

Assessment of Instructional Facilities for Teaching Electrical Installation and Maintenance Works in Technical Colleges in Bauchi Metropolis

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ABSTRACT

The study aimed to evaluate the condition of instructional facilities used for teaching Electrical Installation and Maintenance Works (EIMW) in Technical Colleges within the Bauchi metropolis. A survey research design was employed, guided by three research questions. The study involved 79 respondents as the population. Data collection utilized a structured questionnaire, validated by experts in electrical technology education with a reliability coefficient of 0.95. Analysis of the collected data utilized frequency, percentage, and standard deviation. The findings revealed that the majority of facilities required for teaching EIMW in Technical Colleges were available, functional, and effectively utilized, with only a few exceptions. Based on these results, it is recommended that additional facilities such as welding/brazing equipment, conduit pipes, and heaters (ovens) be provided to enhance the implementation of the EIMW curriculum.

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INTRODUCTION

Facilities for teaching EIMW should be made available such that it can arouse and motivate the learners' curiosity towards learning. Without availability of facilities, teaching and learning of Electrical Installation and Maintenance Work in Technical Colleges will be abstract and not be realizable, thereby making knowledge impartation and acquisition of skills appear like mirage. The adverse effect of inadequate facilities for teaching and learning technical skills is that it will invariably lead to the production of craftsmen and technician who are not properly trained (Kya, Anyem, Terhema & Abuh, 2021).

According to Oluwunmi and Oyewole (2021) instructional facilities are fixed or movable objects, equipment, supplies and material resources which may be private, public or government properties that may be turned into educational usage so as to achieve the set goals. Instructional facilities play a crucial role for effective teaching and learning in workshops and

classrooms. Suleiman, Mukhtar and Suleiman (2021) submitted that educational facilities play a crucial role in aiding the concretizing of abstract notions and inspiring the imagination of learners. Also Peterson (2022) stated that material resources are essential facilities that help teachers to impart knowledge effectively so that learners can receive, understand, retain, and apply the knowledge and experiences gained in order to reach overall educational goals.

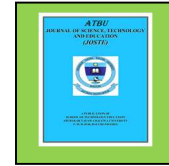
The success of any system is a function of the available facilities to accomplish the goals and objectives of such a system, because whenever these facilities and equipment are judiciously used, they normally arouse students' interest greatly in the learning process and also enhances the retention of ideas generated (Fatoba, Soyombo, Eribo & Adeleke, 2021). In view of this, Adejumo (2022) maintained that instructional facilities have been positively linked with educational efficiency, students' academic performance, and their improved capabilities after

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graduation. The importance of the provision of instructional facilities for teaching and learning in technical colleges cannot be over-emphasized. On this note, Abass and Oyeniyi (2021) emphasized that instructional facilities play an important role in the actualization of the educational goals and objectives by satisfying the physical and emotional needs of staff and students' of the school.

Hale and Hale (2021) submitted that school facilities consist of all buildings for academic and non-academic activities, whereby equipment are used for academic and non-academic functions, playground for sports and games, landscapes, farms, gardens, including trees, roads and pathways. Other amenities include furniture and restrooms, lighting, acoustics, storage and packing areas, security, transportation, Information and Communications Technology (ICT), clearing materials, and special facilities for the physically challenged. Ezeudu and Agu (2021) opined that many scholars, researchers, administrators, and educational planners have confirmed that school in Nigeria lack basic facilities such as laboratories, libraries, and furniture, among others. Furthermore, the schools that have these facilities are often under-equipped and overcrowded, leading to an unfavorable learning environment for students. Whereas Charles and Rita (2022) lamented that maintenance of facilities is of great concern to effective teaching and learning. Charles and Rita (2022) emphasized that even when a large amount of money is invested in school facilities; it ends up wasted when school buildings and equipment are left to deteriorate without maintenance.

Koyoh, Musyoka, mvogo and Oyieke (2021) added that facilities tend to depreciate over time due to various factors such as poor maintenance, vandalism, and natural wear and tear. Therefore, there is a need for maintenance through repair and servicing of components in order to restore their physical conditions and sustain their working capacity. Maintenance enhances performance, durability, and prevents wastage. Twalo (2021) noted that in many poor countries, resources per student are low, meaning there are few teachers, few classrooms, and few teaching and learning materials. While the number of students has increased rapidly, the supply of

public educational facilities like classrooms, teaching and learning materials have also fallen behind.

Purpose of the Study

The purpose of the study is to assess the state of instructional facilities for teaching Electrical Installation and Maintenance Works in Technical Colleges in Bauchi metropolis. Specifically, the study sought to;

1. Assess the availabilities of instructional facilities for teaching Electrical Installation and Maintenance Works in Technical Colleges in Bauchi metropolis.
2. Determine the functionality of the available instructional facilities for teaching Electrical Installation and Maintenance Works in Technical Colleges in Bauchi metropolis.
3. Examine the state of utilization of the available instructional facilities for teaching Electrical Installation and Maintenance Works in Technical Colleges in Bauchi metropolis.

Research Questions

The following research questions were raised to guide the study;

1. What are the instructional facilities available for teaching Electrical Installation and Maintenance Works in Technical Colleges in Bauchi metropolis?
2. What are the functionality of the available instructional facilities for teaching Electrical Installation and maintenance Works in Technical Colleges in Bauchi metropolis?
3. What is the state of utilization of the available instructional facilities for teaching Electrical Installation and Maintenance Works in Technical Colleges in Bauchi metropolis?

LITERATURE REVIEW

Concept of Instructional Facilities:

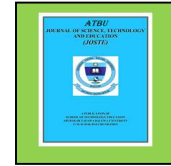
Instructional facilities are essential facilities that are required in learning environment, such as lecture hall, computer lab, technical

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workshop, with the objective of supporting learners for attaining desired changes in behavior or performance in response to specified demands (Fagbade & Popoola, 2023). The compatibility, sufficiency, and effective usage of educational facilities impact the effectiveness of accomplishing the set goals and objectives in educational process. It is evident that instructional facilities affect students' judgments of their academic accomplishment in teaching and learning.

Teaching and learning can only be effectively realizable if facilities that are needed are available. In view of this, Fasheun, Ojewole and Oluwayemisi (2022) submitted that effective teaching would not be possible without adequate arrangements for the availability of required instructional facilities. This means that the availability of facilities in technical colleges enhance the vital process of skills acquisition. Availability of appropriate workshop facilities enhances student learning by allowing them to be involved in demonstrations, and practice which will help them to continue to build their skills. Inadequate facilities for teaching/learning technical work trades have been observed as a barrier in instructional processes especially in Technical Colleges where teaching is more practically demonstrated than theory while others lamented on the gross inadequacy, unavailability and non-functional state of the facilities (Adejumo, Olutunji & Ajiboye, 2021). Eseka and Annune (2022) stressed that for technical and vocational education to achieve its objectives, equipment, materials and tools must be available and adequate. Tambari and Puyate (2021) concluded that for any meaningful vocational and technical education programme, facilities are indispensable. This is because students in technical education are expected to do a lot of workshop practical. These practical's can only take place in an environment where adequate and relevant tool and equipment are available.

Also, Gebrekidan and Gebremedhin (2021) emphasized that tools and equipment must be in perfect condition for success to be achieved in technical education. Idoko and Amali (2021) supported this fact by stating that practical approach in teaching Electrical Installation and Maintenance Works (EIMWs) in Technical

Colleges enhances manipulative skills in students. This implies that without adequate functional tools, equipment, machines and consumables, it will be difficult to teach Electrical Installation and Maintenance Work Trade effectively. Having functional equipment contributes immensely towards the achievement of the objectives of Technical College programmes. On this note, Gedera and Seneviratne (2021) noted that it will be difficult to carry out instructional activities efficiently and effectively without physical facilities and equipment.

Review of Related Empirical Studies

This section reviews some empirical work that have been done on areas related to the study;

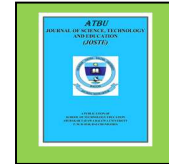
Tambari and puyate (2021) assessed the level of availability, utilization and maintenance of facilities for teaching electrical installation and maintenance works in technical colleges in Rivers State. The objective of the study was to identify the available facilities for teaching of electrical installation and maintenance works, examine the level of utilization of facilities for teaching of electrical installation and maintenance works. And to find out the level of maintenance carried out on electrical installation and maintenance works in Government Technical Colleges in Rivers State. The researchers adopted a descriptive research survey design and used a self-structured questionnaire for data collection. A population of 18 electrical installation and maintenance works teachers was used for the study. The study found that majority of the facilities was available while few were not available. It was also found that teachers of electrical installation and maintenance works utilized the facilities for teaching while maintenance culture adopted was found to be low. Based on the findings, it was recommended among others that all the technical colleges in Rivers State should be properly equipped with facilities through provision by donor agencies such as government, Parent Teachers Association (PTA), UNDP, UNESCO, UNICEF, philanthropist and so on. This will enhance teaching of electrical installation and maintenance works; Teachers of electrical installation and maintenance works should be

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knowledgeable on how to use the available facilities in teaching and in some cases; improvisation should be encouraged and adopted. This study is similar to the present study in terms of use and availability of instructional facilities. However it differs in area of coverage. The study under review was carried out in Rivers state while the present study was conducted in Bauchi metropolis.

Okoji and Olubayo (2021) conducted a research on Assessment of Availability and Utilization of Instructional Resources for Teaching Primary School Pupils' Mathematics in Ilorin Metropolis, Nigeria. The study adopted descriptive survey research design. Two research instruments were raised which comprised of self-designed questionnaire and checklist. The first instrument questionnaire with reliability value of 0.74 tagged "Availability and Utilization of Instructional Resources Questionnaire (AUIRQ) while the checklist was tagged Availability of Instructional Resources Checklist_(AIRC). The hypotheses tested at 0.05 were analyzed using t- test and analysis of variance (ANOVA). The population for this study comprised of 150 primary school teachers in private and public schools in Ilorin metropolis. Findings from the study indicated that there was no significant difference in the use of instructional resources for teaching primary school pupils' Mathematics in Ilorin Metropolis based on gender, there was no significant difference in the use of instructional resources for teaching primary school pupils' Mathematics in Ilorin Metropolis based on teaching qualifications, there was no significant difference in the use of instructional resources for teaching primary school pupils' Mathematics in Ilorin Metropolis based on teaching qualifications, there was no significant difference in the use of instructional resources for teaching primary school pupils' Mathematics in Ilorin Metropolis based on teaching experience. Thus, it was recommended that Teachers should be encouraged to search for necessary instructional materials that can appeal to the senses of pupils, arouse their interest, encourage their participation, make learning more meaningful and promote academic standard. This study is similar to the present study in terms of use and availability of

instructional facilities. However it differs in subject and area of coverage. The study under review was carried out in Kwara state while the present study was conducted in Bauchi metropolis.

METHODOLOGY

The study adopted a survey research design. The population of the study was 79 respondents, comprising of 75 EIMW students and 4 EIMW teachers. The entire population size was used in this study because the population was manageable. The instrument used for data collection was a structured questionnaire titled "Assessment of The State of Instructional Facilities For Teaching Electrical Installation and Maintenance Works Questionnaire" (ASIFFTEIMWQ). The instrument was classified into four sections of A, B, C, and D. Section A elicited personal information from the respondents, section B consisted of items eliciting information on availabilities of instructional facilities for teaching Electrical Installation and Maintenance Works, section C contained functionality of the available instructional facilities for teaching Electrical Installation and Maintenance Work, and section D contained items designed to determine if this available instructional facilities were effectively utilized for teaching Electrical Installation and Maintenance Work. The instrument for data collection was face and content validated. The validated instrument was reconstructed by the researcher based on the suggestions of experts. These experts subjected the instrument to rigorous scrutiny in order to ascertain the clarity, relevance, adequacy and other attributes which a good research instrument should possess. A reliability co-efficient of 0.95 was obtained. Hence, this reliability co-efficient was considered adequate for the internal consistency of the instruments. The instrument was designed in a checklist format, the data collected was analyzed using frequency, percentage and checklist for research questions.

RESULTS

Research Question 1: what are the instructional facilities available for teaching Electrical Installation and Maintenance Works in Technical Colleges in Bauchi metropolis?

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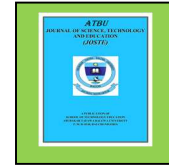


Table 1.1: Percentage showing the instructional facilities available for teaching EIMWs in Technical Colleges in Bauchi metropolis.

S/N	Items	Available		Not Available		Remark
		Freq.	Percentage (%)	Freq.	Percentage (%)	
1.	Workshop	79	100%	0	0%	Avail
2.	Class blocks	79	100%	0	0%	Avail
3.	Store/storage facilities	79	100%	0	0%	Avail
4.	Work benches	79	100%	0	0%	Avail
5.	Fire extinguisher	79	100%	0	0%	Avail
6.	Clamp	79	100%	0	0%	Avail
7.	Micrometer	79	100%	0	0%	Avail
8.	Hacksaw	79	100%	0	0%	Avail
9.	Safety belt	79	100%	0	0%	Avail
10.	Scaffolding	79	100%	0	0%	Avail
11.	Helmet	79	100%	0	0%	Avail
12.	Measuring tape	79	100%	0	0%	Avail
13.	Safety boot	79	100%	0	0%	Avail
14.	First aid box	79	100%	0	0%	Avail
15.	Hand gloves	73	92.4%	06	8.2%	Avail
16.	Welding/brazing. Equip.	06	8.2%	73	92.4%	N/Avail
17.	Screw driver	79	100%	0	0%	Avail
18.	Mallet	79	100%	0	0%	Avail
19.	Soldering iron	79	100%	0	0%	Avail
20.	Fishing tape	79	100%	0	0%	Avail
21.	Ladder	79	100%	0	0%	Avail
22.	Voltage tester	79	100%	0	0%	Avail
23.	Megger tester	79	100%	0	0%	Avail
24.	Goggle	79	100%	0	0%	Avail
25.	Knives	79	100%	0	0%	Avail
26.	Side cutter/pliers	79	100%	0	0%	Avail
27.	Conduit pipe	03	3.8%	76	96.2%	N/Avail
28.	Overall uniform	70	88.6%	09	11.4%	Avail
29.	Energy meter	09	11.4%	70	88.6%	N/Avail
30.	Heater(Oven)	40	49.4%	39	50.6%	N/Avail
31.	Ammeter	79	100%	0	0%	Avail
32.	Wiring board	79	100%	0	0%	Avail
33.	Voltmeter	79	100%	0	0%	Avail
34.	Spanner	79	100%	0	0%	Avail
35.	Staffroom	79	100%	0	0%	Avail
36.	Hammer	79	100%	0	0%	Avail

Data in table 1.1 indicates that the available instructional facilities for teaching Electrical Installation and Maintenance Works in Technical colleges in Bauchi metropolis include workshop, class blocks, store/storage facilities,

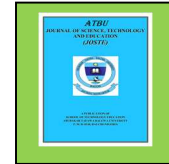
work benches, fire extinguisher, clamp, micrometer, hacksaw, safety belt, scaffolding, helmet, measuring tape, safety boot, first aid box, hand gloves, screw driver, mallet, soldering iron, fishing tape, ladder, voltage tester, megger tester,

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goggle, knives, side cutter/pliers, overall uniform, ammeter, wiring board, voltmeter, spanner, staffroom, and hammer. While the instructional facilities that were limitedly available include conduit pipe, energy meter and heater (oven).

Research Question 2: What is the functionality of the available instructional facilities for teaching Electrical Installation and Maintenance Works in Technical Colleges in Bauchi metropolis?

Table 1.2: Mean response showing the functionality of the available instructional facilities for teaching EIMWs in Technical Colleges in Bauchi metropolis.

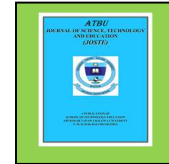
S/N	Items	HF	SF	RF	NF	X	SD	Remark
1.	Workshop	79	0	0	0	4.00	0.00	HF
2.	Class blocks	79	0	0	0	4.00	0.00	HF
3.	Store/storage facilities	79	0	0	0	4.00	0.00	HF
4.	Work benches	79	0	0	0	4.00	0.00	HF
5.	Fire extinguisher	79	0	0	0	4.00	0.00	HF
6.	Clamp	79	0	0	0	4.00	0.00	HF
7.	Micrometer	79	0	0	0	4.00	0.00	HF
8.	Hacksaw	79	0	0	0	4.00	0.00	HF
9.	Safety belt	79	0	0	0	4.00	0.00	HF
10.	Scaffolding	79	0	0	0	4.00	0.00	HF
11.	Helmet	79	0	0	0	4.00	0.00	HF
12.	Measuring tape	79	0	0	0	4.00	0.00	HF
13.	Safety boot	79	0	0	0	4.00	0.00	HF
14.	First aid box	79	0	0	0	4.00	0.00	HF
15.	Hand gloves	76	0	0	03	3.94	0.25	HF
16.	Welding/brazing. Equip.	6	0	0	73	1.13	1.81	NF
17.	Screw driver	79	0	0	0	4.00	0.00	HF
18.	Mallet	76	0	3	0	3.97	0.18	HF
19.	Soldering iron	76	3	0	0	3.94	0.24	HF
20.	Fishing tape	76	3	0	0	3.94	0.24	HF
21.	Ladder	76	3	0	0	3.94	0.24	HF
22.	Voltage tester	76	0	3	0	3.97	0.18	HF
23.	Megger tester	76	3	0	0	3.94	0.24	HF
24.	Goggle	76	3	0	0	3.94	0.24	HF
25.	Knives	76	0	3	0	3.97	0.18	HF
26.	Side cutter/pliers	76	3	0	0	3.94	0.24	HF
27.	Conduit pipe	2	1	0	76	1.16	1.57	NF
28.	Overall uniform	70	6	0	3	3.91	0.71	HF
29.	Energy meter	9	3	0	70	1.49	1.38	RF
30.	Heater(Oven)	5	11	24	39	2.32	1.61	RF
31.	Ammeter	70	3	6	0	3.64	0.75	HF
32.	Wiring board	79	0	0	0	4.00	0.00	HF
33.	Voltmeter	79	0	0	0	4.00	0.00	HF
34.	Spanner	76	3	0	0	3.94	0.24	HF
35.	Staffroom	79	0	0	0	4.00	0.00	HF
36.	Hammer	76	3	0	0	3.94	0.24	HF

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The data on table 1.2 revealed that Electrical Installation and Maintenance Works facilities were highly functional in Technical Colleges in Bauchi metropolis. This was shown in their mean responses as majority of the facilities were seen to be Highly Functional (HF), while others were Not Functional (NF), with an average

mean of 2.50 which shows acceptability of functionality.

Research Question 3: What is the state of the utilization of the available instructional facilities for teaching Electrical Installation and Maintenance Works in Technical Colleges in Bauchi metropolis?

Table 1.3: Mean response showing the extent of utilization of the available instructional facilities for teaching EIMWs in Technical Colleges in Bauchi metropolis.

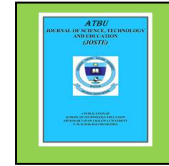
S/N	Items	HU	SU	RU	NU	X	SD	Remark
1.	Workshop	79	0	0	0	4.00	0.00	HU
2.	Class blocks	79	0	0	0	4.00	0.00	HU
3.	Store/storage facilities	79	0	0	0	4.00	0.00	HU
4.	Work benches	79	0	0	0	4.00	0.00	HU
5.	Fire extinguisher	79	0	0	0	4.00	0.00	HU
6.	Clamp	79	0	0	0	4.00	0.00	HU
7.	Micrometer	79	0	0	0	4.00	0.00	HU
8.	Hacksaw	79	0	0	0	4.00	0.00	HU
9.	Safety belt	79	0	0	0	4.00	0.00	HU
10.	Scaffolding	79	0	0	0	4.00	0.00	HU
11.	Helmet	79	0	0	0	4.00	0.00	HU
12.	Measuring tape	79	0	0	0	4.00	0.00	HU
13.	Safety boot	79	0	0	0	4.00	0.00	HU
14.	First aid box	79	0	0	0	4.00	0.00	HU
15.	Hand gloves	61	12	0	6	3.62	0.79	HU
16.	Welding/brazing. Equip.	4	2	3	70	1.24	1.92	NU
17.	Screw driver	76	3	0	0	3.94	0.24	HU
18.	Mallet	70	3	3	3	3.77	0.85	HU
19.	Soldering iron	76	3	0	0	3.94	0.24	HU
20.	Fishing tape	76	0	3	0	3.94	0.24	HU
21.	Ladder	76	0	3	0	3.94	0.24	HU
22.	Voltage tester	76	0	3	0	3.94	0.24	HU
23.	Megger tester	76	0	3	0	3.94	0.24	HU
24.	Goggle	76	3	0	0	3.94	0.24	HU
25.	Knives	76	3	0	0	3.94	0.24	HU
26.	Side cutter/pliers	76	0	3	0	3.94	0.24	HU
27.	Conduit pipe	2	1	0	76	1.16	1.59	NU
28.	Overall uniform	73	3	0	3	3.84	0.57	HU
29.	Energy meter	3	0	6	70	1.18	1.62	NU
30.	Heater(Oven)	4	2	3	70	1.24	1.92	NU
31.	Ammeter	70	3	6	0	3.81	0.78	HU
32.	Wiring board	76	0	3	0	3.94	0.24	HU
33.	Voltmeter	79	0	3	0	3.97	0.17	HU
34.	Spanner	76	3	0	0	3.94	0.24	HU
35.	Staffroom	79	3	0	0	3.94	0.24	HU
36.	Hammer	70	6	0	3	3.81m	0.76	HU

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The data in table 1.3 revealed that Electrical Installation and Maintenance Works teachers in Technical Colleges in Bauchi metropolis were utilizing the available instructional facilities in teaching and learning of EIMWs. However, there were variations in the level of utilization as indicated in the remark.

Table 1.3 further revealed that 88.9% of the instructional facilities for teaching Electrical Installation and Maintenance Works in Technical Colleges were highly utilized, while 11.1% of the instructional facilities were not utilized. This may not be unconnected with the fact that utilization is dependent upon availability.

CONCLUSION

In view of the findings from this study, it can be concluded that there are adequate supplies of the various instructional facilities (such as workshop, classrooms, storage facilities, helmet, safety boots, soldering iron, coverall uniform, and micrometer) that can be used in teaching of Electrical Installation and Maintenance works in Technical Colleges within the area of study. The available instructional facilities were functional and effectively utilized in the actual process of teaching Electrical Installation and Maintenance Works in Technical Colleges in Bauchi metropolis. But, there was problem of awareness of the relevant instructional facilities by both teachers and students. For instance, some students were not aware of the existence of some facilities but some teachers were aware of them in the Technical College. Even where the teachers and students were aware of the availability of these facilities, there was no effective utilization by teachers and students.

RECOMMENDATIONS

Based on the findings of this study, the following recommendations were made:

- 1 Ministry of Education of Bauchi state should as a matter of urgent importance provide the various types instructional facilities such as welding/brazing equipment, conduit pipe, energy meter and heater (oven), among others for the teaching and learning of Electrical

Installation and Maintenance Works in Colleges.

- 2 There is a need for in-house training and periodic orientation on the use of acquired available instructional facilities for the teaching and learning of Electrical Installation and Maintenance Work trades in Technical Colleges.
- 3 There is a need for an enabling policy to improve awareness level of both teachers and students on the use of instructional facilities, especially on pedagogical application in the teaching and learning of EIMWs.
- 4 Government should imbibe the use of motivation strategies through seminars and workshops for teachers to fully utilize instructional facilities for effective teaching and learning of EIMWs in Technical Colleges.

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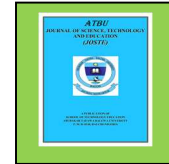
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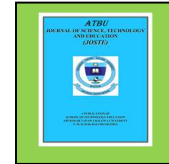
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