

Exploring The Insights of Teachers and School Heads on the Current Electrical System in Selected Public Schools

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Abstract— Reliable and safe electrical systems are vital in supporting effective teaching, ensuring learning continuity, and maintaining efficient school operations. This study explored the insights of school heads and teachers on the current electrical system in selected public elementary schools in Gubat, Sorsogon, focusing on adequacy, reliability, safety, maintenance responsiveness, and sustainability. It also examined the electrical-related problems encountered by educators, their effects on daily school operations and classroom instruction, and the strategies adopted to address these issues as basis for proposing a sustainable electrical system for public schools. The qualitative descriptive design was used in the study and data were collected from 15 respondents to reveal significant findings on basic instructional needs, issues and challenges.

Keywords— electrical system, electrical safety, public schools, energy efficiency, renewable energy, ICT integration, sustainable school infrastructure.

INTRODUCTION

Electricity is a fundamental component of a safe, functional, and effective school environment, particularly in public schools where infrastructure conditions directly influence teaching and learning processes. A well designed and properly maintained electrical system supports essential instructional and operational needs, including classroom lighting, electric fans and ventilation, computers and multimedia equipment, printing and reproduction of learning materials, and safety installations such as alarms and emergency lighting.

Globally and locally, education authorities and infrastructure planners have increasingly recognized that mere access to electricity does not necessarily guarantee its effective use in schools. While many public schools are already connected to electrical power, a significant number continue to experience frequent power interruptions, outdated wiring systems, insufficient lighting, limited electrical outlets, and delayed maintenance responses.

These challenges are particularly pronounced in disaster prone, rural, and economically disadvantaged areas, where schools often operate with aging facilities

and limited technical support. Such conditions compromise not only instructional continuity but also the safety of students and school personnel, as faulty wiring and improvised electrical connections can pose serious hazards. These realities highlight the need for systematic, school level assessments that move beyond identifying whether electricity is present and instead examine how electrical systems function in everyday school operations. Understanding issues related to adequacy, reliability, safety, and maintenance responsiveness requires insights from those who directly experience and manage these conditions, particularly teachers and school heads.

In this context, gathering insights on the current electrical system in selected public schools through a researcher-developed semi-structured questionnaire with open-ended responses provides a practical and systematic approach to understanding actual school conditions. This school-based assessment tool enables the collection of data on common electrical issues, their impact on teaching and learning processes, existing maintenance practices, and priority areas for improvement, as perceived by school heads and teachers.

By focusing on the experiences and perspectives of key stakeholders, the study ensures that identified concerns and recommended interventions are grounded in actual school needs, thereby supporting more responsive, effective, and sustainable improvements in electrical system management. By capturing these perspectives, the study generates grounded and meaningful evidence that can inform school improvement planning, strengthen safety measures, guide maintenance and repair decisions, and support the development of sustainable electrical solutions.

In developing Asian countries, school electrification has progressed rapidly, yet challenges remain in ensuring that electrical systems keep pace with growing instructional demands. For example, India has achieved near universal school electrification, but national education data reveal ongoing issues related to voltage fluctuations, overloaded systems, and uneven maintenance quality, especially in older school buildings.

The Philippine government has responded to these concerns through policies that integrate electrical safety, disaster risk reduction, and energy efficiency into school governance. Laws such as the Energy Efficiency and Conservation Act institutionalize the responsible use of energy in government facilities, including schools, while the Department of Education has strengthened its emphasis on safe learning facilities through disaster risk reduction and management frameworks.

Sorsogon reflects many of the electrical challenges observed in the broader Bicol Region. Public schools in the province are served by local electric cooperatives that regularly issue advisories for scheduled and unscheduled power interruptions due to maintenance activities, line clearing operations, and repairs following weather disturbances. These interruptions often occur during school hours and affect entire districts, including both urban and rural communities. As a result, classes are sometimes disrupted, and teachers are forced to modify lessons when electricity is unavailable.

The impact of electrical system issues is directly felt in daily teaching and learning activities. Teachers commonly report difficulties arising from insufficient lighting, malfunctioning electrical fixtures, limited outlets, and unpredictable power supply. Such conditions disrupt lesson flow, restrict the use of computers and projectors, and reduce learners' comfort and concentration, especially during hot weather. Safety concerns also arise when faulty wiring, damaged switches, or overloaded outlets are left unrepaired for extended periods due to limited maintenance resources.

These challenges affect not only classroom instruction but also broader school operations, including the preparation of learning materials, completion of administrative tasks, and coordination among school personnel. For learners, repeated electrical disruptions can result in decreased engagement, physical discomfort, and reduced continuity of learning, ultimately leading to missed educational opportunities.

From the perspective of school heads and teachers, these experiences reinforce the need for clear, evidence based assessments that document electrical system realities from the ground up. By using researcher-developed semi-structured questionnaire, this study captures the voices and observations of those directly involved in school operations, providing a grounded basis for improving electrical safety, reliability, and sustainability in public schools.

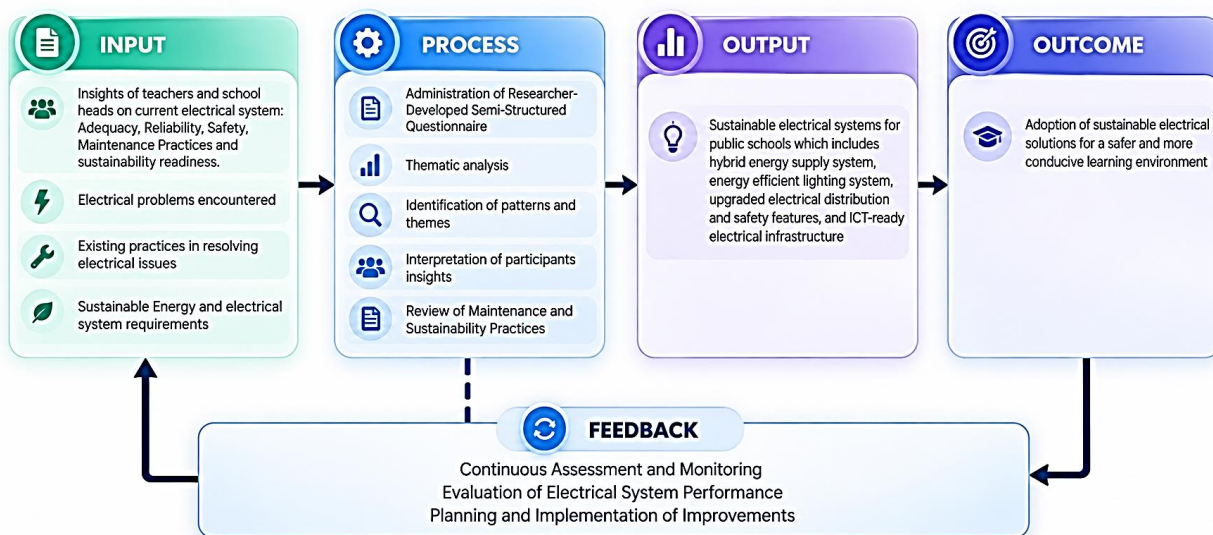
The research identified three (3) schools within the Division of Sorsogon, to wit; San Ignacio Elementary School, Tagaytay Elementary School, Cabiguhan Elementary School all of which came from the municipality of Gubat Sorsogon. These schools were purposively chosen because it depicts diverse classroom contexts typical of the division ranging from lower to upper primary grades and operate within comparable resource and administrative structures, making them suitable sites for examining school electrical systems in authentic teaching-learning environments.

A total of 15 respondents participated in the study, comprising 12 classroom teachers and 3 school heads. Teachers were selected to provide front-line accounts

of classroom-level electrical functionality, safety concerns, and instructional adaptations, while school heads contributed division and school level perspectives on reporting protocols, maintenance coordination, and resource allocation. The scope of the study was limited to five (5) key construct namely; adequacy, reliability, safety, maintenance responsiveness, and sustainability readiness. It did not include electrical testing, load measurements, or technical evaluations which are performed by licensed engineers.

The study looked into the insights of the teachers and school heads regarding the current electrical system in the schools chosen. The research also investigated the problems encountered by teachers and school heads regarding the current electrical systems in the classroom and the different strategies to resolve them. As an output of the study, the researcher designed an electrical system for public schools using sustainable source. The study is of significance to the school heads, teachers, learners, community and other researchers.

CONCEPTUAL PARADIGM



METHODOLOGY

The study employed a qualitative descriptive research design, which is well suited for generating rich, practice proximal accounts of how a phenomenon is experienced, interpreted, and managed by individuals directly involved in it. This approach allowed for a detailed and straightforward description of participants' experiences without imposing highly abstract or interpretive frameworks. the qualitative descriptive design was particularly appropriate for capturing the day to day realities of teachers and school heads who regularly use, oversee, and manage school electrical systems. By focusing on their firsthand accounts, the design enabled the study to document actual conditions, instructional

implications, and response practices associated with school electrical systems in natural school settings.

Primary data consisted of respondents' answers to a researcher-developed semi-structured questionnaire with open-ended responses. These narrative responses captured concrete classroom level experiences, typical effects on instruction such as deferred ICT based activities, shortened lessons, and learner discomfort and routine pathways for resolving electrical issues, including informal workarounds and formal reporting, ticketing, and follow up procedures. Secondary data comprised documentary sources that informed questionnaire's content and guided data interpretation, including the operational definitions of the five assessment domains and relevant policy and standards frameworks discussed in earlier chapters.

In obtaining data, the researchers employed semi – structured open – ended questionnaire in five (5) domains relevant to teaching – learning environments. The instrument contains short, structured items followed by open ended prompts for each domain to elicit specific situations, examples, and perceived effects on instruction and safety. The questionnaire was reviewed against the definitions and constructs already established, ensuring that each prompt directly taps the intended domain. The researcher personally administered the researcher-developed semi-structured questionnaire during regular school hours. Respondents were given clear instructions on how to answer the instrument and were encouraged to describe their actual experiences with the school electrical system. All accomplished instruments were carefully reviewed for completeness, systematically organized, and prepared for data analysis and research use. Strict confidentiality of all respondents was maintained throughout the conduct of the study, and no identifying information was disclosed in any phase of data handling or reporting.

The data gathered from the respondents were systematically organized, reviewed, and analyzed to address the research objectives of the study. After collecting the accomplished questionnaires, all responses were carefully checked for completeness, clarity, and consistency. The data were then transcribed and organized according to the five domains of the study, namely: adequacy, reliability, safety, maintenance responsiveness, and sustainability readiness.

RESULTS & DISCUSSION

Insights of School Heads & Teachers on the Current Electrical System in Selected Public Schools

The electrical and lighting systems of the three selected public schools in Gubat, Sorsogon support basic teaching and learning activities but are inadequate for ICT-integrated instruction. Challenges such as insufficient lighting, limited outlets, power interruptions, voltage fluctuations, exposed wiring, and overloaded outlets affect the reliability and safety of the electrical system. Consequently, these

conditions disrupt instructional delivery and school operations, reducing overall efficiency.

Problems Encountered in the Current Electrical System

Teachers and school heads regularly experience electrical issues, such as flickering lights, faulty outlets, overloaded circuits, tripped breakers, and deteriorating wiring. These problems disrupt instruction, limit ICT integration, and affect learner comfort and concentration. While temporary measures are implemented to address safety hazards, the absence of long-term solutions continues to pose risks to school operations and safety.

Ways of Resolving Electrical System Problems

Teachers and school heads address electrical problems through prompt reporting, temporary safety measures, instructional adjustments, and collaborative coordination. Teachers report issues immediately and adapt instructional strategies to ensure learning continuity, while school heads resolve minor concerns and refer major electrical problems to higher authorities. Although coordination and communication are generally effective, the resolution of complex issues is often hindered by limited funding, delayed procurement, inadequate technical support, and dependence on higher-level approvals. As a result, schools frequently rely on temporary remedies rather than permanent solutions.

Sustainable Electrical System for Public Schools

The schools demonstrate readiness to adopt sustainable electrical solutions. Solar photovoltaic (PV) systems emerged as the most viable renewable energy option for addressing power interruptions, complemented by energy-efficient LED lighting, upgraded wiring, adequate electrical outlets, and ICT-ready infrastructure.

However, implementation remains constrained by limited funding, inadequate technical support, and capacity-building needs. These challenges highlight the importance of phased implementation and sustained institutional support to ensure the successful adoption of sustainable electrical systems in public schools.

CONCLUSIONS

1. The current electrical and lighting systems of the three selected public schools in Gubat, Sorsogon are functional for basic instructional use but are insufficient to fully support modern teaching and learning demands. The limitations in adequacy, reliability, and safety particularly in ICT readiness and electrical infrastructure condition contribute to instructional disruptions and reduced operational efficiency.
2. The Problems Encountered in the Current Electrical System concludes that teachers and school heads frequently encounter electrical problems, including poor lighting, insufficient outlets, unstable power supply, and safety hazards associated with aging infrastructure. These issues disrupt instruction, classroom management, and learner comfort, particularly during ICT-based activities.
3. Teachers and school heads address electrical problems through prompt reporting, temporary safety measures, instructional adjustments, and coordination with relevant authorities.
4. There is an emerging readiness among public schools to adopt sustainable electrical solutions, particularly solar photovoltaic systems and energy efficient lighting.

RECOMMENDATION

Based on the findings and conclusions of the study, the following recommendations are proposed to address the identified issues and support the development of safe, reliable, and sustainable electrical systems in public elementary schools in Gubat, Sorsogon.

1. Prioritize the upgrading of existing electrical and lighting systems to improve adequacy, reliability, and safety. This includes replacing outdated lighting fixtures, increasing the number of electrical outlets, and improving electrical capacity to support ICT based and multimedia instruction. Regular electrical system audits and classroom level assessments should be institutionalized to guide evidence based planning and resource allocation.
2. Schools are advised to implement a preventive maintenance and safety management program that

focuses on early detection and timely correction of electrical faults. Immediate attention is required for safety critical issues such as exposed wiring, loose sockets, overloaded circuits, and deteriorated installations. The Schools Division Office may consider establishing a dedicated maintenance fund or fast track repair mechanism to reduce reliance on temporary fixes and enhance learner and staff safety.

3. Formalize reporting, documentation, and response protocols for electrical issues to ensure consistent and timely action. Clear procedures for escalation, defined response timelines, and designated maintenance contacts may help improve resolution efficiency. Strengthening institutional support through improved access to technical assistance, streamlined procurement processes, and increased maintenance funding is also recommended to move from short term remedies toward permanent solutions.
4. Adopt a phased approach to sustainable electrical system implementation, beginning with low cost, high impact measures such as LED lighting upgrades and improved wiring safety. Pilot testing of solar photovoltaic (PV) systems may be undertaken in selected schools to enhance power reliability and reduce dependency on the grid. Capacity building initiatives, including basic training on energy management and system monitoring, should accompany these efforts to ensure sustainability and long term effectiveness.
5. Integrate electrical system improvements and sustainability initiatives into the School Improvement Plan (SIP) and aligned with disaster risk reduction, energy efficiency, and safety policies. Collaboration with local government units, electric cooperatives, and partner institutions may be strengthened to support funding, technical assistance, and sustainability initiatives.
6. Future research may expand the scope of this study to other districts or include quantitative electrical load analysis and cost benefit evaluation of renewable energy systems to further inform infrastructure planning.

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