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DEVELOPMENT OF ELECTRICAL ENERGY MANAGEMENT MODULE FOR TRAINING EMPLOYEES AND STUDENTS OF FEDERAL UNIVERSITY OF TECHNOLOGY MINNA

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Abstract: *Developmental research design was adopted for this study. The researchers employed the ADDIE (Analysis, Design, Development, Implement, Evaluate) Model in building the instructional module. Three research questions guided the study, that is the objectives and the contents of electrical energy management included in module and also the experts' assessment on the developed module of electrical energy management in terms of: objectives; content; organization; evaluation of instruction; terminologies and language. The population of the experts' 27 which cut across Electrical Technology Education, Electrical Engineering and Educational Technology from Federal University of Technology (FUT) Minna. 15 experts were sampled to assessed research instrument and developed module on electrical energy management. The two-set of questionnaire instrument were administered at different times and were analyse using mean and standard deviation. The grand mean of the expert's assessment of the objectives and contents used in development of the electrical energy management module were 4.53 and 4.60, which mean absolutely appropriates. The composite mean score of 4.62 with the adjectival description very good was gained by the instructional learning modules. The results shows that the instructional learning modules were highly accepted by the experts to be used for training. It is recommended that the developed training module on electrical energy management should be used for training employees and students of FUT Minna.*
Keywords: *Electrical energy management module, training, employees and students*

Introduction

Universities exist as institutions for the creation and dispersion of knowledge and research outputs which are the master key to economic development and globalization. To perform these notable functions, Universities must intensify research activities in all disciplines offered in the institutions. 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 electric energy consumption in hostels, laboratories, workshops, offices and libraries (Edison, 2023; 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 *et al.,* 2021).

This in turn calls for modern science and technology research facilities which are relatively expensive and has become a major challenge especially in developing economies. In the process of teaching and research, universities consume a substantial amount of electric energy and this means that large proportions of their budgets are used to pay electricity bills (Edison, 2023). An energy-literate individual is characterized as one who is cognizant and knowledgeable; understands energy use in daily life, the impact of energy overconsumption on the society and environment, and the need for energy conservation and alternative energy resource development; can make appropriate energy choices and decisions; and can take actions reflecting one's skills and action for a sustainable society (Arya & Chaturvedi, 2020, Umoh, & Bande, 2021). Thus, it can be argued that energy literacy is a common ability that is fostered by energy education to overcome energy challenges in the world (Saba *et al.,* 2022).

Electrical energy conservation and efficiency is also seen as a major factor that can reduce changes in climate and policies in energy sector in many countries of the world, especially in Nigeria where the demand for electricity is increasing rapidly. Electrical energy efficiency and conservation is a purposeful step to reduce energy usage, it is the most effective and proper approach of improving energy usage by energy consumers and thereby saving energy use and reduction of GHG emissions in various domains such as university, residential, industrial, and commerce. 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 employees and students' behaviour and this can be greatly achieved through motivation (Saba, *et al.* 2023).

The theory of planned behaviour developed by Ajzen in 1985, measure how human actions are directed. It foretells the event of certain behaviour, provided that such behaviour is intention (Ajzen, 1991). The theory recommended that human behaviour directly proportional to intention of the people that perform such act of behaviour. Intention is predicted by personal attitude and subjective norms (Abrahamse & Steg, 2011). They also agreed that, behaviour can be checked by one's perceived behavioural that is controlled, defined as personal view of their ability or feelings of self-efficacy to perform behaviour. Abrahamse and Steg (2011) explained that, the closest indication of behaviour is the act to perform the behaviour in question. Behavioural intentions are ways which human beings are eager to perform the questioned behaviour.

The employees and students also need to be aware on the knowledge of energy problem, the potential and actual employees and students impact on energy use and publicity of energy conservation progress (Fatoki, 2022). Information to employees on energy management will serve as a reminder on when to do things, the things to be done and give imagery on the impact of new and ongoing conservation activities (Saba *et al.,* 2023; Ekundayo, 2018). A well-designed structure and equipped with efficient technology features, but if the users of that structures lack knowledge of electrical energy management, the efficiency of the structures would not be guaranty thereby may lead to electrical energy wastages (Mansur, *et al,* 2024). Hence the need for training energy users using training module.

A training module is an instructional guide primarily used for teaching and learning step-by-step procedures, Training modules also can be used to present more factual information. In relation to this study training module is a self-contained unit of instructional contents that focuses on electrical energy management in university system. It is designed to deliver targeted learning objectives, providing learners with the necessary knowledge, skills, and information related to electrical energy management.

Statement of Research Problem

Electrical energy presents a crucial resource for daily operations of every university. It has recently become one of the key aspects that universities should improve and keep monitoring, due to the related high economic costs and the significant environmental impacts, to which today's society is paying more and more attention.

Universities are struggling to cope with high electricity bills, for instance, before the new tariff, Nigeria universities were paying around N1bn annually, but now the cost has risen to N4bn per annum (Edema, 2024). The questions before us. How are they supposed to find such funds? How much is being allocated to universities for their overhead budgets? If nothing is done to rescue the universities from high cost of electrical energy used, the costs will be transferred to students as user charges, amounting to N80,000 per student. Alternatively, universities will have to limit their operations to four hours a day (Edema, 2024).

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). FUT Minna paid millions of naira monthly for electricity bills. Tsado (2014) pointed out that there are rich chances to save 70% to 90% of energy and cost for running fan, lighting, electric pump systems; 60% in areas such as heating and cooling systems, office electric equipment/appliances and 50% for electric motor through proper adoption electrical energy

management practices. When the module is been developed and used to trained university employees and students it will have a great and long-lasting impact. Awareness is noted to be the seed of tomorrow's change. Specifically, the study will have direct and indirect benefits to University, Government and society. The training will help to: drastically reduce electrical power consumption thereby increase access to electricity; reductions in university energy bills.; reductions in the need for new power plant, transmission and distribution networks and reduction in air pollution and environmental degradation through the use of generators.

Purpose of the Study

Development of electrical energy management module for training employees and students of Federal University of Technology Minna. Specifically, the study is to determine;

1. The objectives of electrical energy management to be included in module for training employees and students in FUT Minna.

2. The contents of Electrical energy management to be included in module for training employees and students in FUT Minna.

3. Expert's assessment of developed electrical energy management module for training employees and students in FUT Minna.

Research Questions

The sought the answer on the following questions;

1. What are the objectives of electrical energy management to be included in module for training employees and students in FUT Minna?
2. What are the contents of Electrical energy management to be included in module for training employees and students in FUT Minna?
3. What is the experts' assessment on the developed module of electrical energy management in terms of: objectives; content; organization; evaluation of instruction; terminologies and language?

Methodology

The developmental research design was used for this study. A developmental research design is a systematic study of creating, developing, and assessing educational programmes, procedures, and products that must meet internal consistency and effectiveness requirements. In the realm of instructional technology, developmental research is especially essential. The researchers employed the ADDIE (Analysis, Design, Development, Implement, Evaluate) Model in building the instructional module on the different lessons under the subject in order to establish an empirical basis for producing self-instructional modules. The ADDIE model is often used to describe a systematic approach to instructional development (Dechavez, 2023).

The purpose of this model is to produce teaching designs and learning materials so that the delivery of teaching will be more effective and efficient. This model can be used for various forms of product development in learning activities such as learning strategies, learning methods, media and teaching materials (Dechavez, 2023). Step 1- Analysis; The researchers read different books, study modules, journals and unpublished materials in order to gather relevant information on the need of the module and content of the learning modules. Step 2- Design; after reading all the related literature, the development will go to design stage, state the objectives and contents of the module. This an important aspect of design stage of research based on educational product. The experts assessed the objectives and contents before development of draft module. Step 3. Development: The developed module was subjected to assessment in terms of objectives; content; organization; evaluation of instruction; terminologies and language to determine is validity.

The population of the experts 27 which cut across Electrical Technology Education, Electrical Engineering and Educational Technology from Federal University of Technology Minna. 15 experts were sampled to assessed research instrument and developed module on electrical energy

management. The two-set of questionnaire instrument were administered to at different times. To provide answers to the questions raised in the research, the research instrument were scaled as Absolutely Appropriate (AA) 5; Appropriate (A) 4; Slightly Appropriate (SA) 3; Inappropriate (I) 2; Neutral (N) 1. Very Good (VG) 5; Good (G) 4; Fair (F) 3; Poor (P) 2 and Very Poor (VP) 1. Descriptive statistical tools (mean and standard deviation) were utilized. Real lower and upper limits numeration value range displayed in Table 1 was utilized in deciding on taking judgement on the questions raised for the research work. The nearness to the respondent's opinion towards the mean was ascertained utilizing the Standard Deviation (SD) statistical tool. In this approach, if an item is having SD of below 2.13 showing that the respondents were close to each other in their opinion. Also, if an item has SD which is the same or more than 2.13; it indicates that the respondent's opinions were far apart from the mean.

Table 1: The Real lower and upper limits numeration value range

S/N	Adjectival Rating	Acronym	Adjectival Rating	Acronym	Value
1	Absolutely Appropriate	AA	Very Good	VG	4.50 – 5.00
2	Appropriate	A	Good	G	3.50 – 4.49
3	Slightly Appropriate	SA	Fair	F	2.50 – 3.49
4	Inappropriate	I	Poor	P	1.50 – 2.49
5	Neutral	N	Very Poor	VP	1.00 – 1.49

Results

Table 2: Objectives of electrical energy management to be included in module for training employees and students in FUT Minna.

S/N	Items	Mean	S.D	Remark
	At the end of the training the learners should be able to explain:			
1	Basic Principles of Energy	4.93	.258	Absolutely Appropriate
2	Basic Principles of Electrical Energy	4.60	.632	Absolutely Appropriate
3	Electrical Energy Management	4.13	.639	Appropriate
4	Energy Management in Lighting	4.27	.457	Appropriate
5	Electrical Energy Management of Electric Motor	4.60	.737	Absolutely Appropriate
6	Maintenance of Electrical Equipment	4.47	.743	Appropriate
7	Electrical Energy Audit	4.47	.743	Appropriate
8	Basic Electrical Hazard and Safety	4.73	.458	Absolutely Appropriate
9	Barriers and Techniques of Electrical Energy Management in University	4.60	.507	Absolutely Appropriate
	Grand Mean	**4.53**		**Absolutely Appropriate**

The result of Table 2 revealed that the experts adjudged objectives 1, 2, 5, 7 and 8 to be Absolutely Appropriate and other objectives were adjudged to be appropriate. The grand mean is 4.53 which is absolutely appropriate to be used in developing the contents of electrical energy management module for training employees and students of FUT Minna. All the S. D. are less than 2.13 which signify that there is no divergent opinion from the respondents.

Table 3: Contents of Electrical energy management to be included in module for training employees and students in FUT Minna.

S/N	Items	Mean	S.D	Remark
	Basic Principles of Energy			
1	Concept of energy	5.00	.000	Absolutely Appropriate
2	Forms of Energy	4.07	.258	Appropriate
3	Sources of Energy	4.33	.799	Appropriate

4	Renewable Energy Technologies	4.87	.899	Appropriate
	Basic Principles of Electrical Energy			
5	Concept of electrical energy	5.00	.000	Absolutely Appropriate
6	concept of voltage, current and resistance	4.07	.258	Appropriate
7	Electrical energy and power	4.67	.799	Absolutely Appropriate
	Electrical Energy Management			
8	Technological approach to electrical energy management	4.67	.488	Absolutely Appropriate
9	Behavioural approach to electrical energy management	5.00	.000	Absolutely Appropriate
10	Behaviour related practices on electrical equipment	4.27	.458	Appropriate
	Electrical Energy Management of Lighting Systems			
11	Lighting systems	5.00	.000	Absolutely Appropriate
12	Efficacy of lighting system	4.60	.737	Absolutely Appropriate
13	Types of lighting systems	4.20	.414	Appropriate
14	Control of lighting systems	4.53	.516	Absolutely Appropriate
15	Types of luminaries	4.53	.743	Absolutely Appropriate
16	Steps of reducing energy wastages in lighting	4.60	.738	Absolutely Appropriate
	Electrical Energy Management of Electric Motor			
17	Electric motor	5.00	.000	Absolutely Appropriate
18	Electrical efficiency motor	4.67	.488	Absolutely Appropriate
19	Cases to considered applying electrical efficiency motor	4.60	.507	Absolutely Appropriate
20	Power factor	4.07	.799	Appropriate
21	Ways of correcting power factor	4.47	.516	Appropriate
	Maintenance of Electrical Equipment			
22	Electrical maintenance	4.73	.516	Absolutely Appropriate
23	Types of electrical maintenance	4.87	.704	Absolutely Appropriate
24	**Importance of electrical maintenance**	4.67	.351	Absolutely Appropriate
25	Maintenance to be carried out in electrical equipment	4.60	.488	Absolutely Appropriate
	Electrical Energy Audit			
26	Types of electrical energy audit	5.00	.000	Absolutely Appropriate
27	Reasons for carrying out energy audit	4.47	.516	Appropriate
28	Steps of carry out energy audit	4.40	.737	Appropriate
	Electrical Hazard and Safety			
29	Electrical hazards	5.00	.000	Absolutely Appropriate
30	Examples of electrical hazards	4.60	.507	Absolutely Appropriate
31	Electrical Safety	4.47	.516	Appropriate
32	Precautions of electrical safety	4.00	.926	Appropriate
33	Electrical safety audit	4.60	.507	Absolutely Appropriate
34	Benefits of electrical safety audit	4.60	.507	Absolutely Appropriate
	Barriers and Techniques of Electrical Energy Management in University			
35	The barriers to electrical energy management in university	5.00	.000	Absolutely Appropriate
36	The techniques of electrical energy management in university	4.47	.516	Appropriate
	Grand Mean	**4.60**		**Absolutely Appropriate**

Table 3 revealed that the experts' opinions on the contents of the module. 23 out of 36 items which signify 63.89% were agreed to be absolutely appropriate while 13 out of 36 items, which represent 36.11% were agreed to be appropriate. The grand mean is 4.60 which is absolutely appropriate to be used as contents of electrical energy management module for training employees and students of FUT Minna. The S.D of the respondents were less than 2.13 meaning that their opinions were close to one another.

Table 4: Experts' assessment on the developed module electrical energy management in terms of: objectives; content; organization; evaluation of instruction; terminologies and language.

S/N	Items	Mean	S.D	Remark
1	The objectives clearly stated	5.00	.000	Very Good
2	The objectives are specific	4.67	.488	Very Good
3	The objectives are well-formulated	4.67	.488	Very Good
4	The objectives are attainable and measurable	4.73	.458	Very Good
5	Desirable values of objectives are provided	4.07	.704	Good
6	Students' interest will be aroused for active participation	4.07	.594	Good
7	The objectives are closely related to the purpose of the module	4.27	.704	Good
8	The objectives are relevant to the topics of each lesson of the module.	4.47	.640	Good
9	Each set of specific objectives leads to the achievement of its relevant general objectives	4.67	.488	Very Good
	Grand Mean	**4.51**		**Very Good**
	Content			
10	The contents are relevant to the objectives	5.00	.000	Very Good
11	The contents are arranged in logical sequence of learning.	4.53	.640	Very Good
12	The lessons are clearly stated in precise manner	4.53	.516	Very Good
13	The topic(s) of each unit is (are) fully discussed	4.67	.617	Very Good
14	The content of each lesson is simple and easy to understand	4.53	.640	Very Good
15	The introductory statement provided the students enough information about the concept of the lesson in the module	4.47	.743	Good
16	The module can be used by the students without much help from the teacher	4.60	.507	Very Good
17	Knowledge about the activity is provided	4.73	.458	Very Good
18	Interest of the students to accomplish the varied learning activities is aroused	4.73	.458	Very Good
19	Learners will be able to develop skills in thinking intelligently and critically	4.73	.458	Very Good
	Grand Mean	**4.65**		**Very Good**
	Organization			
20	The organization of the lesson is sequential	4.93	.258	Very Good
21	The instruction and diagrams are clear, logical and suitable	4.67	.488	Very Good
22	The learning activities are clearly presented	4.67	.488	Very Good
23	The illustrations are properly drawn and labelled	4.53	.516	Very Good
24	The format/layout is well-organized making the lessons interesting	4.80	.414	Very Good
25	Effective reinforcement statements have been included at necessary point.	4.40	.737	Good
	Grand Mean	**4.67**		**Very Good**
	Evaluations of the Instruction			
26	Evaluation questions will be each lesson are clear to learners	4.73	.594	Very Good
27	Questions are in line with stated objectives	4.67	.488	Very Good
28	The questions will adequately measure the achievement of the objectives	4.53	.516	Very Good
	Grand Mean	**4.64**		**Very Good**
	Terminologies			
29	The module itself can be relied upon by the students	4.73	.458	Very Good

30	Facts provided in the module are likely to be accurate and free from errors	4.67	.488	Very Good
31	Module is dependable to deliver its objectives and targets	4.47	.516	Good
32	The lessons are dedicated to the betterment of the students' knowledge on electrical energy management in university	4.53	.516	Very Good
	Grand Mean	**4.60**		**Very Good**
	Language of the Module			
33	The language used is easy to understand.	4.87	.351	Very Good
34	The language used is motivating	4.73	.458	Very Good
35	The instructions given are clear	4.53	.516	Very Good
36	Instructions are easy to follow	4.47	.516	Good
37	The language used is concise	4.60	.507	Very Good
		4.64		**Very Good**

Table 4 revealed that the experts' opinions on the evaluation of the developed training module shows that 29 out of 37 items which signify 78.38% were agreed to be very good while 8 out of 37 items, which represent 21.62% were agreed to be good. The S.D of the respondents were less than 2.13 meaning that their opinions were close to one another.

Table 5: Summary of Grand Mean and interpretation on the Over- all assessment of Instructional Learning Modules in Electrical energy Management in FUT Minna

S/N	Criteria	Grand Mean	Descriptive Rating
1	Objectives	4.51	Very Good
2	Contents	4.65	Very Good
3	Organization	4.67	Very Good
4	Evaluations of the Instruction	4.64	Very Good
5	Terminologies	4.60	Very Good
6	Language of the Module	4.64	Very Good
	Composite Mean	**4.62**	**Very Good**

The composite mean score of 4.62 with the adjectival description very good was gained by the instructional learning modules. The results shows that the instructional learning modules were highly accepted by the experts to be used for training employees and students of FUT Minna in electrical energy management

Discussion of Findings

The result revealed that objectives and the contents of electrical energy management included in module for training employees and students in FUT Minna were adjudged to be very good. instructional objectives are crucial in an instructional module because they define the intended learning outcomes, guiding both the instructor and learners in the design, implementation, and assessment of the module. They clarify what learners should know, understand, and be able to do after completing the module, providing a roadmap for effective teaching and learning. This is in harmony with the study conducted by Hamora, *et al,* (2022), instructional modules, clearly defined contents and objectives are crucial for effective learning.

Objectives guide the selection of content, activities, and assessment methods, ensuring the module aligns with learning goals. They also inform learners about what they should know and be able to do, enhancing their understanding and motivation. Contents, in turn, should be carefully selected and organized to support the achievement of those objectives, fostering a structured and engaging learning experience (Cabral, 2023).

Experts revealed that developed training module were well-sequenced and benefit both the instructors and the learners. Well-organized and properly sequenced module allow for a smother functioning instruction; classroom disruptions are minimized, the stress on the part of instructors is greatly reduced and the learning environment is optimized for the learners (Dechavez, 2023). A well-organized instructional module is crucial for effective learning because it enhances engagement, comprehension, and retention of information. It helps learners follow a logical progression of content, facilitating easier understanding and application of concepts. It ensures that

information is presented in a clear, logical order, making it easier for learners to understand and retain (Cabral, 2023). Classroom assessment and evaluation are highly concerned with qualitative judgments that are used to improve students' knowledge and learning. Assessment and evaluation also give teachers useful information about how to improve their teaching methods. Experts evaluate instructional modules by assessing various aspects like content quality, instructional design, and technical/technological aspects, often using a structured rubric or questionnaire (Lacanilao & Manalastas, 2023; Yongco, & Del Valle, 2022). The goal is to determine the module's effectiveness, validity, and suitability for its intended audience. Evaluations often involve both quantitative data and qualitative feedback. Nasrullah et. al (2015) claimed that students' time management is one of the aspects that can move a student to be a good student. A good time management is vital for students to shine. The present study was designed to suit with the student's time management.

Conclusion

This study developed a training module on electrical energy management to be use for training employees and students of FUT Minna, was satisfied to be valid by experts. The module when used to train employees and students of FUT Minna will make them to be aware and conscious of electrical energy use in university and their household. Raising awareness on electrical energy conservation and efficiency in higher education institutions is a strategic step toward building a sustainable, cost-effective, and socially responsible learning environment. It empowers individuals, strengthens institutional capacity, and contributes to national and global energy sustainability goals.

Recommendations

Based on the findings the following recommendations were made;

1. The developed training module on electrical energy management should be used for training employees and students of FUT Minna. This will create awareness and knowledge on electrical energy usage thereby minimising energy wastages due to lack of awareness.
2. The objectives and the contents of the module should be integrated into the curriculum of University under General Studies for all students admitted into the university. This will promote the culture of energy savings among students.
3. The units of the module should be published in university news bulletin that will serve as reminder on ways electrical energy should be used in campus.

References

Abrahamse, W., & Steg, L. (2011). Factors related to household energy use and intention reduces it: The role of psychological and socio-demographic variables. *Human Ecology Review,* 18 (1), 30 – 40.

Ajzen, I. (1991). The theory of planned behavior: *Organizational Behavior and Human Decision Processes*, 50 (1), 179-211.

Arya, B. & Chaturvedi, S. (2020). Extending the theory of planned behaviour to explain energy saving behaviour. *Environmental and Climate Technologies* 24, (1), pp. 516–528

Cabral, C. S. (2023) Development and validation of instructional module on CHED Mandated topics in mathematics in the modern world. *Innovations,* Number 72 www.journal-innovations.com

Dechavez, M. D. (2023) Peer and Students' Evaluation: An Instructional Module Enhancement. *International Journal of Research and Innovation in Social Science (IJRISS)* 7 (1)

Edema, G. (2024, August 1) Students may pay N80,000 electricity fee in varsities – VCs' panel. Nigeria Punch. retrieved on 15th August 2024 from https://punchng.com/students-may-pay-n80000-electricity-fee-in-varsities-vcs-panel/

Ekundayo, O. A. (2018). The impact of motivation on employee performance in selected insurance companies in Nigeria. *International Journal of African Development*. 5 (1) 31-42

Edison, M. (2023) Evaluation of Factors that Influence Electrical Energy Consumption in Higher Educational Institutions – Preparatory for Energy Management System. *E3S Web of Conferences **433**, 03004.* https://doi.org/10.1051/e3sconf/202343303004 *REEE 2023*

Fatoki, O. (2022). Determinants of employee electricity saving behavior in small firms: The role of benefits and leadership. *Energies*, 15, 3168. https://doi.org/10.3390/ en15093168

Hamora, L., Rabaya, M., Pentang, J., Pizaña, A., & Gamozo, M. J. (2022). Students' Evaluation of Faculty-Prepared Instructional Modules: Inferences for Instructional Materials Review and Revision. *Journal of Education, Management and Development Studies,* 2(2), 20–29. https://doi.org/10.52631/jemds.v2i2.109

Lacanilao, I. C. & Manalastas, A. S. (2023) Development and validation of instructional learning module in tailoring. *World Journal of Advanced Research and Reviews,* 2023, 20(01), 1071–1088

Mansur, A. D., Saba, T. M., Ibrahim, D. & Kareem, W. B. (2024) Personnel's level of Knowledge and Opportunities for Saving Electrical Energy in Woodwork Industries in Katsina State, Nigeria. *International Journal of Industrial Technology, Engineering, Science and Education (IJITESED) 2 (4). 4*63-71

Marasigan, N. V. (2019). Development and Validation of a Self-Instructional Material on Selected Topics in Mathematics in the Modern World. *International Journal of Recent Innovation in Academic Research,* 3(5).

Mohd, R. A. Kazi, R. Rohaan, B., & Sumit, B. (2022) A study on research design and its types. *International Research Journal of Engineering and Technology (IRJET) 3 (2)*

Moses, A. A, Kadek-Adrian S. I. W., Made-Shania S. P, Nyoman & I. S. (2024) Revolutionizing Education: Unleashing the Power of the ADDIE Model for Effective Teaching and Learning. *Jurnal Pendidikan Indonesia* 13, (1)1, 202-209

Nasrullah, S. (2015). The Impact of Time Management on the Students' Academic Achievements. *An International Peer-reviewed Journal,* 11.

Nguyen, T. T., Duong, K. T & Do, T. A. (2021). Situational factor affecting energy-saving behaviour in direct approaches in Hanoi City. The role of socio-demographics. *Cogent Psychology 8: 1978634 https://doi.org/10.1080/23311908.2021.1978634*

Saba, T. M., Adamu, M. J. & Yisa, S. N. (2022). Investigating energy literacy of secondary education students in Niger state, Nigeria. *KIU Interdisciplinary Journal of Humanities and Social Sciences,* 3(2), 156-170

Saba T. M., Tsado J., Bello, H., & Owodunni, S. A, (2016). Behavioural approach to electrical energy management in residential buildings in Niger State, Nigeria. *Multidisciplinary Journal of Science, Technology and Vocation Education. (M- JOSTEVE), 4, (1). 99-109*

Saba, T. M**.,** Yisa, S. N. & Abubakar, M. **(**2023) Employee's psychology of motivation and behaviour towards electrical energy conservation in Universities in Niger State. *Annals of Technology Education Practitioners Association of Nigeria (ATEPAN) 6* (1), 1-8

Tsado, J. (2014). National energy saving initiative and right lighting. Paper presentation at the 8th International Lighting Conference 2014 (November.18th – 20th) at Hotel De Bently, Utako District, Abuja.

Umoh, E. A. & Bande, Y. M. (2021) A template for promoting energy conservation in Nigeria's residential sector. *International Journal of Sustainable Energy Planning and Management. 32(1) 125–138.*

Yongco, J. O. & Del Valle, J. M. (2022). Development and Evaluation of Instructional Module for Special Program in Journalism. *International Journal of Educational Management and Development Studies*, 3(4), 97-117.DOI: https://doi.org/10.53378/352948

Mohd, R. A. Kazi, R. Rohaan, B., & Sumit, B. (2022) a study on research design and its types. *International Research Journal of Engineering and Technology (IRJET),*