

Article

Teaching English for Specific Purposes in Technical Electricity Classes: A Contextualized Pedagogical Framework for Secondary Education in the Democratic Republic of the Congo

Pius Canisius Kahindo Ngunde

Institut Supérieur Pédagogique de Muhangi (ISP Muhangi), Butembo, République démocratique du Congo

Abstract: English is increasingly important in technical and vocational education because learners must interpret equipment labels, manuals, safety instructions, specifications, diagrams, and workplace communication that frequently use English. Yet general-purpose English materials may not adequately address the communicative tasks of learners in electricity programmes. This conceptual and pedagogical design paper develops a context-sensitive English for Specific Purposes (ESP) framework for teaching English in secondary-level electricity classes in the Democratic Republic of the Congo. The framework is informed by the national orientation toward specialized English in technical education, established ESP principles, recent vocational needs-analysis research, and classroom-informed materials originally developed for electricity learners. Rather than treating technical English as a list of isolated terms, the proposed model organizes instruction around target tasks: identifying components, interpreting safety messages, reading technical information, describing installation procedures, reporting measurements, explaining faults, and producing short workplace texts. The model integrates technical vocabulary, reading, pronunciation, grammar-in-context, multimodal support, task-based practice, and formative assessment through a six-stage lesson cycle. A sample unit on electrical safety and measurement illustrates how the framework can be implemented with limited resources. The article argues for authentic but level-appropriate materials, systematic attention to disciplinary language, and stronger collaboration between English teachers and technical-subject teachers. Because the paper does not report an empirical intervention, future classroom trials should evaluate learning gains, feasibility, and learner perceptions.

Keywords: English for Specific Purposes; technical and vocational education; electricity; technical English; vocabulary; needs analysis; Democratic Republic of the Congo

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1. Introduction

English has become an important working language across many technical domains. For learners in electricity programmes, English may appear on equipment labels, user manuals, safety notices, technical catalogues, online documentation, software interfaces, and training resources. In such settings, language competence is not an optional academic add-on: it supports access to technical knowledge and can influence learners' ability to interpret information, communicate procedures, and continue professional learning. Research in vocational education similarly shows that specialized learners require English for concrete target tasks and that general language courses may overlook those tasks (Arias-Contreras & Moore, 2022; Santika et al., 2022).

This issue is particularly relevant in technical secondary education in the Democratic Republic of the Congo (DRC). The national English programme distinguishes specialized technical streams and indicates that instruction in the later years should be

oriented toward understanding texts related to learners' areas of specialization. The broader national curriculum also places English within secondary education while technical streams combine general subjects with vocational specialization. These orientations create a clear pedagogical space for English for Specific Purposes (ESP), especially in electricity classes where specialized language is closely linked to tools, measurements, procedures, safety, and problem solving.

However, a recurrent classroom difficulty is the limited availability of English materials that are both technically relevant and accessible to secondary-school learners. General-purpose textbooks can provide useful grammatical and communicative foundations, but they do not necessarily supply the disciplinary vocabulary, text types, and workplace-like tasks required by electricity learners. This gap is consistent with studies of vocational and engineering learners in other contexts. For example, electricity-installation students have expressed a need for reading materials directly related to their programme (Khasanah & Madya, 2019), while engineering-oriented needs analyses show sustained demand for field-specific language, technical vocabulary, and authentic materials (Suyadi & Andana, 2020; Santika et al., 2022).

The present paper responds to that gap by transforming a teacher-oriented collection of electricity vocabulary, reading texts, grammar activities, and visual aids into a more coherent, research-informed pedagogical framework. Its purpose is not to claim the effectiveness of an intervention that has not yet been experimentally tested. Instead, it offers a principled design for what can be taught, how language can be linked to technical tasks, and how teachers can adapt the model to resource-constrained secondary classrooms.

The paper addresses three questions: (1) Which communicative tasks should organize English instruction in electricity classes? (2) Which language resources—vocabulary, grammar, reading, pronunciation, and writing—are most relevant to those tasks? (3) How can these resources be integrated into a feasible lesson cycle for technical secondary schools?

2. Conceptual foundation: ESP, vocational needs, and disciplinary literacy

2.1. English for Specific Purposes as needs-responsive instruction

ESP is commonly defined by its responsiveness to the reasons learners need English. Rather than starting from a universal sequence of grammar points, ESP course design begins with the communicative situations, genres, vocabulary, and skills associated with a target academic or occupational domain (Hutchinson & Waters, 1987; Dudley-Evans & St John, 1998; Basturkmen, 2010; Anthony, 2018). This does not mean that grammar or general language is ignored. It means that language is selected and sequenced because it enables learners to perform meaningful tasks in their field.

Needs analysis is therefore central. In vocational contexts, useful questions include what learners must do in English, what texts they must understand, what language they already know, what they find difficult, and which classroom practices are feasible. A study of agricultural technicians, for example, identified concrete occupational tasks as the basis for English programme design and emphasized the importance of supporting teachers with suitable materials (Arias-Contreras & Moore, 2022). Research with vocational high-school learners also shows that relevance to the programme of study can increase the perceived usefulness of reading and learning materials (Khasanah & Madya, 2019; Santika et al., 2022).

2.2. Technical vocabulary should be taught as functional language

Electricity education necessarily involves specialized vocabulary, but an ESP course should not become a bilingual glossary. Specialized words are most useful when learners encounter them in recurring technical actions: identifying a component,

comparing two circuits, interpreting a rating, warning a colleague, describing a procedure, or reporting a measurement. Corpus-based research in engineering shows that vocabulary selection benefits from attention to frequency, disciplinary relevance, and the ways words actually function in technical discourse (Mudraya, 2006; Otto, 2021). This supports moving from isolated word lists to lexical sets, collocations, sentence patterns, and task-based use.

Terminological accuracy also matters. Several expressions that are common in literal translation from French do not correspond to standard technical English. For example, electrical 'tension' is normally expressed as voltage; a 'derivation box' is more naturally a junction box; and 'working under tension' is better expressed as working on live or energized equipment. Likewise, electrician or electrical installer is usually preferable to fitter when referring to the person who installs or maintains electrical systems. Correcting such terms helps learners acquire language they are more likely to encounter in manuals, training resources, and professional communication.

2.3. *Multimodal and situated reading in technical education*

Technical reading is multimodal. Learners read words together with symbols, labels, diagrams, units, tables, schematics, and problem statements. Research on engineering students' textbook practices shows that disciplinary meaning is distributed across several resources rather than located in prose alone (Huang & Wible, 2024). For electricity learners, this means that a reading lesson should include authentic or teacher-produced labels, simple circuit diagrams, measurement displays, safety symbols, and equipment specifications—not merely continuous text.

This multimodal orientation is especially useful in low-resource settings because teachers do not need sophisticated laboratories to contextualize language. Locally available components, photographs taken by the teacher, sketches on the board, recycled packaging, equipment labels, or printed extracts from openly licensed manuals can provide meaningful input. The core criterion is pedagogical relevance and legal reusability, not visual sophistication.

3. *Methodological orientation of the pedagogical design*

This article is a conceptual and pedagogical design paper rather than an empirical effectiveness study. No learner test scores, experimental comparisons, or survey results are reported. The framework was developed through a structured redesign of classroom-oriented content for electricity learners, guided by three evidence sources: (a) the DRC curriculum orientation toward specialized texts in technical streams; (b) established principles of ESP course design and needs-responsive instruction; and (c) recent research on vocational, engineering, and discipline-specific English.

The redesign followed five criteria. First, specificity: each language item had to connect to a plausible electricity-related task. Second, technical accuracy: terminology was standardized where literal translation produced non-idiomatic English. Third, integration: vocabulary, grammar, reading, pronunciation, and writing were combined within the same lesson rather than taught as unrelated blocks. Fourth, feasibility: activities had to remain possible in classes with limited internet access, limited equipment, and few English periods per week. Fifth, safety and authenticity: technical examples had to reinforce safe professional communication while avoiding the uncritical use of copyrighted stock images or decontextualized web material.

Because the framework has not yet been evaluated in a classroom trial, its contribution is design-oriented. It offers a testable model and specifies the dimensions that future empirical work should evaluate: vocabulary gains, reading comprehension, ability to perform technical communication tasks, learner engagement, teacher feasibility, and transfer to technical-subject learning.

4. A contextualized ESP framework for electricity classes

4.1. Target communicative tasks

The starting point is not a list of grammar topics but a set of target communicative tasks that reflect how English may be used in electricity training. Table 1 proposes a core set suitable for upper-secondary technical classes. Teachers can simplify or extend the tasks depending on learner proficiency and the technical syllabus.

Table 1. Core target tasks and associated language resources for electricity ESP

Target task	Communicative function	Core language resources	Example output
Identify tools and components	Naming, classifying, locating	This is/These are; is used for; part-whole vocabulary	"This is a circuit breaker. It protects the circuit."
Interpret safety messages	Warning, prohibiting, instructing	must, must not, should, do not; imperatives; hazard vocabulary	"Switch off and isolate the supply before inspection."
Read labels and specifications	Reporting values and units	volts, amperes, ohms, hertz, watts; ranges; decimals	"The rated voltage is 230 V."
Describe a procedure	Sequencing actions	first, next, then, after that, finally; imperative/passive forms	"First, check that the supply is isolated."
Explain circuit relationships	Describing connection and function	series, parallel, connected to, flows through, supplies	"The lamps are connected in parallel."
Report measurements	Measuring and comparing	measure, read, record; higher/lower than; approximately	"The meter reads 12.4 V."
Diagnose a simple fault	Stating symptoms, causes, and checks	if...then; may/might; because; check/test/replace	"If the lamp does not light, check the supply and connections."
Write a short maintenance note	Summarizing work performed	past tense; passive; problem-action-result structure	"The loose terminal was tightened and the circuit was retested."

4.2. A functional core lexicon

A core lexicon should be organized by technical function rather than presented as an undifferentiated list. Table 2 revises and extends common classroom vocabulary for electricity learners. English variants such as earth/ground and socket/outlet can be taught explicitly so learners recognize different international conventions.

Table 2. Suggested functional vocabulary for upper-secondary electricity English

Category	Suggested vocabulary
Components and connections	wire, cable, conductor, plug, socket/outlet, switch, lamp/light bulb, fuse, circuit breaker, terminal, connector, junction box, conduit, cable tie, insulator, earth/ground conductor
Sources and conversion	battery, generator, alternator, transformer, charger, converter, inverter, rectifier, solar panel
Electrical quantities	voltage, current, resistance, frequency, power, energy; volt (V), ampere (A), ohm (Ω), hertz (Hz), watt (W), kilowatt-hour (kWh)
Measurement tools	multimeter, voltmeter, ammeter, clamp meter, test leads, probe, scale, range, reading

Circuit relations	series circuit, parallel circuit, open circuit, short circuit, live/hot conductor, neutral conductor, load, source, branch
Safety and maintenance	electric shock, energized/live, isolated/de-energized, protective equipment (PPE), insulated gloves, warning sign, fault, loose connection, damaged insulation, inspect, test, replace, tighten

4.3. Grammar in context

Grammar remains necessary, but it should be selected for communicative usefulness. In electricity classes, several structures recur naturally. Imperatives and modal verbs support safety instructions ('Do not touch exposed conductors'; 'You must isolate the supply'). The passive voice is useful when the process or result matters more than the agent ('The voltage is measured with a voltmeter'). Sequence markers organize procedures ('First... Next... Finally...'). Conditionals support troubleshooting ('If the fuse is blown, replace it only after identifying the cause'). Comparatives describe measurements ('The second reading is lower than the first'). Present simple forms explain function ('A fuse protects the circuit').

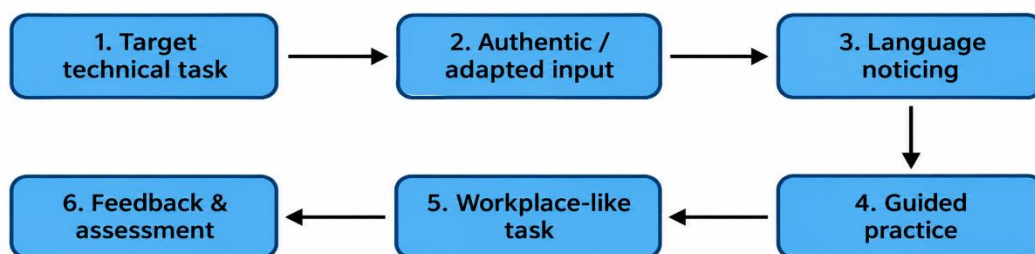
These structures can still be taught explicitly, but examples should come from technical situations. This approach is more coherent than teaching long sequences of grammar rules whose examples are unrelated to learners' field. It also allows recurring recycling: the same modal verbs or passive constructions can appear in safety notices, reading passages, oral instructions, and writing tasks.

4.4. Pronunciation and intelligibility

Pronunciation work should focus on intelligibility and high-value technical terms rather than exhaustive phonetic transcription. Terms such as voltage, current, circuit, generator, electrician, insulation, resistance, frequency, and measurement can be practiced through stress marking, minimal contrasts where relevant, choral repetition, short teacher models, and audio from reputable dictionaries when connectivity is available. The objective is to help learners recognize technical words when listening and produce them clearly enough for classroom and workplace interaction.

4.5. Multimodal input and locally available materials

Visual support is pedagogically valuable when it is integrated with a language task. Rather than inserting images abruptly, the teacher should first explain the purpose of each visual, indicate the language outcome expected from it, and then guide learners through observation, naming, interpretation, and short technical description. The figures that follow therefore function as curated teaching supports, each one introduced by a short explanatory paragraph and linked to a specific classroom use.



Context constraints: learner level • available equipment • safety • time • multilingual resources

Figure 1. Six-stage contextualized ESP lesson cycle for electricity classes (author's design).

To illustrate how multimodal resources can be used in a structured way, Figures 2–8 below present selected visuals adapted from the original teaching resource. Each figure is preceded by a short introductory explanation so that the image is not isolated

from the pedagogical argument, and each visual has been cleaned and reorganized to improve readability.

A useful starting point for technical vocabulary is a labelled object with clearly identifiable parts. Figure 2 can help learners move from isolated nouns to short descriptive statements such as “The filament is inside the bulb” or “The fitting connects the bulb to the holder.”

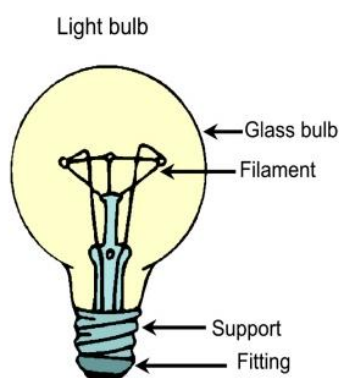


Figure 2. Labelled light bulb used for component identification and descriptive vocabulary practice.

After single objects, learners should also encounter component diagrams. Figure 3 is appropriate for teaching part-whole relations in an electric cable and for practising prepositions and noun phrases such as outer sheath, inner sheath, insulation, and conductors.

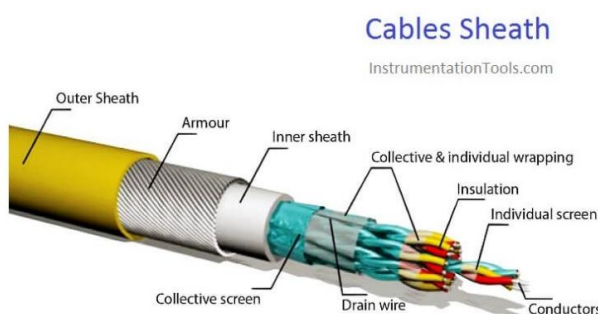


Figure 3. Labelled electric cable diagram illustrating sheath, screen, insulation, and conductors.

Functional objects such as switches and plugs are especially useful in ESP because learners can name them, compare them, and explain what they are used for. Figure 4 may therefore support tasks based on identification, comparison, and simple functional description.



Figure 4. Examples of switches and plugs that can support naming, comparison, and function-description tasks.

Procedural understanding becomes clearer when learners see internal wiring arrangements. Figure 5 provides two visuals that can be used for guided explanations of how a switch or socket is connected and for safety-oriented classroom discussion.

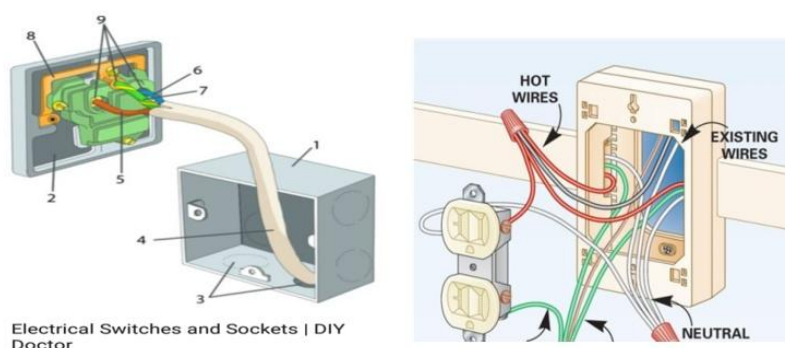


Figure 5. Wiring and switch/socket installation visuals suitable for procedural explanation and safety-oriented reading tasks.

Safety language should be anchored in realistic situations. Figure 6 introduces protective gloves and protected handling contexts that can prompt imperatives, warnings, and short advisory statements such as “Wear protective gloves before touching the installation.”



Figure 6. Protective gloves and protected handling contexts for teaching electrical safety language.

Measurement is another central domain in electricity English. Figure 7 can support lessons on ammeters and multimeters, as well as reporting tasks in which learners describe a device, identify its function, or interpret a simple reading.



Figure 7. Ammeter and multimeter visuals for measurement vocabulary and interpretation tasks.

Lastly, energy-related vocabulary can be broadened through familiar devices and renewable-energy examples. Figure 8 combines batteries and a solar-panel diagram, making it suitable for explanation tasks, classification activities, and short oral or written descriptions of energy flow.

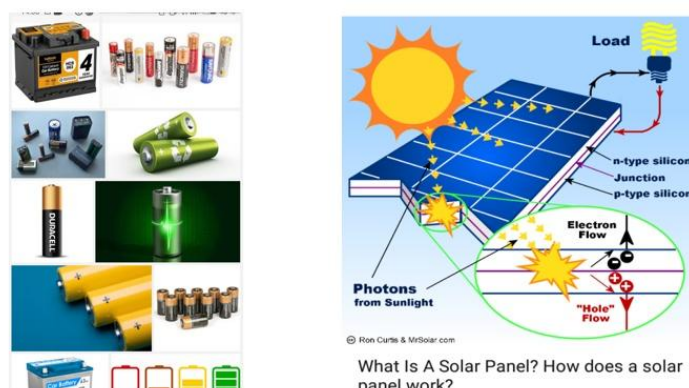


Figure 8. Batteries and solar-panel illustration for energy-related vocabulary and explanatory speaking or writing tasks.

5. Sample teaching unit: Electrical safety and measurement

The following unit illustrates how the framework can be translated into a single lesson sequence. The objective is not to teach electrical installation procedures in place of the technical teacher. Rather, English instruction uses familiar technical content so that learners can practice language for safety, measurement, and explanation. Coordination with the electricity teacher is recommended whenever technical procedures are demonstrated.

5.1. Learning outcomes

- identify and correctly name at least eight common components and measurement terms;
- interpret short safety instructions containing imperatives and modal verbs;

- extract key information from a short technical passage and a simple meter display;
- report a measurement using a number and appropriate unit; and
- produce a brief oral or written explanation of a safe checking procedure using sequence markers.

5.2. Model reading text

Before any electrical check, the learner should confirm that the task is authorized and supervised. The supply must be isolated when the activity requires contact with conductors or components. A multimeter can be used to measure several electrical quantities, but the correct function and range must be selected before a reading is taken. Voltage is measured in volts, current in amperes, and resistance in ohms. Test leads and probes must be in good condition, and damaged insulation must not be used. A reading should be recorded together with its unit. If a value is unexpected, the learner should stop, verify the setup, and ask the instructor before continuing. Clear communication is part of electrical safety: learners should be able to state what they are checking, what the instrument shows, and whether the result is within the expected range.

5.3. Suggested lesson sequence

Table 3. Example 70-minute lesson sequence

Stage	Time	Teacher and learner activity	Primary language focus
1. Activate the task	8 min	Show a multimeter or a clear photo. Learners name known parts and predict what information the device can provide.	Technical nouns; prior knowledge
2. Input	10 min	Pre-teach a small set of terms: voltage, current, resistance, range, probe, reading, damaged insulation. Read/listen to the model text.	Meaning, pronunciation, recognition
3. Notice language	10 min	Underline safety language and measurement expressions. Contrast must / must not / should and identify units.	Modals; imperatives; units
4. Guided practice	12 min	Match warnings to situations; complete short sentences; read three sample measurement displays.	Controlled accuracy
5. Workplace-like task	20 min	Pairs receive a simple scenario card and explain what they would check, what safety language applies, and how they would report a displayed value.	Sequencing; explanation; reporting
6. Feedback and exit task	10 min	Teacher gives focused corrections. Each learner writes a 3–4 sentence safety-and-measurement note.	Integrated formative assessment

5.4. Comprehension and language tasks

- Comprehension: Why must the correct meter function and range be selected before taking a reading?
- Vocabulary: Match voltage, current, resistance, and frequency with their standard units.
- Safety language: Rewrite “Do not use damaged test leads” using must not.
- Technical reporting: Read a sample display and write one complete sentence containing the value and unit.
- Procedure language: Arrange first, next, then, and finally to explain a safe teacher-supervised checking sequence.
- Transfer task: Create a two-column safety card with “Hazard” and “Instruction” for three classroom situations.

6. Assessment principles

Assessment should reflect the same target tasks that organize instruction. If learners are taught to interpret labels, report measurements, and explain safety instructions, evaluation should not consist only of decontextualized grammar questions. A balanced assessment can combine vocabulary recognition, short reading tasks, oral identification of components, interpretation of a diagram or display, and a brief written or spoken workplace-like output.

A simple analytic rubric can evaluate four dimensions: (1) technical appropriateness of the message, (2) accuracy and range of English, (3) clarity and organization, and (4) appropriate use of safety language. In formative assessment, technical correctness should be checked in coordination with the technical-subject teacher when necessary. Language teachers should avoid penalizing minor accent differences when the message is intelligible and technically clear.

Table 4. Example analytic rubric for a short technical communication task

Criterion	4 – Strong	3 – Adequate	2 – Developing	1 – Limited
Technical appropriateness	Information is accurate and relevant to the task.	Mostly accurate; minor omission.	Some inaccurate or incomplete information.	Message is technically unclear or inappropriate.
Language use	Uses target vocabulary and structures accurately.	Minor errors do not impede meaning.	Frequent errors occasionally impede meaning.	Errors frequently prevent understanding.
Clarity & organization	Message is concise and logically sequenced.	Generally clear with minor sequencing issues.	Partly organized; requires listener/reader effort.	Disorganized or difficult to follow.
Safety communication	Safety instruction is explicit and appropriate.	Safety meaning is present but not fully precise.	Safety language is incomplete.	Safety meaning is absent or misleading.

7. Discussion

The proposed framework advances a shift from topic coverage to task-oriented ESP. In the earlier teacher-resource model, vocabulary, reading, phonetics, grammar, composition, and visual aids were presented largely as separate pedagogical elements. The revised design keeps those useful components but connects them to target tasks. This integration is consistent with the central ESP principle that course content should derive from the purposes for which learners need English (Basturkmen, 2010; Anthony, 2018).

The emphasis on relevant reading materials is especially well supported for electricity education. Khasanah and Madya (2019) found that learners in an electricity installation programme expected reading materials related to their field and needed varied activities to overcome reading difficulties. Similar vocational studies report the importance of technical vocabulary and authentic materials for programme relevance (Santika et al., 2022; Suyadi & Andana, 2020). The present framework responds by embedding vocabulary within short technical texts, displays, labels, scenarios, and learner outputs.

The framework also addresses the role of disciplinary literacy. Technical learners do not read prose in isolation; they interpret language together with diagrams, numer-

ical values, symbols, and problem information. Huang and Wible (2024) show that engineering students draw on interconnected disciplinary resources when reading. For secondary electricity classes, this supports a multimodal pedagogy in which words, units, drawings, component labels, and simple technical schematics are taught as part of one communicative event.

A further advantage is feasibility. Many technical schools have limited access to specialized English textbooks, licensed digital resources, or language laboratories. A useful ESP approach therefore has to work with what teachers can realistically access. Local components, chalkboard diagrams, original photographs, short teacher-written texts, and collaborative tasks can support meaningful learning at low cost. This is particularly important in African TVET contexts where language barriers may interact with academic performance and where institutionally appropriate ESP approaches require careful attention to learner profiles and local conditions (Moyo & Mann, 2021; Stander et al., 2022).

At the same time, relevance should not be confused with excessive technical complexity. The English teacher's role is not to replace the electricity instructor. Technical content should be selected at a level already familiar to learners, allowing cognitive attention to focus on language and communication. Collaboration between the English teacher and the technical teacher is therefore one of the strongest practical recommendations emerging from this framework.

8. Implications for curriculum and teacher practice

For curriculum developers, the main implication is that specialized English should be represented by explicit communicative outcomes, not only by an instruction to include technical vocabulary. Curriculum documents and textbooks can specify target tasks, recurring text types, technical lexical sets, and assessment examples for each technical stream. This makes specialization observable and teachable.

For English teachers, a practical planning sequence is: identify one technical task; collect or create a short authentic-like input; select only the vocabulary and grammar needed for that task; provide guided practice; then ask learners to complete a communicative output. Teachers can recycle the same vocabulary across speaking, reading, and writing rather than introducing many words once. Where learners are beginning English users, strategic use of French or a familiar local language can clarify complex concepts, but the key target expressions should be repeatedly practiced in English.

For technical-subject teachers, collaboration can improve both language accuracy and technical validity. A short monthly planning exchange between an English teacher and an electricity teacher can identify upcoming topics, useful equipment labels, typical safety expressions, and common learner misconceptions. Such collaboration also helps prevent technical English from drifting toward unnatural literal translations.

9. Limitations and directions for future research

The framework is intentionally conservative in its claims. It does not report a formal needs analysis conducted with Congolese electricity students, teachers, graduates, or employers, and it does not present pre-test/post-test evidence. Consequently, it should be treated as a research-informed pedagogical proposal rather than a validated intervention. This distinction is important for publication integrity and for the design of subsequent studies.

Future research should begin with a local multi-stakeholder needs analysis involving students, English teachers, electricity teachers, recent graduates, and—where feasible—employers or technicians. A classroom study could then compare a task-based ESP unit with current instruction using measures of technical vocabulary, read-

ing comprehension, oral task performance, and learner engagement. Qualitative interviews could examine which materials are most feasible under local resource constraints. A longer-term study could also investigate whether technical English supports learners' use of manuals, digital resources, and further technical education.

10. Conclusion

Teaching English in electricity classes is most useful when language is connected to the technical purposes for which learners may need it. A publishable pedagogical argument therefore requires more than a vocabulary inventory: it needs a clear ESP rationale, accurate technical terminology, a principled relationship between tasks and language, and transparent limits on what has and has not been empirically tested. The framework proposed here reorganizes electricity English around authentic communicative functions—identifying components, interpreting safety language, reading technical information, describing procedures, reporting measurements, explaining faults, and writing short technical notes.

For technical secondary schools in the DRC, the model offers a feasible route from a general English curriculum toward contextualized professional communication. Its strongest features are integration, low-resource adaptability, and direct alignment between learning activities and technical tasks. The next step is empirical validation in Congolese classrooms so that the framework can be refined from evidence on learners' actual needs, achievement, and classroom realities.

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