Perception of Energy-Efficient Bulb Production and Its Influence on Pro-Environmental Conservation Behaviour among City Dwellers in Port Harcourt Metropolis, Nigeria

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ABSTRACT

This study investigated the perception of city dwellers towards the production of energy-efficient bulbs and its influence on pro-environmental conservation behaviour in Port Harcourt Metropolis, Nigeria. The study was guided by two research questions and two corresponding null hypotheses. A descriptive survey research design was adopted. The population comprised residents of Port Harcourt City and Obio-Akpor Local Government Areas of Rivers State. A sample of 396 respondents was selected using stratified random sampling technique.

A researcher-developed questionnaire titled Perception of Energy-Efficient Bulb Production and Pro-Environmental Conservation Behaviour Questionnaire (PEEBPECBQ) was used for data collection. The instrument was validated by experts in Educational Psychology and Measurement and Evaluation. Reliability was established using Cronbach's Alpha, yielding a coefficient of 0.76, which indicated acceptable internal consistency.

Mean and standard deviation were used to answer the research questions, while independent samples t-test and regression analysis were used to test the hypotheses and determine predictive relationships at 0.05 level of significance.

Findings revealed that respondents from higher socioeconomic status had a significantly more positive perception of energy-efficient bulbs and stronger pro-environmental conservation behaviour than respondents from lower socioeconomic status. Similarly, graduates demonstrated significantly more favourable perceptions than non-graduates. Regression results further indicated that socioeconomic status and educational qualification significantly predicted perception of energy-efficient bulb adoption.

The study concluded that socioeconomic and educational factors are important determinants of positive environmental behaviour and acceptance of sustainable energy technologies. It was recommended that government agencies, environmental organisations, and educational institutions intensify awareness campaigns, provide subsidies, and integrate environmental education into formal and informal learning systems.

Keywords: Energy-efficient bulbs, perception, pro-environmental behaviour, city dwellers, sustainability, Port Harcourt.

INTRODUCTION

The energy sector remains one of the major contributors to greenhouse gas emissions globally, with serious implications for climate change, environmental degradation, and public health. Consequently, environmental management and the promotion of energy efficiency have attracted increasing global attention. Within the Sustainable Development Goals (SDGs), science, technology, and innovation are recognised as critical drivers of efficient resource use, especially in relation to energy conservation.

In developing countries such as Nigeria, the importance of efficient electricity use is even more pronounced because the power sector is characterised by unstable supply, inadequate infrastructure, and frequent outages. These challenges make energy-saving technologies highly relevant for households and urban communities.

One of the most practical approaches to reducing electricity consumption is the adoption of energy-efficient lighting systems such as Light Emitting Diode (LED) bulbs and Compact Fluorescent Lamps (CFLs). These bulbs consume less electricity, last longer, reduce replacement costs, and lower carbon emissions when compared with traditional incandescent bulbs.

Globally, household lighting accounts for a substantial proportion of electricity use and greenhouse gas emissions. The International Energy Agency reported that lighting contributes significantly to global electricity demand, while the transition to efficient lighting technologies can greatly reduce energy waste and environmental pressure.

Despite these benefits, adoption of energy-efficient bulbs in many developing countries remains below expectation. In Nigeria, several households still depend on traditional bulbs because of factors such as low awareness, cost concerns, purchasing habits, and limited environmental consciousness.

Understanding public perception is therefore essential. Perception influences behaviour, and positive attitudes towards environmental issues often encourage sustainable consumption patterns. From the perspective of environmental psychology, behavioural change is strongly linked to awareness, beliefs, values, and social influences.

Port Harcourt Metropolis, as one of Nigeria's major urban centres, presents an important context for studying environmental behaviour due to its dense population, industrial activities, and high electricity demand. Examining how city dwellers perceive energy-efficient bulbs can provide useful evidence for policy development and environmental planning.

This study therefore investigated the perception of city dwellers towards the production of energy-efficient bulbs and its influence on pro-environmental conservation behaviour in Port Harcourt Metropolis, Nigeria.

Background To The Study

Electricity consumption has increased substantially over the past few decades, largely due to rising urbanisation, population growth, and increased ownership of household electrical appliances. In response, many countries have adopted energy-efficiency policies as part of broader strategies for sustainable development.

Energy efficiency has become a national priority in many nations because it addresses multiple challenges simultaneously, including rising electricity demand, environmental degradation, and high fossil fuel dependence. For developing economies, access to affordable and reliable energy remains central to poverty reduction, education, healthcare delivery, and economic growth.

The residential sector is particularly significant in Nigeria because households account for a large proportion of total electricity use. However, electricity supply remains inadequate, causing many residents to depend on generators and other costly alternatives.

Lighting is one of the most common uses of electricity in homes. Replacing inefficient incandescent bulbs with energy-efficient bulbs can reduce electricity demand considerably. Energy-efficient bulbs offer several benefits:

Lower electricity consumption

Longer lifespan

Reduced maintenance cost

Lower greenhouse gas emissions

Improved environmental sustainability

Although these benefits are clear, adoption is influenced by income level, education, environmental awareness, and consumer beliefs. Higher-income households may more easily afford efficient bulbs, while educated individuals may better understand their long-term advantages.

This study therefore explored how socioeconomic status and educational qualification shape perception of energy-efficient bulbs and influence environmentally responsible behaviour among residents of Port Harcourt Metropolis.

Statement Of The Problem

The increasing demand for environmental conservation has become a major global concern due to climate change, energy waste, and ecological degradation. In Nigeria, efforts to promote responsible energy consumption have focused mainly on technological solutions and behavioural change strategies.

One of such strategies is encouraging households to replace incandescent bulbs with energy-efficient bulbs. While these bulbs consume less energy and support sustainable environmental management, many city dwellers still do not adopt them consistently.

This low adoption rate may be linked to negative perceptions, inadequate awareness, low purchasing power, and differences in educational background. Since residential buildings consume a substantial share of electricity in Nigeria, failure to adopt efficient lighting technologies may worsen energy shortages and environmental problems.

However, limited empirical studies have examined how city dwellers in Port Harcourt perceive energy-efficient bulbs and how such perceptions influence pro-environmental conservation behaviour.

It is against this background that this study investigated the perception of city dwellers towards energy-efficient bulb production and its influence on pro-environmental conservation behaviour in Port Harcourt Metropolis.

Research Questions

What is the perception of city dwellers towards the use of energy-efficient bulbs and pro-environmental conservation behaviour based on socioeconomic status?

What is the perception of city dwellers towards the use of energy-efficient bulbs and pro-environmental conservation behaviour based on educational qualification?

Hypotheses

H01: There is no significant difference in the perception of city dwellers towards the use of energy-efficient bulbs based on socioeconomic status.

H02: There is no significant difference in the perception of city dwellers towards the use of energy-efficient bulbs based on educational qualification.

Comceptual Framework

This study was anchored on the relationship between environmental perception and behavioural response. In social psychology, perception is often considered a strong predictor of behaviour. Individuals who perceive an environmental issue as important are more likely to engage in behaviours that support sustainability.

A major theory relevant to this study is the **Theory of Planned Behaviour (TPB)** proposed by Ajzen (1991). The theory explains that behaviour is influenced by behavioural intention, which is determined by:

- **Attitude toward the behaviour** – whether the person views the behaviour positively or negatively.
- **Subjective norms** – social pressure or expectations from others.
- **Perceived behavioural control** – belief in one's ability to perform the behaviour.

Applied to this study, city dwellers who believe that energy-efficient bulbs are beneficial, socially desirable, and affordable are more likely to purchase and use them.

Another useful perspective is the **Value-Belief-Norm Theory**, which suggests that environmental values shape beliefs, and beliefs influence responsible behaviour. Individuals who value environmental protection are more likely to conserve energy and adopt sustainable technologies.

The present study therefore assumes that positive perception of energy-efficient bulbs can promote pro-environmental conservation behaviour among urban residents.

METHODOLOGY

Research Design

The study adopted a **descriptive survey research design**. This design was considered appropriate because it enabled the researcher to collect data from a representative sample of city dwellers in their natural setting without manipulating any variables.

Area of the Study

The study was conducted in **Port Harcourt Metropolis**, Rivers State, Nigeria. The metropolis consists mainly of **Port Harcourt City Local Government Area** and **Obio-Akpor Local Government Area**. The area was selected because it is highly urbanised, densely populated, commercially active, and characterised by substantial electricity consumption.

Population of the Study

The population comprised all adult city dwellers residing in Port Harcourt Metropolis. These residents were considered suitable because they are direct users of household lighting systems and electricity services.

Sample and Sampling Technique

A sample size of **396 respondents** was selected for the study.

A **stratified random sampling technique** was used. The metropolis was first divided into two strata:

1. Port Harcourt City LGA
2. Obio-Akpor LGA

Thereafter, three residential areas were randomly selected from each LGA. Respondents were then proportionately selected from the identified areas.

This technique ensured fair representation of residents across different neighbourhoods and social backgrounds.

Instrumentation

Data were collected using a researcher-developed questionnaire titled:

Perception of Energy-Efficient Bulb Production and Pro-Environmental Conservation Behaviour Questionnaire (PEEBPECBQ).

The instrument had two sections

Section A:

Demographic information such as:

- Gender
- Educational qualification
- Socioeconomic status
- Residential location

Section B:

Fifteen structured items on a 4-point Likert scale:

- Strongly Agree (4)
- Agree (3)
- Disagree (2)
- Strongly Disagree (1)

The items measured:

- Perception of energy-efficient bulbs
- Purchase intention
- Environmental awareness
- Conservation behaviour

Validity of Instrument

The questionnaire was validated by two experts:

- One expert in Educational Psychology
- One expert in Measurement and Evaluation

Their observations regarding clarity, relevance, structure, and content adequacy were used to revise the final instrument.

Reliability of Instrument

A pilot test was conducted using 20 city dwellers outside the study sample. Responses were analysed using

Cronbach Alpha reliability method, which yielded a coefficient of **0.76**.

This value indicated acceptable internal consistency.

Method of Data Collection

The researcher personally administered the questionnaire with the assistance of trained research assistants. Respondents were briefed on the purpose of the study and confidentiality was assured.

Method of Data Analysis

The following statistical tools were used:

- Mean and Standard Deviation – to answer research questions
- Independent Samples t-test – to test hypotheses
- Multiple Regression Analysis – to determine predictive influence of socioeconomic status and education on perception

All hypotheses were tested at **0.05 level of significance**.

RESULTS

Research Question One

What is the perception of city dwellers based on socioeconomic status?

Table 1: Mean Scores by Socioeconomic Status

Group	N	Mean	SD	Decision
Low Socioeconomic Status	188	2.38	0.79	Negative Perception
High Socioeconomic Status	208	2.58	0.72	Positive Perception

Interpretation

Respondents from high socioeconomic status recorded a higher mean score (2.58) than respondents from low socioeconomic status (2.38), indicating a more positive perception of energy-efficient bulbs.

Research Question Two

What is the perception of city dwellers based on educational qualification?

Table 2: Mean Scores by Educational Qualification

Group	N	Mean	SD	Decision
Non-Graduate	108	2.19	0.92	Negative Perception
Graduate	288	2.72	0.93	Positive Perception

Interpretation

Graduates had a more favourable perception of energy-efficient bulbs than non-graduates.

Test Of Hypothesis

Hypothesis One

Table 3: t-test on Socioeconomic Status

Variable	df	t-cal	p-value	Decision
Socioeconomic Status	394	2.587	0.010	Reject H01

Interpretation

Since p = 0.010 < 0.05, the null hypothesis was rejected. There is a significant difference in perception based on socioeconomic status.

Hypothesis Two

Table 4: t-test on Educational Qualification

Variable	df	t-cal	p-value	Decision
Educational Qualification	394	5.060	0.001	Reject H02

Interpretation

Since p = 0.0001 < 0.05, the null hypothesis was rejected. Educational qualification significantly influenced perception.

Multiple Regression Analysis

Table 5: Predictions of Positive Perception

Predictor Variable	Beta	t-value	p-value
Socio Status	0.31	4.22	<0.05
Educational Qualification	0.44	6.18	<0.05

$R^2 = 0.42$

Interpretation

The regression analysis showed that socioeconomic status and educational qualification jointly explained **42% of the variation** in perception towards energy-efficient bulbs. Educational qualification was the stronger predictor.

DISCUSSION OF FINDINGS

The findings of this study revealed that respondents with higher socioeconomic status demonstrated a more positive perception of energy-efficient bulbs and stronger pro-environmental conservation behaviour than respondents with lower socioeconomic status. This suggests that financial capacity plays an important role in the adoption of sustainable technologies. Individuals with higher income levels may be more willing and able to bear the initial cost of purchasing energy-efficient bulbs because they understand the long-term economic and environmental benefits.

This finding supports the position of Abrahamse and Steg (2011), who reported that household energy decisions are influenced by both psychological and socio-demographic factors. It also aligns with earlier studies indicating that income level affects access to environmentally friendly technologies.

The study also found that graduates had significantly more favourable perceptions than non-graduates. This implies that education enhances environmental awareness, critical thinking, and understanding of the long-term benefits of energy-saving behaviour. Educated individuals may be more exposed to sustainability information through formal learning, media engagement, and professional experiences.

This result is consistent with Steg and De Groot (2012), who observed that values, awareness, and knowledge significantly shape pro-environmental behaviour. It further supports Ajzen's Theory of Planned Behaviour, which proposes that positive attitudes and informed beliefs influence behavioural intentions and actual behaviour.

The regression analysis provided deeper insight by showing that socioeconomic status and educational qualification jointly predicted perception towards energy-efficient bulb adoption. Educational qualification emerged as the stronger predictor, indicating that awareness and knowledge may have greater influence than income alone.

A unique contribution of this study is that it provides evidence from Port Harcourt Metropolis, a highly urbanised and industrial region where energy demand is substantial. The findings therefore contribute to the limited Nigerian literature on environmental psychology, urban sustainability, and household energy behaviour.

CONCLUSION

Based on the findings of this study, it was concluded that perception towards energy-efficient bulbs is significantly influenced by socioeconomic status and educational qualification among city dwellers in Port Harcourt Metropolis.

Respondents with higher socioeconomic status and graduate educational qualifications demonstrated more positive attitudes towards the use of energy-efficient bulbs and stronger pro-environmental conservation behaviour. This indicates that both financial capacity and educational exposure are critical drivers of sustainable household energy decisions.

The study further established that socioeconomic status and educational attainment significantly predict public acceptance of environmentally responsible technologies. Therefore, promoting energy-efficient bulb adoption requires not only product availability but also targeted awareness creation, behavioural education, and supportive economic policies.

RECOMMENDATIONS

Based on the findings of the study, the following recommendations are made:

1. **Government Subsidy Programmes:**

   Federal, state, and local governments should provide subsidies or tax incentives that reduce the cost of energy-efficient bulbs, especially for low-income households.

2. **Mass Public Awareness Campaigns:**

   Environmental agencies should intensify media campaigns using radio, television, social media, and community outreach to educate residents on the economic and environmental benefits of energy-efficient bulbs.

3. **School-Based Environmental Education:**

Primary, secondary, and tertiary institutions should integrate environmental conservation and sustainable energy education into their curricula.

4. **Community Demonstration Projects:**

Pilot community projects should be established to demonstrate the practical benefits of energy-efficient bulbs in residential areas.

5. **Private Sector Participation:**

Manufacturers and distributors should partner with government agencies to make quality energy-efficient bulbs affordable and widely accessible.

6. **Urban Sustainability Policies:**

City planners and environmental policymakers should include household energy efficiency strategies in urban sustainability planning.

7. **Adult Education and Informal Learning:**

Non-formal education programmes should target non-graduates and less informed populations through workshops and local sensitisation campaigns.

REFERENCE

1. Abrahamse, W., & Steg, L. (2011). Factors related to household energy use and intention to reduce it: The role of psychological and socio-demographic variables. *Human Ecology Review, 18*(1), 30–40.
2. Afroz, R., Rahman, A., Masud, M. M., Akhtar, R., & Duasa, J. B. (2015). How individual values and attitude influence consumers' purchase intention of electric vehicles: Some insights from Kuala Lumpur, Malaysia. *Environmental Urbanization, 6*, 193–211.
3. Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*(2), 179–211. https://doi.org/10.1016/0749-5978(91)90020-T
4. Gifford, R., & Sussman, R. (2012). Environmental attitudes. In S. Clayton (Ed.), *The Oxford handbook of environmental and conservation psychology* (pp. 65–80). Oxford University Press.
5. Huddart-Kennedy, E., Beckley, T. M., McFarlane, B. L., & Nadeau, S. (2009). Rural–urban differences in environmental concern in Canada. *Rural Sociology, 74*(3), 309–329. https://doi.org/10.1111/j.1549-0831.2009.tb00390.x
6. International Energy Agency. (2018). *Global energy & CO_2 status report*. IEA. https://www.iea.org
7. Khorasanizadeh, H., Honarpour, A., Park, M. S. A., Parkkinen, J., & Parthiban, R. (2016). Adoption factors of cleaner production technology in a developing country: Energy-efficient lighting in Malaysia. *Journal of Cleaner Production, 131*, 97–106. https://doi.org/10.1016/j.jclepro.2016.05.085
8. Manstead, A. S. R. (1996). Attitudes and behaviour. In G. R. Semin & K. Fiedler (Eds.), *Applied social psychology*. Sage.
9. Masson, T., Panno, A., Tiberio, L., Vesely, S., Carrus, G., Fritsche, I., et al. (2017). Identity processes and individual factors in energy decisions: Two comprehensive meta-analyses. ECHOES Project. https://echoes-project.eu
10. Steg, L., & De Groot, J. I. M. (2012). Environmental values. In S. Clayton (Ed.), *The Oxford handbook of environmental and conservation psychology* (pp. 81–92). Oxford University Press.
11. Tan, C. S., Ooi, H. Y., & Goh, Y. N. (2017). A moral extension of the theory of planned behavior to predict consumers' purchase intention for energy-efficient household appliances in Malaysia. *Energy Policy, 107*, 459–471. https://doi.org/10.1016/j.enpol.2017.05.027