

## EMPLOYEE'S PSYCHOLOGY OF MOTIVATION AND BEHAVIOUR TOWARDS ELECTRICAL ENERGY CONSERVATION IN UNIVERSITIES IN NIGER STATE, NIGERIA

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**Abstract:** This study adopted a convergent parallel mixed methods design, where quantitative data was collected at the first stage of the study and supplemented by qualitative data in the second stage of the research. The study was carried out in Federal University of Technology Minna and Ibrahim Badamasi Babangida University Lapai, Niger State. The population of the study is 3,214 employees and 28 Lecturers from electrical and electronics technology education and electrical and electronics engineering departments. 643 of the employees were sampled using Multi-stage sampling techniques, and 20 lecturers were sampled using simple random sampling. 35 employees and five Lecturers were interviewed. The instrument used was validated by three experts to determine its validity and subjected to a reliability test. The reliability coefficient of the instrument was obtained with the use of Cronbach's alpha statistics. The outcome of the internal consistency of items was grouped into three sections, A, B, and C, representing each research questions. The results of 0.89 for section A was obtained, while sections B and C have 0.91 and 0.90 respectively. Mean, percentage, and standard deviation (SD) were used for analysis. Findings revealed that employees do not ensure the adequate practice of electrical energy saving while at the workplace. The interview conducted shows that 68% of employees' attitude toward adequate practice of electrical energy saving at workplace is somewhat untrue of them, 26% were true and 6% were untrue. They strongly agreed on the need for employers to let the staff see the need to save energy. Responses during the interview revealed that all respondents strongly agreed that employers should let their staff see the need to save energy in the workplace. It's recommended that employees should let the staff see the need to save energy and staff should be trained on electrical energy saving.

**Keywords:** Employee's, Psychology, Motivation, Energy energy, Universities

### Introduction

Energy is a critical factor for economic competitiveness and employment, and a substantial amount of it is necessary in countries experiencing rapid economic expansion. Because of economic and industrial advances, the demand for energy in emerging countries such as Nigeria has increased during the previous two decades (Li, Xu, Chen & Menassa, 2019; Adekunle, Olatunde, Sunday, Akinwale & Ayeyemitan, 2008). Energy availability has been identified as a crucial component of any nation's social, economic, and political sustainability, and as the world sees increased demand and expense of energy, there is an urgent need to limit energy use as a means of controlling cost and sustainability. Electrical energy conservation is the most effective and proper approach of improving energy efficiency by energy consumers and thereby saving energy use and GHG emissions in various domains such as residential, industrial, and commerce (Saba, Adamu, & Yisa, 2022). Electrical energy conservation is a purposeful step to reduce energy usage, it can be as simple as switching off the light when not needed and seeking for alternate energy uses that need less energy. Electrical energy conservation is a method of lowering the amount of electricity consumed through human behaviour and this can be greatly achieved through motivation (Saba, Tsado, Bukar, & Raymond, 2016). Electrical energy conservation motivation is critical for reducing electrical energy usage and waste.

Motivation is defined as the psychological processes that cause behaviour to be purposeful and directed. It is also a proclivity to act in a meaningful way to meet certain demands that are not satisfied (Ekundayo, 2018). Motivation is an internal process. It can be defined as a drive or a need, motivation is a condition inside us that desires a change, either in the self or the

environment. When we tap into electrical energy, motivation endows the person with the drive and direction needed to engage with the environment in an adaptive, open-ended, and problem-solving sort of way. Psychological needs are also significant drivers of motives as they represent inborn needs for the development of a sense of autonomy, competence, and relatedness. When we try to force ourselves to do something that contradicts those needs, these innate forces can be tough to overcome.

Motivation and behaviour psychology are exceedingly complex, and it is also becoming increasingly significant in electrical energy conservation in institutions. Workers are employed by educational institutions to carry out operations; these employees are directly accountable for energy saving in their workplace. The employer's physical presence to conserve energy by turning off lights, air conditioners, machinery, and other appliances and equipment when not in use may not be successful. Opportunities exist in smart energy management and the impact of employee awareness on their routine daily job. Employees have the ability to reduce energy waste as they observe areas where energy is wasted during their usual responsibilities (Halsell, 2014).

Elbea (1984) classified behaviour into four parts: motives, goals, activity, and feedback. Motive is the most crucial single component that represents the 'why' of the behavior. Motivations are needs that describe an individual's wants, desires, urges, and impulses, whereas behavior is awakened and maintained by motives that are directed towards the goals. Outside of individual goals, Elbea and Deere (1985) agreed that these are the perceived rewards or outcomes of a specific activity. The behavior displayed is made up of many activities, which are the tools to achieve a specific objective, and the essential component of behavior is feedback, which offers information about a specific action completed. Feedback is typically maintained in the individual's memory and utilized to evaluate future behaviors that have occurred.

Giving staff education and adequate motivation is an excellent means of obtaining good savings at a low cost. It contributes to the development of long-term and sustainable transformation. Using employees to manage electrical energy can result in additional benefits such as higher productivity and improved employee morale. People appreciate taking part in challenges that benefit the entire community (Department of Climate Change, 2012). Staff should be made more aware of;

1. why and how energy is utilized in the organization;
2. why energy conservation is vital;
3. how their everyday behavior influences energy consumption; and
4. what impact energy conservation will have on them.

Proper energy management education, such as turning off appliances, equipment, and lights when not in use, and other places where energy can be managed, is essential. Employees must be taught the 'how' and 'why' of energy conservation. Employees must also be informed of the energy problem, the potential and existing employee impact on energy use, and the promotion of energy conservation efforts. Employee energy management information will serve as a reminder of when to do things, what to do, and provide imagery on the impact of new and existing conservation initiatives. Once the significance has been established, increasing the job's energy accountability will promote energy responsibility. Internalizing incentives that link industry rewards to employee benefits would help to strengthen commitment to energy stewardship. Meaningfulness and responsibility will suffice to launch conservation action, but more is required to continue the activity, which is why feedback is critical. The feedback component completes the cycle of conservation behavior. With positive feedback from the conservation activity, the results are returned to the employees as a fulfilling, pleasant, and encouraging experience.

Feedback and reinforced energy conservation acts become internalized behaviors. Getting your employees' commitment and interest in using energy efficiently is critical to success. Staff should be taught on the importance of electrical energy conservation and how their daily behavior influences energy use (Abrahamse & Steg, 2009; Department of Climate Change, 2012). The effects of monetary incentives on energy consumption behavior have been studied, and it has been

discovered that behavioural change that occurred by such incentives does not last and diminishes over time (Abrahamse & Steg, 2009).

Electrical energy-saving behavior refers to actions taken by an individual to reduce overall electricity consumption. The following are examples of energy-saving behaviours: Restrictive behaviour. This type of behaviour conserves energy by reducing consumption. Turning off lights when not in use, lowering appliance usage, and disconnecting appliances are examples of curtailment behaviour. Electricity is the most common source of energy used in institutions of learning. As a result, the focus of this study will be on employees' electricity conservation behaviour.

### **Statement of the problem**

It is a fact that Universities uses substantial amount of electrical energy because of the nature of their daily activities. This large population constitutes high electrical energy consumption in hostels, laboratories, workshops, offices and libraries (Saba, et al., 2016) Coupled with issues of Climate change which has become more and more visible, creating significant impacts on production activities as well as the livelihood of people around the world. Countries have agreed on the necessity of changing the energy usage structure to mitigate climate change as well as promote sustainable development (Nguyen, Duong, & Do., 2021). Today's world is looking for energy solution and alternative due to the threat of energy shortage, sky rocket energy price, unsecure of energy supply and the issue of enormous wastages (Saba, et al., 2022).

A study carried out by Hong and Lin (2013) stimulated the energy consumption of typical occupant behaviours in offices and suggested that occupants who are proactive in saving energy can reduce energy use by up to 50% during working hours. In addition, Masoso and Grobler (2010) revealed that 56% of energy was wasted during non-working hours, mainly due to occupant behaviours such as leaving lights and other equipment on after work.

Energy conservation is one way to make the environment cleaner and healthier and to deal with climate change. One way to make sure energy conservation happens is for people to change how they act at home and at work (Hallsell, 2014). While energy usage in houses were paid for by the owners, energy consumption in institutions is free for employees, and since employers paid for energy used in the workplace, employees may likely waste energy since they are not involved in the payment of electrical energy used. Rising energy prices have become a key hurdle to the growth of these institutions, prompting higher education institutions worldwide to participate in energy saving (Lo, 2013). Hence the need to investigate employees' psychology of motivation, and behaviour towards electrical energy conservation in Universities in Niger State, Nigeria.

### **Purpose of the Study**

The study investigated employee psychology of motivation, and behaviour towards electrical energy conservation in tertiary institutions in Niger State, Nigeria. Specifically, the study determined the;

1. attitude of staff toward electrical energy conservation;
2. motivated techniques for employees towards electrical energy conservation; and
3. strategies for effective electrical energy conservation.

### **Research questions**

The following research questions were formulated to guide the study;

1. What are the attitudes of staff toward electrical energy conservation?
2. What are motivating techniques for employees towards electrical energy conservation?
3. What are the electrical energy savings strategies for effective electrical energy conservation?

## Hypotheses

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

H<sub>01</sub>: There is no significant difference in the mean responses of head teachers, workshop attendants and students on the extent of utilization of brick/block laying tools and equipment for skill acquisition in technical colleges in Delta State.

H<sub>02</sub>: There is no significant difference in the mean responses of head teachers, workshop attendants and students on the extent of utilization of concreting tools and equipment for skill acquisition in technical colleges in Delta State.

## Methodology

The research study adopted a mixed-methods research design. The use of quantitative and qualitative data: questionnaire was used as quantitative data, while interview was used as qualitative data. Specifically, the study adopted a convergent-parallel mixed methods design. Where quantitative data were collected at the first stage of the study and supplemented by qualitative data in the second stage of the research. The study was carried out at the Federal University of Technology Minna and Ibrahim Badamasi Babangida University Lapai, both in Niger State. The population of the study was 3,214 employees and 28 lecturers from electrical and electronics technology education and electrical and electronics engineering. 20% (643) of the employees were sampled using proportional sampling techniques, and 20 lecturers were sampled using simple random sampling. 35 employees and five lecturers were interviewed. Employees responded to research question One while electrical and electronics technology education and electrical and electronics engineering lecturers responded to research question Two and Three.

The instruments used, the questionnaire and interview were validated by three experts to determine its validity and subjected to a reliability test. The reliability coefficient was obtained with the use of Cronbach's alpha statistics. The outcome of the internal consistency of items were grouped in sections A, B, and C, representing each research question. Results of 0.89 for section A were obtained, while sections B and C have 0.91 and 0.90, respectively. This indicated that the questionnaire is reliable for use. Out of the total of 643 questionnaires distributed to the employees, 567 were retrieved, representing an 88.2% return rate. All lecturers sampled returned their questionnaires. Mean, percentage, and standard deviation (SD) were used for analysis. The decision on research questions was based on Table 1. 1.96 was used as a decision point for SD to determine the divergent opinions of employees and experts and how close their opinions were.

**Table 1: Range of Values for the Scale Utilized**

S/N	Response Option of R.Q 1	Response Option of R.Q 2 & 3	Point
1	Very true of me	VTM Strongly Agreed	SA 6.50-7.00
2	True of me	TM Agreed	A 5.50-6.49
3	Somewhat true of me	STM Somewhat Agreed	SwA 4.50-5.49
4	Neutral	N Neutral	N 3.50-4.40
5	Somewhat untrue of me	SUM Somewhat Disagree	SwD 2.50-3.49
6	Untrue of me	UM Disagreed	D 1.50-2.49
7	Very untrue of me	VUM Strongly Disagreed	SD 0.50-1.49

## Results

**Table 2: Mean responses of University employees on their attitude towards electrical energy conservation in workplace**

SN	Attitudes: I	$\bar{x}$	SD	RMK
1	ensure adequate practice of electrical energy saving while at work place	5.23	0.11	SUM
2	prefer using natural light during the day than switching on electric bulb	4.78	0.09	STM
3	always switch off the light while leaving the office	3.34	0.76	SUM
4	make sure students switch off bulbs and fan when leaving the classroom	2.31	1.01	UM
5	usually closed the door and window when AC is switch on	5.76	0.03	TM
6	conserve electricity more at home compare to workplace	6.72	0.08	VTM
7	usually switched off machine while taken measurement on work piece	5.09	0.23	STM
8	cross check to ensure all appliances are switched off at closing time	5.26	0.45	STM
9	used A. C only when the air from fan is inadequate	3.23	0.12	SUM
10	think electric energy saving is important to me	4.52	0.00	STM
11	am conscious that wasting energy at workplace affect me, family and planet	3.41	0.06	SUM

The result of the study revealed that the employee's attitudes towards energy conservation are somewhat true; items 2, 7, 8, and 10 show that employees' attitudes are somewhat true; items 1, 3, 9, and 11 are somewhat untrue; their attitudes on item 4 are untrue; item 5 is true; and item 6 revealed that the employees conserve electricity more at home than at the workplace. The SD of the respondents was less than 1.96; this indicated that their responses were close to one another, which added value to the reliability of the mean. The interview conducted shows that 68% of employees' attitudes toward ensuring adequate practice of electrical energy saving while at work are somewhat untrue; 26% were true, and 6% were untrue. 48% said they always switch off the light while leaving the office, while 52% do not switch off the light when leaving the office. 63% never switch off the machine while measuring a work piece, whereas 37% always switch off the machine while measuring a work piece. 95% of employees responded that they conserve electricity more at home than at the workplace. 32% of employees were aware that wasting energy at work affects them, their families, and the environment, while 68% were not.

**Table 3: Mean responses of electrical and electronics technology and engineering lecturers on motivation techniques towards electrical energy conservation in workplace by employees**

SN	Items	$\bar{x}$	SD	RMK
1	Let the staff see need to save energy	6.67	0.00	SA
2	Train staff on electric energy saving techniques	6.08	0.12	A
3	Educating workers on need of energy conservation	6.87	0.09	SA
4	The staff be asked to provide innovative ideas to save energy	5.97	0.00	A
5	Ask staff to review their own workstation or practices of energy savings	6.01	0.01	A
6	Have a written energy policy and including energy saving responsibilities in job descriptions	6.52	0.08	SA
7	Send practical tips and reminders for energy conservation in staff emails	6.78	0.07	SA
8	Creating an office policy on energy use	6.35	0.87	A
9	Monitor the energy use	6.09	0.56	A
10	communicate the achievements to staff by using newsletters, notice boards	5.88	0.67	A
11	perform spot checks of different areas to identify energy "infractions" or best practices.	6.10	0.02	A
12	Reward unit or department imbibed on energy saving during spot checks	6.61	0.03	SA

The responses of electrical and electronics technology and engineering lecturers on motivation techniques towards electrical energy conservation in the workplace by employees revealed that they strongly agreed with items 1, 3, 6, 7, and 12 and agreed with other items. The SD of the respondents was less than 1.96. This indicated that their responses were close to one another, which added value to the reliability of the mean. Responses during the interview revealed that 100% of respondents strongly agreed that employers should let the staff know they need to save energy. 75% said there is a need to create an office policy on energy use; 100% of them said employers should always send practical tips and reminders for energy conservation in staff emails; 75% agreed that employers should always perform spot checks of different areas to identify energy "infractions" or best practices; and 100% also agreed that units or departments that achieved energy savings during spot checks should be rewarded.

**Table 4: Mean responses of electrical and electronics technology and engineering lecturers on electrical energy savings strategies for effective electrical energy conservation in workplace by employees**

SN	Items	$\bar{x}$	SD	RMK
1	Regular usage of natural day lighting	6.56	0.04	SA
2	Utilization of minimum wattage lamp to provide required light	6.87	0.11	SA
3	Turn off all lights not in use	6.68	0.00	SA
4	Keep lamps and fixtures clean	6.76	0.23	SA
5	Regular usage of task lighting on the work	6.61	0.15	SA
6	Provide a space for vent well positioning refrigerator	6.77	0.56	SA
7	Switching off machine immediately after use	6.82	0.85	SA
8	Avoid usage of fan and A.C at the same time.	6.59	0.76	SA
9	Ensure the openings are closed when A.C is on	6.72	0.31	SA
10	Switch off machine when taken measurement on the work piece.	6.43	0.00	A
11	Boiling the quantity of water needed	6.01	0.90	A

The respondents strongly agreed with all items except items 10 and 11, which they rated agreeable. The SD of the respondents was less than 1.96. This indicated that their responses were close to one another, which added value to the reliability of the mean. The result of the interview revealed that they strongly agreed with all items as electrical energy savings tips for effective electrical energy conservation. They also suggested that strategies such as punishing any staff, unit, or department that wastes electrical energy and providing constant education on energy savings during meetings should be encouraged.

## Discussion

Attitude of staff toward electrical energy conservation is such that they ensure adequate practice of electrical energy saving while at work and prefer to switch off the light while leaving the office. revealed something somewhat untrue about them. Meaning that the attitude of staff toward conserving electricity in the offices is not good, and that might have led to significant energy wastages. This is in harmony with a study carried out by Masoso and Grobler (2010), who found that 56% of energy was wasted during non-working hours, mainly due to occupant behaviors like leaving lights and other equipment on after work. In addition, Zhiyuan, Hong, and Chou (2021) observed that during the unoccupied time, the wasteful style assumed occupants would keep lights on for convenience. The moderate and austere styles assumed occupants would always switch off lights upon leaving. This is based on the truth that 94% of participants in the survey reported they would like to do so, though they may forget in practice.

On motivating techniques for employees towards electrical energy conservation. The findings show that there is a great need to educate workers on the need for energy conservation, and the staff should see the need to save energy. This agrees with the study conducted by Han, De, Blokhuis, and Schaefer (2013), as they believe that the lack of energy saving knowledge is one of the reasons for residents' energy consumption behaviours. Researchers took Dutch households as objects to discuss their energy-saving behaviors. The results show that energy-saving behavior is

largely determined by knowledge. Frick, Kaiser, and Wilson (2004) have reached the same conclusion: environmental knowledge can significantly promote the transformation of residents' awareness of environmental behaviour into specific environmental behaviour. The wastage of electricity can be reduced significantly if people are aware of electrical energy management practices. Raising energy awareness is very important in energy management. As awareness is the seed of tomorrow's change, Electrical energy savings strategies for effective electrical energy conservation include turning off all lights not in use, regular usage of task lighting at work, keeping lamps and fixtures clean, and many others. Saba et al. (2016), which confirmed that electricity users were Aware, that switching off equipment when not in use saves electricity. Furthermore, wastages of electrical energy in residential buildings and offices are due to the reduced sensation of guilt among electricity users. The idea that people who usually leave their lights on during the daytime, especially outdoor lights, are doing so not because of a lack of awareness of the waste that results from such acts but because they are applying the right behaviour towards electrical energy management practices.

## Conclusion

Employees' motivation towards electrical energy conservation in universities is very important as universities spend a significant amount of money to pay electricity bills. The study revealed that employees' attitudes towards electrical energy conservation in the workplace are not positive, as many of the staff do not ensure adequate practice of electrical energy saving while at work and do not make it a habit to switch off the light while leaving the office. To ensure the right attitudes toward electrical energy savings, they need to be motivated by educating the staff to see the need to save energy, performing spot checks of different areas to identify energy "infractions" or best practices, and rewarding the unit or department that imbibed energy saving during spot checks. The more positive an employee's attitude toward energy savings, the more likely he or she is to be motivated to perform that behaviour.

## Recommendations

1. The employees should apply the right attitude towards energy usage in the workplace; they should see the workplace as their residents.
2. Employers should ensure that their employees are well educated on the need to save energy through regular training and retraining.
3. Employers should perform spot checks of different areas to identify energy "infractions" or best practices and reward units or departments that achieve energy savings during spot checks. This will motivate staff to imbibe energy savings in their various offices.

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