Oyo state?

**Table 2: Descriptive Statistics of Academic Achievement of Students**

Items	N	$\bar{x}$	SD	min	max
Biology Practical Achievement Test	500	23.76	11.29	5.00	42.00
<b>Average Total</b>	<b>500</b>	<b>23.76</b>	<b>11.29</b>	<b>5.00</b>	<b>42.00</b>

Source: Fieldwork, 2024

From Table 2 above, it was seen that the mean score is 23.76, while the standard deviation of 11.29 indicates a moderate spread of scores, the minimum score is five, and the maximum score is 42 out of the total score of 80. Overall, the data suggest that there is a moderate level of achievement in Biology practicals in Oyo State, with a wide range of scores. This could be due to a variety of factors, such as instructional resources and teacher-related factors, among others.

**Research Question Two:** What is the availability level of instructional resources for teaching Biology practicals in Oyo state Secondary Schools?

**Table 3: Descriptive Statistics on Availability of Instructional Resources**

S/N	ITEMS	A(%)	S(%)	O(%)	N(%)	$\bar{x}$	SD
1	Audio/tape recorder and player to facilitate learning in the laboratory.	0.0(0)	0.0(0)	0.0(0)	500(100)	1.00	.000
2	Visual/video recorder is available in the school for field studies.	0.0(0)	0.0(0)	0.0(0)	500(100)	1.06	.391
3	Software, such as slides and films are available for Lesson	6(1.2)	6(1.2)	6(1.2)	482(96.)	1.07	.403
4	The school library is well equipped with recent books.	15(3.0)	6(1.2)	0.0	479(95.)	1.10	.522
5	Projector and television are available in the school	6(1.2)	26(5.2)	6(1.2)	462(92.4)	1.11	.443

6	Computer set as instructional material is available in the school	15(3.0)	7(1.4)	6(1.2)	472(94.4)	1.13	.562
7	Biology practical chemicals such as Iodine, Benedict's solution, Fehling's Solution, Sudan III Solution are available for food tests.	3(0.6)	63(12.)	6(1.2)	428(85.6)	1.17	.447
8	Practical instrument such as pooter, rain gauge, thermometer, sweep nets and quadrats are available for teaching Ecology.	9(1.8)	127(25.)	0.0	364(72.)	1.31	.567
9	Biology laboratory is available.	43(8.6)	116(23.)	6(1.2)	335(6.7)	1.51	.889
10	The chalkboard is conducive to write on	49(9.8)	149(29.)	19(3.8)	283(56.)	1.67	.942
11	Instructional materials such as the microscope, potometer, clinostat are available in the laboratory.	23(4.6)	363(72.)	40(8.0)	74(14.)	2.02	.642
12	Charts of various biological activities are well available in the laboratory.	59(11.)	136(27)	175(35.)	130(26.)	2.32	.989
13	The desks and chairs in the classrooms are conducive for learning.	131(26.2)	116 (23.)	84 (16.)	169 (33.)	2.35	1.199
14	The staff room is available and comfortable for lesson planning	138(27.6)	6(1.2)	296(59.)	60(12.)	3.02	.877
15	Models of various organs of the body such as the heart, eye, skeleton, lungs are available to enhance learning	401(80.2)	34(6.8)	0.0	65(13.0)	3.47	1.081
<b>Average Total</b>						<b>1.69</b>	<b>.662</b>

**Source: Field Work, 2024**

**A: Always S: Seldom O: Often N: Never**

**Decision Rule; VH: Very High (3.50 – above); H: High (3.00-3.49); M: Moderate (2.50-2.99); L: Low (Below 2.50)**

Table 3 reveals a general scarcity of instructional resources in the surveyed schools, particularly for biology education. Audio/visual aids, computer sets, and software tools are almost entirely unavailable, while basic laboratory facilities, practical instruments, and classroom resources like desks and chalkboards are also limited. Essential materials for hands-on biology, including chemicals and specific equipment, show only moderate availability. However, anatomical models and staff rooms are relatively accessible, with the models being the most available resource. Overall, the average score for resource availability is low (1.69), indicating that the lack of instructional tools could impede effective teaching and learning in these schools.

**Research Question Three:** What is the level of utilisation of instructional resources for teaching Biology in Oyo State Secondary Schools?

**Table 4: Descriptive Statistics on Utilization of Instructional Resources**

S/N	ITEM	VHU(%)	HU(%)	LU(%)	VLU(%)	$\bar{x}$	SD
1	Software such as slides and films to enhance learning	6(1.2)	0(0.0)	26(8.2)	468(93.6)	1.09	.391
2	Projector And Television are available in the school	0.0(0)	6(1.2)	71(14.2)	423(84.6)	1.17	.403
3	Biology Practical Chemicals such as Iodine, Benedict's Solution, Sudan 111 Solution for food tests	9(1.8)	34(6.8)	6(1.2)	451(90.2)	1.20	.637
4	Visual/video recorder for field studies	33(6.6)	0(0.0)	6(1.2)	461(92.2)	1.21	.750
5	Computer set as instructional material	12(2.4)	27(5.4)	22(4.4)	439(87.8)	1.22	.653
6	Audio recorder and player to facilitate learning	0.0(0)	43(9.4)	38(7.6)	415(83.0)	1.26	.619
7	Practical instrument such as Pooter, Rain gauge, Thermometer, Sweep nets and Quadrats for ecological studies	49(9.8)	39(7.8)	9(1.8)	403(80.6)	1.47	.997
8	The Biology Laboratory for Teaching Practical Lessons	21(4.2)	138(27.6)	12(2.4)	329(65.8)	1.70	1.007
9	The school library equipped with recent text books	64(12.8)	18(3.6)	151(30.2)	267(53.4)	1.76	1.012
10	Desks, Chairs, and Stools in Classrooms and Laboratory	49(9.8)	172(34.4)	38(3.6)	241(48.2)	2.06	1.103
11	Instructional materials such as the microscope, potometer, clinostat	50(10.0)	139(27.8)	244(48.8)	67(13.4)	2.34	.834
12	The staff room is comfortable for lesson planning	95(19.0)	148(29.6)	101(20.2)	156(31.2)	2.36	1.113
13	Charts of various biological activities	9(1.8)	447(89.4)	16(3.2)	28(5.6)	2.87	.508
14	Models of various Organs of the body such as the heart, eye, skeleton, lungs	376(75.2)	15(3.0)	13(2.6)	96(19.2)	3.34	1.197
15	The chalkboard is well used by the teacher	330(66.0)	97(19.4)	39(7.8)	34(6.8)	3.45	.902
<b>Average Total</b>						<b>1.90</b>	<b>.813</b>

**Source: Field Work, 2024**

**VHU: Very High Use HU: High Use LU: Low Use VLU: Very Low Use**

**Decision Rule; VH: Very High (3.50 – above); H: High (3.00-3.49); M: Moderate (2.50-2.99); L: Low (Below 2.50)**

Table 4 shows that instructional resources in the surveyed schools are generally underutilised, with an average usage score of 1.90. Resources like educational software, projectors, biology chemicals, visual recorders, and computers are rarely used. Items like ecology instruments,

biology laboratories, and library books have low to moderate usage. Only anatomical models and chalkboards see high utilisation, with chalkboards being the most frequently used resource. This limited use of instructional tools may affect teaching effectiveness and students' hands-on learning experiences.

### Test of Hypothesis

**H<sub>01</sub>:** There will be no significant influence of instructional resources on students' academic achievement in Biology practicals in Senior Secondary Schools in Oyo State.

**Table 5: Summary of Regression Analysis Showing the Influence of Instructional Resources on Students' Academic Achievement in Biology Practical in Senior Secondary Schools in Oyo State**

		Coefficients <sup>a</sup>			
		Unstandardized Coefficients		Standardized Coefficients	
Model		B	Std. Error	Beta	t
1	(Constant)	43.750	5.370		8.146
	Instructional resources	-.125	.053	-.106	-2.380
					Sig.

a. Dependent Variable: Practical Biology Achievement Test

Table 5 presents the coefficients indicating the influence of instructional resources on students' achievement in Biology practicals in senior secondary schools in Oyo State. The result shows the contribution of instructional resources to students' achievement, as reflected by the standardised Beta (B) weight of -0.106,  $t = -2.380$ , and  $p < 0.05$ . This indicates a significant but negative influence, suggesting that increased instructional resources are associated with a slight decline in students' performance in practical Biology. The analysis revealed that instructional resources, as an independent variable, have a statistically significant influence on students' academic achievement in Biology practicals, albeit in an unexpected direction.

### Discussion of Findings

The finding from research question one revealed that there is a moderate level of achievement in Biology practicals in Oyo State. This suggests that while students perform satisfactorily, there is substantial room for improvement. Moderate achievement levels can hinder students' readiness for advanced studies in biology or science-related fields, as practical skills are essential for deep scientific understanding and application. Odewumi, Akintola and Bello (2020) highlight that instructional innovation, such as using plastic relief sculptures, can significantly improve students' practical Biology performance, suggesting that when creative instructional resources are integrated, practical achievement increases. Similarly, Akintola, Ayanlola, and Sulaiman (2021) found that frequent exposure to Biology practicals led to improved performance in drawing skills among students. In contrast, a study by Olabode, Awolola & Awusah (2023) noted no significant relationship between teacher qualifications and student achievement in Biology, suggesting that teacher quality alone without adequate resources may not enhance practical skills.

The second finding revealed a low availability of instructional resources in Oyo State's senior secondary schools, which has significant implications for students' practical science education. Limited resources can restrict students' engagement and their ability to understand complex

biological concepts through experimentation. Ukoh and Amuda (2016) support this finding, indicating that inadequate laboratory resources in Physics led to reduced practical engagement and lower academic achievement among students. Similarly, Araromi and Olatubosun (2018) found that the limited availability of reading materials in English language instruction contributed to poor academic performance, highlighting that resource scarcity affects multiple subjects. However, Oyinloye and Ige (2018) observed that teachers' understanding of science concepts could still positively influence student outcomes despite limited resources, suggesting that well-prepared teachers might mitigate some negative impacts of resource shortages.

Analysis of research question three indicated that the level of utilisation of instructional resources in senior secondary schools in Oyo State is low, suggesting that even when resources are available, they may not be actively employed in teaching. Low utilisation can stem from inadequate teacher training, time constraints, or large class sizes, all of which hinder students' practical experience. The findings by Usen (2016) on the utilisation of resources in Nursing schools in Akwa Ibom State support this, showing that teacher engagement with available resources correlates positively with student achievement in practical subjects. Similarly, Babatunde and Olanrewaju (2017) found that increased ICT utilisation improved teacher literacy, which then influenced instructional quality. Contrastingly, Gbore and Daramola (2013) suggested that some teachers can achieve high academic performance in Biology through traditional methods, emphasising the variability in the necessity of resource usage across different contexts.

Results from hypothesis one revealed that instructional resources have a significant influence on student's academic achievement in Biology practicals in senior secondary schools in Oyo state. Hence, the null hypothesis initially stated was rejected. This is supported by studies carried out by Ebek, Ekon, John, and Ibok (2023) in Calabar South Local Government Area, Nigeria, which found that the availability and adequacy of instructional materials significantly impacted Biology students' academic achievement. Similarly, research in Ilorin West, Kwara State, Nigeria, by Abidoye, Abidoye, and Olaide (2023) demonstrated that the use of Biology instructional materials positively affected senior secondary school students' academic performance. Conversely, some studies have reported no significant influence of instructional resources on students' academic achievement in Biology practicals in senior secondary schools in Oyo state. For example, research in Ibesikpo Asutan Local Government Area, Nigeria, by Etim (2021) found that learning resources did not significantly influence students' academic performance in Biology.

## Conclusion

This study highlighted several key factors influencing students' performance in Biology practicals in Oyo State. The moderate level of achievement in Biology practicals suggests that while students perform at an acceptable level, there is a significant opportunity for improvement. The study also revealed a low availability of instructional resources, which hampers students' ability to engage with practical aspects of Biology. This shortage has been shown to restrict students' understanding of complex concepts through experimentation. Additionally, the low level of utilisation of available instructional resources underscores the importance of teacher training and effective classroom management. Even when resources are available, their underutilisation can hinder the practical learning experience. The study also confirmed that instructional resources significantly influence students' academic achievement in Biology practicals, highlighting the critical role of these materials in facilitating student success. In conclusion, to enhance students' practical achievements in Biology in Oyo State, it is essential to increase both the availability and effective



utilisation of instructional resources. Additionally, teacher training programs should be strengthened to ensure optimal use of these resources, fostering an environment conducive to improved academic performance in practical subjects.

### Recommendations

1. To enhance students' achievement, the government should provide resources and support for schools in terms of instructional resources and materials.
2. There is a need to appropriately fund educational sectors to enable the sector to acquire the necessary facilities to make the learning attainable to meet the educational goal in Oyo state.
3. Teachers should be trained and retrained on the use of Hands-on equipment in the laboratories. This will help to familiarise them and the students with the innovative trends in the STEM world, which will enhance quality assurance in the educational system in Oyo state.
4. Schools should encourage teachers to create low-cost instructional tools, offering training on using everyday materials to effectively teach biology concepts when resources are limited.

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