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VOCATIONAL EDUCATION-BASED ACQUISITION OF SKILLS TO CURB YOUTH RESTIVENESS: THE INTERNET OF SKILLS APPROACH

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ABSTRACT

Lack of pertinent skills has been linked to youth unrest brought on by rising unemployment rates. This work offered a method for students to learn without the assistance of a subject-matter expert (SME). The paper is a source of information that focuses on using the internet to develop entrepreneurial skills to address the issue of youth unemployment in developing countries. It is a fact that entrepreneurial skills are essential to job creation; active use of the internet to acquire pertinent knowledge could lead to self-actualization. Youth unemployment in developing nations is on the rise. This paper used real-world examples to demonstrate how internet resources can be helpful for performing tasks both at home and in the workplace. For example, studying saponification in chemistry can be taught similarly to how it is used in the soap manufacturing industry. Information on troubleshooting guides for electrical machines (electric motors and synchronous generators) was also provided from secondary sources. Finally, the "Internet of Skills" could be used to design a microgrid system. The Internet of Skills strategy was employed as the technique to accomplish this. With this strategy, it is possible to reduce youth unrest and improve security.

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1. INTRODUCTION

According to data from the National Bureau of Statistics, by the third quarter of 2018, 55.4% of young Nigerians were unemployed, up from 52.6% in 2017. This alarming increase in the youth unemployment rate is a concern. The threat could be reduced by acquiring skills; that include those found in many professions like shoemaking, carpentry, furniture, welding, and automotive mechanics (Emeh, 2012). The alarmingly high unemployment rate in the nation hinders economic development, and consequently, there is an increasing demand for skilled workers in our nation. The National Policy on Education recommended acquiring the knowledge and abilities required to work for pay in offices or on one's own (National, 2018). Although the federal government has been attempting to address the issue of youth unemployment through various social programs, these programs appear to have fallen short of the desired outcomes. It is still possible for the nation to find a long-term solution to this threat. The National Employment and Poverty Elimination Plan is one of these plans and has recently become a trend (Surajo & Kamir, 2016).

The National Bureau of Statistics report on the percentage of young people without jobs shows that we need to come up with new ideas because the N-Power program did not yield any notable outcomes. As a result, it is necessary to adopt a better strategy that works for the needs of the nation. In the current economic climate, youth unemployment is a problem that most developing nations must deal with. Even developed nations are not an exception because they have not demonstrated a significant improvement in this terrible social issue. This problem is more pronounced in developing countries, especially Nigeria, where nearly one million graduates are produced every year. There are a large number of unemployed young people, and Nigeria as a country will continue to face insecurity if the country cannot effectively contain this social threat. Experience has shown that the situation could be controlled with the conscious governmental policy followed by sustainable programs. Due to this, students must develop entrepreneurial skills using the "internet of skills," a real learning paradigm. Because it enables students of the natural sciences and engineering to start businesses and work for themselves, entrepreneurship skills are crucial for learning science (Hernández-Sánchez et al., 2019). Students of chemistry, biology, physics, and other subjects can develop entrepreneurial skills through self-learning activities. According to research, entrepreneurship education can be a highly effective tool for lowering youth unemployment in Nigeria (Araba, 2012). It was argued in the paper presented by Prabhu (2019) that developing an entrepreneurial mindset is essential to increasing the number of businesses and jobs available to young people in the future. The method of imparting knowledge is the biggest obstacle to fostering in science students the necessary entrepreneurial skills, according to his explanation. These skills cannot be taught to students using the typical lecture-based teaching approach used by teachers in Nigerian schools today.

Effective teaching strategies that encourage students' creativity and innovation are needed to teach entrepreneurship. Gracia et al. (2017) that students need an authentic learning strategy in order to learn entrepreneurial skills in science. According to the study (Pearce, 2016), authentic learning is when a student learns material but is not given the opportunity to practice it. Engineering students have found YouTube to be a very useful resource for self-directed learning (Lee et al., 2017). The "Internet of Skills" refers to the ability to generally transmit practical skills over the Internet (almost) in real-time, allowing third parties (humans or machines) anywhere in the world to use these skills to support activities. College students appear to lack basic practical skills after graduation; some students are well-informed but unable to use their practical ability to handle problems (Herrington et al., 2010). In that case, distance is not a barrier due to the use of audio-visual aids. According to research conducted in Nigeria's Kogi State, those who benefit from skill training programs can afford basic necessities (Kola, 2017).

Literature Review

The "Internet of Skill" is a technological process that enables real-time knowledge, skill, and expertise transfer without the limitations of physical barriers. This is a supplement to authentic learning, which is active learning. This involves asking questions, researching learning tasks, and coming to conclusions about how to solve problems by Milson (2002). Real learning must be student-centered, with students making decisions and directing their own learning. These tasks must be applicable to the real world and necessitate knowledge creation as opposed to knowledge reproduction (Ngang, 2021). This type of education enables students to apply what they learn in the classroom to real-world issues outside of the classroom. Students engage in active learning throughout the course of their studies, find information, participate in discussions, and have fun (Mims, 2003). Researchers in education have discovered that even when students are initially confused or frustrated while engaging in authentic learning, they still have the drive to persevere.

The focus of real learning must be on the student (Herrington et al., 2010). They found that the interdependence of context and cognition prevents the majority of theoretical knowledge taught in most schools from being applied in real-world situations. Herrington and Kelvin give examples of nine fundamental components for real learning in order to make this knowledge applicable and retrievable in everyday life. Real environments, real activities, expert performances, a variety of roles and viewpoints, collaborative knowledge construction, reflection, expression, guidance and scaffolding, and real evaluations are some of these components.

According to Onuma (2016), a lack of pertinent skills is to blame for Nigeria's current youth unemployment problem. Learning by doing is how you truly learn. It is active education. This involves asking questions, researching learning tasks, and coming to conclusions about how to solve problems by Milson (2002). Being student-centered is essential if you want to learn. The main issue in Nigeria is the lack of entrepreneurial skills among students. According to Martin and Iucu (2014), the goal of entrepreneurship education is to develop students' entrepreneurial aptitude and mindset. In Nigeria, entrepreneurship education aims to teach students how to create jobs. Because they are knowledge multipliers and facilitators who assist students in developing entrepreneurial skills, teachers are crucial to entrepreneurship education (Aneke, 2021). According to Karimi et al. (2012), entrepreneurship is crucial for increasing economic efficiency, market innovation, new job opportunities, and employment levels. Entrepreneurship is a strong force that encourages experiential learning. This is authentic learning [UL], in which the process is dominated by questions, research into learning issues, and drawing conclusions based on those issues. Student-centered learning, which increases economic power in the labor market and creates jobs, is necessary for learning to be effective (Byun et al., 2018). The development of entrepreneurial skills, knowledge, and attitudes among students is a key component of entrepreneurship education. (Minna, 2018) argued that an effective teaching strategy is necessary for the development of entrepreneurial skills. For students to develop their creativity in job creation, entrepreneurship education is crucial (Ngang, 2020). Especially in higher education institutions around the world, entrepreneurship education is very well-liked. Instead of looking for nonexistent white-collar jobs, these skills can be used to launch small businesses. With financial assistance from the government and the banking industry, small businesses can expand into businesses and industries that can employ more people. Only a select few of these fields—cosmetics, beverages, dyes, soaps and detergents, perfumery, and others—can be mastered by chemistry students. Fishing, horticulture, honey production, animal husbandry, textile production, and food processing are a few examples of biological activities.

As was already mentioned, the real learning paradigm is a student-centered instructional strategy that is controlled by nine factors (Ude, 2021). Nine elements must be applied to education whenever possible in order for science teachers to guarantee the success of entrepreneurship and to fully communicate with students. Real-world experiences should be used as learning tools in science classes rather than just textbooks and teachers' notebooks (Surajo, 2016). For instance, the process of saponification in chemistry can be taught using examples from the soap-making industry. Students should be permitted to look up information about saponification from different sources and ask questions during the study period. It should be possible for students to choose what and how they learn. Students will learn how to think critically, recognize premises, and logically come to conclusions. According to Herrington et al. (2010), critical thinkers dissect arguments into their fundamental premises and draw logical conclusions. Power system engineers had been making use of the internet of things to improve technical barriers such as protection, power quality, stability, and outstanding operations by seeking new ways of solving power system problems (Sampson, 2013). Technicians get useful information from YouTube to resolve problems in transmission lines, thereby improving the efficacy of the overall power system (Ngang & Aneke, 2021). In order to ensure system stability, engineers must consider power system stability as part of a transmission system security assessment. The network can provide information on how to improve the system. Due to the accessibility of information from published papers as secondary sources of information in research work, evaluation of the economic and technical viability of numerous technology options and accountability could be done with ease. The next subsection explains typical instances of how to obtain skills through the Internet of Skills (IOS) (Okedu et al., 2015).

2. METHOD AND DISCUSSION

The method of research approach is the use of Comparative Techniques, where different acquirable skills and competencies are juxtaposed for the readers to understand the significance of the internet of skills.

Illustrating authentic learning method using case studies.

Authentic learning is learning by doing. It is active learning this information could be obtained from the internet.

Task 1:

Electric Machine (Three-phase induction motor), ten abnormal conditions. A three-phase induction motor exhibited the following abnormal conditions when running on load; as a technician or engineer on duty troubleshoot the faults and provide solutions.

- Motor fails to start upon initial installation.
- The motor has been running, then fails to start.
- Motor runs but dies down.
- The motor takes too long to accelerate.
- Motor runs in the wrong direction.
- Motor overloaded/thermal protector continuously trips.
- Motor overheating.
- Motor vibrates.
- Bearings fail.
- Capacitor fails.

Task 2: Loss of Excitation in a gas Turbine Generator.

The generator circuit breaker tripped on the loss of excitation and generated voltage as indicated in the voltmeter was zero; as an Electrical operator on duty what would you do? what are the possible causes of this undesirable outcome? How can this be prevented? What is the lesson learned?

Previous knowledge

Recall that for a generator to trip on the loss of excitation, it means that the parameters necessary to generate EMF are not complete. From first principles, we know that E=BLVsinwt, Where B is the flux density, L is the sum of conductor lengths on both sides, and V is the tangential velocity of the conductors.

This is a generalized equation.

Excitation in practice is obtained from DC exciter; magnetic flux from the exciter is used to energize the rotor field coils. The exciter output can be controlled by a field regulator, and this, in turn, controls the generated voltage of the synchronous machine. When a generator pulls out of synchronism or tripped on the loss of excitation and could not be synchronized to the busbar; the following factors could be responsible:

- Overload.
- Opened field coils.
- No exciter voltage.
- An opened field in rheostat.
- The Field current set is too low.

Solution steps

Try any of the following steps

1. Use a voltmeter to measure the field coils for continuity.
2. Adjust the voltage regulator if the result obtained in step 1 is good.
3. Flash the field using a twelve-volt battery (12V), if the reading obtained in step 2 is low.

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4. The procedure for field flashing is to perform the task when the Gas turbine generator is on standstill with the circuit breaker on-off position. Observe the correct polarity of the voltage regulator terminals. When this task is completed start the turbine and check for satisfactory voltage build-up.

Task 3: Estimating Renewable Energy Power system Components

One of the renewable energy systems, solar photovoltaic systems or solar power systems use PV modules to convert sunlight into electricity. One or more other electricity generators or additional renewable energy sources may be combined with the generated electricity, or it may be stored, used immediately, fed back into the grid, or all of the above. A solar PV system is a very dependable and environmentally friendly source of electricity that can be used for a variety of purposes, including residential, commercial, agricultural, and livestock uses.

Task 4: Solar Pv System Sizing

Identify the necessary power consumption

Finding out the total power and energy consumption of all loads that the solar PV system must supply is the first step in designing a solar PV system.

Determine the total Watt-hours used by each appliance each day.

The total Watt-hours per day that must be delivered to the appliances can be calculated by adding the collective Watt-hour requirements for all appliances.

Calculate the total daily Watt-hours that the PV modules are required to produce.

The total Watt-hours per day that must be supplied by the panels are calculated by multiplying all of the appliances' Watt-hours per day by 1.3 (the amount of energy lost in the system).

The PV modules' size

PV modules of various sizes will generate varying amounts of power. The total peak watt produced must be known in order to determine the PV module's size. The size of the PV module and the site's climate affect the peak watt (Wp) output. We need to take into account the Panel generation factor, which varies depending on the site location.

To determine the size of PV modules, perform the following calculation:

Calculate the required PV modules' combined peak Watt-peak rating. To calculate the total Watt-peak rating required for the PV panels needed to power the appliances, multiply the total Watt-hours per day required from the PV modules (from item 1.2) by 3.43.

Determine how many PV panels the system needs

Divide your response from item 2.1 by the PV modules you have access to's rated peak output in Watts. The required number of PV modules will be determined by multiplying any fractional part of the result by the next highest whole number. The calculation yields the bare minimum of PV panels. The system will operate more efficiently and the battery life will increase if more PV modules are installed. The system may not function at all during cloudy periods and battery life will be reduced if fewer PV modules are used.

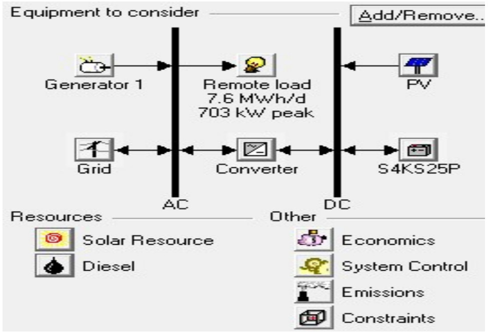

Fig 1. Model System with Diesel Generator, Solar PV and Battery bank

Inverter Sizing

When an output of AC power is required, an inverter is used in the system. Never let the inverter's input rating fall below the combined wattage of the appliances. The inverter's nominal voltage must match that of your battery. The inverter for stand-alone systems needs to be big enough to handle all the Watts you'll ever use at once. The size of the inverter should be 25–30% greater than the total Wattage of the appliances. If the type of appliance is a motor or compressor, the inverter size should be at least three times that capacity. It must also have additional capacity to handle surge current during startup. The input rating of the inverter for grid-tied or grid-connected systems should match the rating of the PV array to allow for safe and effective operation.

Battery Sizing

Deep cycle batteries are the kind that are advised for use in solar PV systems. Deep cycle batteries are created specifically to be rapidly recharged or to cycle charged and discharged repeatedly every day for years. The battery needs to be big enough to hold enough power to run the appliances at night and on overcast days. To determine the battery's size, perform the following calculation:

a. Determine the total daily Watt-hours consumed by appliances.
b. To account for battery loss, divide the daily total of Watt-hours used by 0.85.
c. To determine the depth of discharge, multiply the result from item 4.2 by 0.6.
e. Multiply the response from question 4.3 by the nominal battery voltage.
f. To calculate the necessary Ampere-hour capacity of deep-cycle battery, multiply the response from item 4.4 by the number of days of autonomy (the number of days the system must function without PV panel power).

Days of autonomy x Total Watt-hours per day used by appliances = Battery Capacity (Ah) (0.85 x 0.6 x nominal battery voltage)

Determining the size of solar charge controllers

Amperage and voltage capacities are typically used to rate solar charge controllers. Determine which type of solar charge controller is best for your application after choosing the one that matches the voltage of your PV array and batteries. To handle the current from a PV array, confirm that the solar charge controller has sufficient capacity. The size of a series charge controller is determined by the total PV input current delivered to the controller as well as by the PV panel configuration (series or parallel configuration). The short circuit current (Isc) of the PV array is typically multiplied by 1.3 to determine the size of a solar charge controller. Solar charge controller rating = Total short circuit current of PV array x 1.3

Task 5: Steps in Making Soap by Saponification Process

Materials needed: vegetable oil (20% sodium hydroxide solution, castor oil, olive oil, coconut oil, or palm oil).

• Regular salt
• Cylinders for measuring
• A 250 ml glass beaker;
• Blue and red litmus papers;
Filter funnel, filter paper, tripod stand, glass rod, bunsen burner, wire gauze, and spatula.
• Knife
True Lab How to do it: Measure out 25 ml of coconut oil and pour it into a 250 ml glass beaker.
• Fill a second measuring cylinder with 30 ml of 20% NaOH solution, and then pour it into the beaker containing the vegetable oil.
The mixture should be vigorously stirred with a glass rod.
• From the outside, touch the beaker. The beaker's temperature is noted to be warm.
• Set the beaker on a tripod stand that is covered with wire gauze.
• Use a Bunsen burner to heat the beaker until the mixture turns into a whitish paste.
• Take the beaker off the heat and let it cool.
• Submerge a red litmus paper in the resulting suspension.
• The red litmus paper turns blue when submerged in the suspension.
• Submerge a blue litmus test strip in the suspension.
• The blue litmus paper's colour is unchanged.
• Add 15g of table salt to the aforementioned suspension and thoroughly stir with a glass rod.
• Soap in the suspension precipitates out as solid after being added to the common salt solution.
• Grab a filter funnel, stuff it with filter paper, and mount it on a stand.
• Set a beaker underneath the funnel.
Pour the beaker's contents into the funnel while holding a glass rod over it to filter the liquid.
• Soap is left in the filter paper after filtration.
•Using a spatula, transfer the soap to another filter paper and press it dry with a different filter paper.
• Next, use a knife to cut it into the desired shape.

Students will no longer rely on rote memorization and instead learn to "do" science thanks to the real learning in science and engineering education that has been mentioned above. Engineering and science both depend on real science learning, where students acquire knowledge and put it to use outside of the classroom. These students will graduate with practical skills that they can use throughout their lives. The majority of these students will be able to use spreadsheets and Microsoft PowerPoint for learning, as well as access e-mail, Skype, blogs, and search databases.

The nation's current problem is unemployment because it is a scourge that must be eliminated in order for the country to advance. Graduate unemployment has historically presented a socioeconomic challenge for the nation (Longe, 2017). Unemployment will cause Nigeria's quality of life and job security to decline. According to Emeh (2012), if these skills are given serious consideration in the Nigerian educational system, they might serve as a cure. The current educational system is skillless and focused on academic excellence. According to Surajo and Karim (2016), Nigeria's unemployment problem is not just a concern for young people; it also poses a significant obstacle to the country's long-term growth and development. The National Bureau of Statistics' Table 1 compares Nigeria's unemployment rate between 2017 and 2018.

Table 1. Unemployment rate in Nigeria 2017 and 2018

Period	Unemployment rate (%)	Rate of Quarterly change (%)	Post-secondary graduate Unemployment (%)	Rate of Quarterly change (%)
2017 1st quarter	14.4	0.21	16.66	-7.02
2nd quarter	16.18	1.74	27.96	11.3
3rd quarter	18.8	2.62	31.78	3.82
4th quarter	20.42	1.62	25.65	-6.13
2018 1st quarter	21.83	1.41	30.3	4.65
2nd quarter	22.73	0.9	32.45	2.15
3rd quarter	23.13	0.4	29.75	-2.7

Source: National Bureau of Statistics

3. CONCLUSION

A solution for Nigeria's youth unemployment and unrest has been proposed: internet-based skill acquisition. Lack of pertinent skills has been linked to youth unrest brought on by rising unemployment rates. The paper offered a way for interested students to learn without the assistance of subject matter experts (SME). According to national statistics, youth unemployment in Nigeria is rising. Learning entrepreneurial skills is essential for creating jobs, and you can develop these skills by using the internet to learn about relevant topics. The use of concrete examples was emphasized to demonstrate how internet resources can be used to carry out maintenance tasks both at home and in business. For a proper understanding of authentic learning, information on troubleshooting guidelines for electrical machines (electric motors and synchronous generators) was provided from a secondary source. The Internet of Skills strategy was employed as the technique to accomplish this (secondary source of information)

Suggestion for Additional Research

The following recommendations are crucial in light of the various issues raised in this paper regarding youth unemployment and unrest in Nigeria

- More empirical research is needed to confirm the validity of using an authentic learning strategy to develop scientific entrepreneurial skills
- Secondary and post-secondary schools in Nigeria should conduct studies on the scientific literacy of both science teachers and students

The introduction of machines for use in teaching introductory technology in junior secondary schools shouldn't be abandoned by the federal government

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