African Journal of Applied Research
Vol. 10, No. 2 (2024), pp. 25-43
http://www.ajaronline.com
http://doi.org/10.26437/ajar.01.12.2024.02
Special Issue: Applied Research Conference of Technical Universities in Ghana 2024
Received: December 13, 2023
Peer reviewed: June 2, 2024
Revised: December 3 2024
Published: December 2024

ENGLISH FOR ENGINEERING EDUCATION: A CORPUS STUDY OF LEXICOGRAMMATICAL CONTENTS OF ENGINEERING TEXTBOOKS

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ABSTRACT

Purpose: The need for English usage for Specific Purposes (ESP) in technical institutions has recently gained prominence. Specifically, the study identifies (1) the most frequently used vocabulary (with at least 100 hits) of electrical engineering texts and (2) their collocations in context.
Design/Methodology/Approach: As a corpus-based English for Academic Purposes (EAP) enquiry, the AntConc corpus analytical tool was employed to analyse the data. The data include seven undergraduate Electrical Engineering textbooks easily accessible online with renowned authorship purposively sampled.
Findings: The study's results reveal key vocabulary items in the Electrical Engineering textbooks, including *current*, *electric*, *voltage*, *field*, *circuit*, *magnetic*, and *power* in the order of frequency from the highest. These form beneficial syntagmatic relations with themselves and other content words; *current* collocates most frequently with *voltage*, typically in 'voltage and current' (59 hits) against 'current and voltage' (23 hits) structure.
Research Limitations: These results have implications for existing scholarship on Electrical Engineering education and for further research in English for Academic Purposes.
Practical Implication: This study has a practical implication for developing course contents and pedagogy for English Language or Communicative Skills for Electrical Engineering students and for the teachers in teaching some of these frequently used words to broaden the vocabulary scope of the Engineering students.
Social Implication: The study will help inform policy-making in technical education to address the linguistic gap by providing a framework for including English for Specific Purposes in all curricula of technical universities.
Originality: This study is based on the design of needs analysis in English for specific purposes: efficiently implementing impending competency-based training (CBT) for technical education in Ghana.
Keywords: *Collocation. corpus study. English for specific purposes. syntagmatic relation. Vocabulary*

ISSN: 2408-7920

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INTRODUCTION

Corpus-based research in English for Specific Purposes (ESP) has emerged as a powerful tool for understanding domain-specific language use, particularly in specialised fields such as engineering education (Flowerdew, 2015). A review of the literature reveals that engineering textbooks play a critical role in equipping students with the linguistic and conceptual knowledge required for professional success. Studies such as those by Staples et al. (2016), Sun and Cheng (2017), and Lei and Liu (2018) underscore the importance of identifying key lexico-grammatical patterns to develop tailored teaching materials. These patterns, often unique to technical fields, include specialised terminology, frequent use of passive constructions, nominalisation, and precise collocational structures.

As in all disciplines, language plays a pivotal role in electrical engineering education (Koutsoupidou & Antonopoulou, 2019). It serves as the medium through which complex technical knowledge, theories, and practical skills are conveyed. A vital way language functions in electrical engineering education is by learning to use words effectively (Çiçek Demirci, 2023; Olga & Marina, 2019). Both lectures and texts involve the use of many technical terms, and the learners are expected to be adequately resourced in their communicative skills with the vocabulary items to do well in the electrical engineering lessons and later at the workplace (Çiçek Demirci, 2023; Chen, 2018). Besides, since the vocabulary is used in the context of other words, the kinds of words they collocate with are key to efficiently mastering the vocabulary items in accessing and comprehending textbooks, research papers, technical articles, and engineering standards. Since engineering texts are often written formally and precisely, learners must learn to read and interpret them to succeed academically and professionally.

The present paper is, thus, a study of technical vocabulary, focusing on Electrical Engineering textbooks to identify two key things: (1) the most frequently used words with at least 100 hits in electrical engineering texts and (2) the collocations that the keywords form in context. The findings from the study will highlight specific terminologies and grammatical collocations characteristic of electrical engineering discourse.

LITERATURE REVIEW

Engineering is a broad field of science and technology that is focused on the design, construction, and optimisation of systems, machines, structures, and processes, involving the application of scientific principles, mathematics, and technology to solve practical problems, aiming to create

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efficient and functional solutions (Wright & O'Sullivan, 2018). Dorf (2018) identifies sub-disciplines of engineering such as Mechanical Engineering, Civil Engineering, Electrical Engineering, Chemical Engineering, and Computer Engineering. Engineering is at the heart of technological advancements, driving progress across transportation, energy, manufacturing, and healthcare industries. However, until recently, engineering communication was of little interest to linguists. This was perhaps because engineering was, by default, considered an integral part of science.

Engineering texts generally possess distinct linguistic characteristics to communicate complex technical concepts accurately and efficiently. Particularly, analysing engineering texts from a lexical perspective shows that they are characterised by specialised language, such as technical vocabulary, and specialised lexical bundles (Çiçek Demirci, 2023; Olga & Marina, 2019; Chen, 2018), used to communicate complex ideas within this field. Chen (2018), for example, observed more phrasal bundles than clausal ones in engineering texts. Grammatical features, including linguistic complexity (Olga & Marina, 2019; Biber & Gray, 2016), imperative forms, conditionals, and the passive voice (Flowerdew, 2015; Ward, 2009) are prevalent in engineering texts such as instructional manuals and research articles.

Ward's (2009) study mainly creates a corpus-based word list for engineering students with lower proficiency in English. The list is based on engineering textbooks and other materials, identifying the most common technical words used in the field. However, that study overgeneralises vocabulary in engineering, making it critical to study the specific sub-disciplines of engineering to create the word list for efficient learning of each particular field of engineering. Meanwhile, Ward's (2009) study provides practical insights into how corpus analysis can be used to develop discipline-specific word lists for educational purposes.

Corpus tools like AntConc and Sketch Engine have enabled researchers to analyse large datasets, uncovering trends such as the high frequency of technical terms and multi-word expressions critical for a specific field of discourse. In these studies, researchers have highlighted the pedagogical implications of corpus-based insights. For instance, Staples et al. (2016) demonstrated that explicit instruction based on corpus findings significantly improves students' comprehension and use of technical language. Engineering-focused corpora will provide valuable resources for curriculum designers, allowing them to align language instruction with the linguistic demands of engineering practice. Moreover, corpus-based approaches facilitate the identification of common grammatical challenges learners face, such as complex sentence structures or discipline-specific syntax (Çiçek Demirci, 2023). This growing body of research advances our understanding of

ISSN: 2408-7920

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language use in engineering education and underscores the importance of incorporating authentic, corpus-informed content into ESP instruction to bridge the gap between academic training and professional communication.

Accordingly, studies of the linguistic features of specific engineering texts allow us to identify and describe the linguistic features of that engineering discourse; hence, this corpus study of electrical engineering discourse.

Electrical engineering texts are not a highly explored field, even though electrical engineering is crucial in advancing modern technologies that drive industries such as telecommunications, energy, manufacturing, and healthcare. This field continually evolves with innovations like artificial intelligence, machine learning, and renewable energy sources. Thus, regular synchronic and diachronic corpus-based studies of language evolution in this fast-growing field are required to advance the language use of students learning electrical engineering.

METHODS

The data comprises 491,774 words with 12,204 distinct entries drawn from seven undergraduate Electrical Engineering textbooks easily accessible online with renowned authorship, which were purposively sampled. Please see Table 1 for the sample texts used for the study. AntConc corpus analytical tool was employed in analysing the data first into words from which content words – nouns, adjectives, verbs, and adverbs – were extracted. ChatGPT prompt was queried for key terms used in electrical engineering. The words from the response that are also found among the first twenty words in the vocabulary identified in the AntConc Word List were selected and keyed back into the AntConc concordancer for their collocations with Window Span of 3L3R within the same grammatical sentence.

ISSN: 2408-7920

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Table 1: List of Textbooks used for the study

Title of Textbook	Year	Author(s)	Profile
Fundamentals of Electrical Engineering I	2015	Don Johnson	J.S. Abercrombie Professor Emeritus
Electromagnetics and Applications	2011	David H. Staelin	American Astronomer, Engineer, and Entrepreneur
An Introduction to Electrical Safety for Engineers	1993	Donald S. Bloswick	Assistant Research Professor
Electromagnetics: General theory of the electromagnetic field classical and relativistic approaches (3rd ed.)	2012	Andrei Nicolaide	Regular Member of the Academy of Technical Sciences in Romania; Distinguished University Professor; Life Senior Member of the IEEE (Institute of Electrical and Electronics Engineers)
Introduction to Electronic Engineering	2010	Valery Vodovozov	Professor of Electronic Engineering, Tallinn University of Technology; Member of IEEE, International Institute of Informatics and Systematics (IIIS), Global Research Alliance of Texas Institute of Science (TxIS GRA), and Estonian Society of M. H. Jacobi
Electrical Circuits Lecture Notes (B.TECH Year 1 Sem 2)	2017	Department of Electrical and Electronics Engineering	Malla Reddy College of Engineering & Technology (Autonomous Institution – UGC, Govt. of India) Recognised under 2(f) and 12(B) of UGC ACT 1956
Electromagnetism	2016	David Tong	Lectures on Electromagnetism

RESULTS AND DISCUSSION

General Vocabulary of Electrical Engineering

The vocabulary items include only the content (or lexical) words extracted by the AntCond word count. 419, the vocabulary items have 100 or more hits and are included in the present analysis. The first hundred words include those shown in Table 2 below with their frequencies:

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Table 2: Frequency of the first 100 words in electrical engineering textbooks

Word	**Freq.**		**Word**	**Freq.**		**Word**	**Freq.**		**Word**	**Freq.**
electric	2147		output	714		given	553		like	438
current	2091		Force	696		general	551		space	432
Field	1990		Case	690		shown	550		free	429
voltage	1687		Law	688		circuits	542		charges	420
magnetic	1510		All	687		used	537		phase	420
Signal	1437		system	678		first	527		strength	412
Circuit	1427		source	676		sin	517		waves	412
Figure	1410		More	657		density	514		integral	404
Two	1298		Zero	638		fields	514		unit	402
Power	1188		Wave	634		direction	511		equivalent	395
One	1149		Only	632		expression	496		relations	394
Time	1142		Form	630		there	496		use	394
Charge	1054		Other	630		cos	494		currents	392
frequency	1052		example	629		signals	492		length	389
Any	948		Input	601		number	477		function	386
Point	942		equations	590		complex	476		velocity	380
Vector	934		equation	588		series	473		lines	374
surface	923		Using	588		parallel	470		values	372
Same	856		Line	586		find	467		problem	366
Energy	846		Called	579		follows	460		fixe	362
electromagnetic	778		Frame	569		consonant	456		load	362
Each	766		Value	569		flux	450		quantities	362
relation	734		solution	568		resistance	446		consider	358
reference	726		theory	557		both	443		total	356
these	719		section	556		systems	443		linear	348

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Other vocabulary items in the texts with 100 or more hits include:

A

account acoustic acting again always amp (ampere)
amplifier amplitude analog angle another antenna antennas
appendix applied applications approach arbitrary area associated
assume assumed atoms average axis

B

back base behaviour bit bits bodies boundary branch

C

capacitor cases certain change channel charged closed
code coefficients coil collector combination common
communication component components compute computer
condition conditions conducting conduction conductor connected
considered content corresponds corresponding covariant
cross curl curve cylinder

D

data defined definition denote dependent depends
derived design determined devices difference different differential
digital diode dipole dipoles discrete displacement
distance divergence domain duration

E

earth easily ebook effect electrical
electron electrons, electronic element elements engineering equal equals
error exercise exponential expressions

F

fact factor far faraday filter flow
flowing following forces formula forward found four
fourier frequencies fundamental

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G

gain gate generally grad

H

half having here high higher

I

illustrated imaginary impedance important increases independent index indices inductance induction inductor information introduced introduction

J

junction

K

know known

L

large laws left level light Lorentz losses low lower

M

make made many materials maximum maxwell mean means medium media message method mobile mode model momentum motion motor moving

N

nature need negative network new node noise notation note

ISSN: 2408-7920

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O

obtain obtained occur ohms online open
opposite order ordinates original ox

P

particle particles passing passive peak period periodic
perpendicular place plane points polarised polarisation
positive potential probability
processing produce produced propagating propagation
property properties proportional pulse

Q

quantity

R

radio radius range rate ratio real
receiver reflected related relative relatively relativity
represents represented requires required resistor resistors
resonance resonator respect respectively rest
result results resulting right

S

sample sampling satellite second sense separation
set several short show shows side similar
simple simply single sinusoid sinusoidal small
solutions sources special spectrum speech
square state static stored substance
sum superposition surfaces symbol

T

take taking tem (temperature) tensor term terms theorem
thevenin three times transfer transform transistors
transmission transmitter true

ISSN: 2408-7920

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U

useful

V

vacuum valued various vectors voltages volume vout

W

want waveform wavelength way well wire wires work write

Y

yield yields

Grammatical Collocations

To identify grammatical collocations in the provided text, we focused on phrases where specific words commonly occur together naturally in the context of the electrical engineering texts as technical writing. Specific focus is placed on keywords such as *electric*, *electrical*, *current*, *voltage*, *magnetic*, *electron* (also electrons or electronic), and *component* (or components). We explore how much these collocate with one another and other words in the identified vocabulary. Here are some examples of grammatical collocations found in the text:

- The word *electric* collocates with:
  Field/fields, charge/charges, strength, polarisation, displacement, circuit, current/currents, magnetic, density, moment, intensity, flux, bound, tension, carrying, conduction, point, amperian, vacuo, potential, produced, convection, stored, resistivity, law, distribution, component, macroscopic, static, energy, permittivity, carriers, pressure, induction, frequency, distributed, conservation, unit, moments, dipole, lines, molecular, conductors, motion, temporary, total, voltage, wave, multipole, constant, vector, power, coulombian, moving, source, predominantly, body, quantities, storage.

  Some of the most frequent collocations with *electricity* in electrical engineering texts are presented with contextual examples as follows:

  Electric field, as in

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However, the **electric field** is not isotropic.

electric field strength, as in

… the vectors' electric movement and **electric field strength** differ in greatness and direction, i.e., they

electric charge, as in

It follows that the polarisation **electric charge** of the internal surface …

polarisation electric charge as in

Explanation of the calculation of the external density of the **polarisation electric charge**.

polarisation electric current as in

… displacement **electric current** in vacuo and the intensity of the **polarisation electric current**.

electric current, as in

… where the amount il signifies the strength of the **electric current** considerably.

electric and magnetic field, as in

If the **electric and magnetic fields** are nil external to the two plates and uniform

electric and magnetic energy density, as in

… the average time for storing **electric and magnetic energy densities** are: We = 1 C | V |2 [J/m], Wm = 1

e*lectric and magnetic energy storage*, as in

A simple relation exists between the **electric and magnetic energy storage** in resonators …

electric circuit, as in

An **electric circuit** functions as an element for engineering

The passive fundamentals of an **electric circuit** do not have vigour.

- *Electrical* collocate with

  circuits, engineering, technology, networks, machines, engineer/engineers, fundamentals, science, contacts, breakdown, conductivity, electronics, converts, sliding, energy, institute, power, generators, modern, themes, solving, mechanical, basic, focusing

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Some examples of the most frequent collocations with electrical in context are presented as follows:

Electrical circuits, as in

… induced emf compete with the change in current in **electrical circuits,** and electric current 'I' generates a magnetic field …

electrical power, as in

… the wire by the location converts to negative, and the **electrical power** transported by the Thevenin source converts to positive. That is,

electrical engineers, electrical engineering as in

Electrical engineers refer to these spaces, and in some materials, predominantly certain
One of the most astonishing and beneficial consequences of **electrical engineering** is that signals can be converted from a function

- *Current* collocates with

  voltage, electric, source, flow, flows, flowing, density, carrying, collector, amperian, sources, intensity, base, convection, sheet, displacement, distribution, leakage, conduction, load, distributions, total, lags, divider, versus, loop, reverse, direct, leads, drain, frequency, branch, gain, passing, emitter, ideal, signal, short, alternating, molecular, gate, waveform, forward, behind, maximum, carries, electromagnetic, determine, element, kirchoff, image, induced, practical, division, change, armature, circuited, system, frame, diode, reference, wave, circuit, find, vector, eddy, crosses, localised, polarisation, zero, resultant, carry, rise

Here are some of the most frequent collocations, followed by their examples of use in context:

voltage and current, as in

Because the multifaceted amplitudes of the **voltage and current** are connected by the equivalent resistance, average …

voltage or current, as in

… they improve the data symbol or derive information from the **voltage or current**.
… appropriateness of each examination hinges mostly on the number of **voltage/current** sources in the particular network.

voltage-current or *voltage/current* as in

The conduct of these three elements, along with the separate **voltage-current** connection, is given in the table.

ISSN: 2408-7920

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current source, as in
The resultant **current source** is transformed into a comparable voltage source as revealed

Current is flowing as in
Every time a **current is flowing** through the coil there will be magnetic flux formed

current flowing, as in
… the same amount of heat produced by the alternating **current flowing** through the same resistance for the same time

current flows, as in
Because no **current flows** through the resistor, the voltage across it is nil.

current density, as in
It describes the magnetic field due to a general **current density**.

current flow (n) as in
Electrons are made up of **current flow** in numerous ways. Because electrons have a negative charge,

flow of current, as in
… so, there is no net **flow of current** via the circuit.

carrying … current
… empirically observed the action applied by an electrical conductor **carrying an electric current** on a magnetic needle.

- *Magnetic* collocates with:
  field/fields, flux, strength, induction, electric, monopoles, law, pressure, polarisation, energy/energies, circuital, lines, circuit, permeability, fictitious, dipole/dipoles, density/densities, motors, potential, forces, linkage, materials, susceptibility, induced, commutated, charges, diffusion, force, turn, voltage, relaxation, sensors, existence, nature, stored, fictive, storage, phenomena, needle, rotary, amperian, static, instantaneous, produced, changing, deflection, unit, coulombian, huygens, uniform, current

The following are examples of the most frequent collocations involving magnetic:

magnetic field strength as in

ISSN: 2408-7920

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We will submit a source of the overall method of the **magnetic field strength** of a solenoid, in the Appendix.
The summation of the **magnetic field strength** formed by solenoids that carry an electric current is of great attention, pointing to everyday reasons as well as hypothetical ones.

magnetic flux, as in
The **magnetic flux** through the whole surface is measured, taking into account.

magnetic induction, as in
The law of the association between **magnetic induction**, magnetic field strength, and magnetisation

magnetic monopoles, as in
…volume distributions of **magnetic monopoles** that have the volume density of the magnetic charge UvM are considered.

law of magnetic circuit as in
The Expression of the **Law of Magnetic Circuit** for Empty Medium at Rest
… of the essential form and local form, correspondingly, of the **law of magnetic circuit** for any medium at rest,

- *Electron* collocates with:
  free, volt/volts, spins, cloud/clouds, transit, beam, spinning, energy, donor, mass, neutron, hole, shorten, cyclotron, pairs, valence, states, movement, leaves

The following are examples of some frequent collocations involving the word *electron*.

free electron, as in
In metals, there is roughly one **free electron** for each atom

electron volt, as in
An **electron volt** is the vigour attained by an electron or other

electron spins as in
… the casually oriented - 139 - pre-existing magnetic dipoles connected with **electron spins** and electron orbits in atoms.

electron clouds, as in

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Lorentz forces act on atomic nuclei and the nearby **electron clouds** that are put together, and on any free charges.

- *Electrons* collocate with
  free, holes, valence, move, protons, flow, excited, dislodge, motion, ions, carriers, accelerated, excess, theory, number, lack, orbiting, ejected, possess, release, fill, thermally

Here are examples of the most frequent collocations with the word electrons:

Free electrons, as in
The applied voltage will energize the **free electrons** and holes to move between the positive and negative terminals in the crystal.

electrons and holes as in
As far as both **electrons and holes** contribute to the conductivity, the holes in each case

valence electrons as in
When this happens, the **valence electrons** become free electrons that extricate other valence electrons.

electrons move as in
But that's not the case when **electrons move** in real materials.

- *Electronic* collocates with
  circuits, devices, equipment, contents, converters, systems, development, consumer

Examples of collocations with electronics are as follows:

electronic circuits
Thermal sound plagues all **electronic circuits** that contain resistors.

electronic devices
The significant features of **electronic devices** and circuits are as follows.

electronic equipment
… mixed circuits present a lot of analog and switching **electronic equipment**.

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Technical Vocabulary of Electrical Engineering

Some of these vocabulary items and their collocations identified in the foregone discussion constitute technical vocabulary (i.e., key terminologies) from the present data related to electrical engineering across various texts. These terms highlight the specialised vocabulary in electrical engineering education and texts on electromagnetism and circuits. They include:

Electromagnetics terminologies*:*

- *Lorentz force law*: It connects the force on a charged particle to electric and magnetic fields.
- *Magnetic flux*: It refers to several magnetic field lines passing through an external.
- *Electric susceptibility*: This measures how much a material will become polarised in an electric field.
- *Electric and magnetic fields*: They guide particle movement in electromagnetism.
- *Charge distribution*: This describes how electric charge is distributed in a given region.
- *Current density*: It measures electric current per unit area of cross-section.
- *Maxwell equations:* These are the governing equations for electric and magnetic fields.
- *Lorentz force*: This is the force experienced by a charged particle in electromagnetic fields.

General electrical engineering terminologies*:*

- *Voltage source*: It is a device that provides a constant voltage.
- *Current source*: It provides a constant current.
- *Resistor*: It is a component that resists the flow of current.
- *Inductor*: An unreceptive part keeps energy in a magnetic field.
- *Capacitor*: It keeps electrical power in an electric field.

Electrical circuits terminologies*:*

- *Resistive networks*: It is a network analysis involving resistances.
- *Inductive networks*: They are circuits where inductance plays a role.
- *Capacitive networks*: They are systems involving capacitance.
- *Kirchhoff's laws*: Fundamental laws governing current and voltage in circuits.
- *Mesh analysis and supermesh*: They are methods for analysing complex circuits.
- *Nodal analysis and supernode*: These techniques solve circuits by focusing on node voltages.

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http://doi.org/10.26437/ajar.01.12.2024.02
Special Issue: Applied Research Conference of Technical Universities in Ghana 2024
Received: December 13, 2023
Peer reviewed: June 2, 2024
Revised: December 3 2024
Published: December 2024

DISCUSSION

The findings of this study align closely with the key themes presented in the literature review, emphasising the critical role of technical vocabulary and collocational patterns in engineering education. The literature highlights the unique linguistic features of engineering texts, such as their reliance on domain-specific terms, precise syntax, and formulaic expressions (Çiçek Demirci, 2023; Biber & Gray, 2016). This is consistent with the study's identification of frequently occurring terms such as *current*, *voltage*, *electric*, and *magnetic* as central to Electrical Engineering discourse. These words dominate the lexicon and form intricate syntagmatic relations, underscoring the structured and highly specific nature of engineering language.

The findings further validate prior research on the pedagogical implications of corpus-based approaches. Studies by Ward (2009) and Staples et al. (2016) emphasised that explicit instruction based on corpus insights significantly enhances students' mastery of technical language. Similarly, this study's analysis of collocations, such as "electric field" and "voltage and current," offers actionable insights for creating targeted ESP materials. These combinations exemplify how technical terms co-occur naturally, facilitating comprehension of complex concepts and fostering a deeper understanding of electrical engineering texts. It demonstrates the importance of tailoring linguistic instruction to the usage patterns found in professional and academic texts, as advocated in the literature.

Moreover, the study builds on domain-specific vocabulary lists, as Cheng (2016) and Ward (2009) highlighted. While prior studies are often generalised across engineering disciplines, this research narrows its focus to Electrical Engineering, providing a more granular view of its lexical characteristics. By isolating frequently used terms and their syntactical relationships, the study addresses a gap identified in the literature: the need for sub-discipline-specific analysis. This nuanced approach ensures that educational interventions are precisely aligned with the linguistic demands of Electrical Engineering, offering a robust framework for bridging the gap between academic preparation and professional communication needs.

CONCLUSION

The study provides critical findings related to the use of language in electrical engineering education. The primary focus was to select the most regularly deployed words and their

ISSN: 2408-7920

African Journal of Applied Research
Vol. 10, No. 2 (2024), pp. 25-43
http://www.ajaronline.com
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collocations within seven electrical engineering textbooks, which were analysed using a corpus-based methodology.

This research revealed that the most extraordinary recurrent vocabulary items used in the designated textbooks include technical terms like *current*, *electric*, *voltage*, *field*, *circuit*, *magnetic*, and *power*. These words were found to frequently collocate with other related terms, forming meaningful syntagmatic relationships within the texts. For instance, *current* often appeared with *voltage*, particularly in the structure "voltage and current" more frequently than "current and voltage". This insight into word combinations helps highlight how specific terms are used in electrical engineering contexts, making it easier to understand electrical engineering discourse.

Additionally, the grammatical patterns and collocations identified in the analysis reveal that the language of electrical engineering is highly formulaic and structured. Common collocations such as "electric field", "magnetic field", "magnetic field strength", "flow of current", "current source", "voltage source", and "electrical circuits" underscore the importance of understanding how these technical terms function together in context. This provides deeper insight into the discipline's linguistic patterns. The study also uncovered frequent noun phrases and nominalisations, like "signal transmission" instead of "the signal is transmitted", which are standard features of technical texts, making them more concise but abstract.

Moreover, the results have pedagogical implications. They suggest that teaching these frequently occurring words and their collocations to electrical engineering students can enhance their communicative competence, aiding their comprehension of their textbooks and academic materials. Instructors may, therefore, use these findings to develop more targeted English for Academic Purposes (EAP) courses for electrical engineering students, focusing on the most relevant vocabulary and syntagmatic structures.

In conclusion, the study's corpus analysis highlights the critical lexical and grammatical elements essential in electrical engineering education. The research contributes valuable insights for educators and learners in technical universities, particularly in electrical engineering programmes, by focusing on the most frequent technical vocabulary and their collocations. It also offers a foundation for future English for Specific Purposes studies, particularly in refining teaching approaches to better suit engineering students' language needs.

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ISSN: 2408-7920