



AN ABSYAK MODEL OF ENGLISH TEACHING MATERIALS FOR PHARMACY STUDENTS: ENHANCING VOCABULARY MASTERY AND SYNTAX ACCURACY FOR PHARMACEUTICAL TEXTS

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ABSTRACT

Aim/Purpose	This study addresses the persistent challenge in pharmacy education where English for Specific Purposes (ESP) instruction often prioritizes general communicative competence while overlooking the discipline-specific vocabulary mastery and syntactic accuracy required for interpreting and producing pharmaceutical texts. The study aims to develop and validate the Absyak Model of English Teaching Materials, designed to strengthen pharmacy students' ability to understand and produce precise pharmaceutical discourse.
Background	Pharmaceutical education increasingly requires students to engage with complex drug monographs, clinical guidelines, patient information leaflets, and research abstracts written in English. However, many ESP instructional materials lack systematic integration of pharmaceutical terminology, morphological awareness, and syntactic structures characteristic of scientific discourse. As a result, students frequently encounter difficulties in accurately interpreting pharmacological information and producing structured pharmaceutical texts. This study ad-

Accepting Editor Fariza Khalid | Received: March 28, 2026 | Revised: May 29, August 22, 2026 |

Accepted: September 15, 2026.

Cite as: Yulia, Y., Syakur, A., Margana, & Purnawan, A. (2026). An Absyak model of English teaching materials for pharmacy students: Enhancing vocabulary mastery and syntax accuracy for pharmaceutical texts. *Journal of Information Technology Education: Research*, 25, Article 39. <https://doi.org/10.28945/5885>

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	addresses this gap by designing a discipline-aligned instructional model that integrates lexical development and syntactic scaffolding through authentic pharmaceutical materials.
Methodology	This study employed a Design-Based Research approach involving iterative cycles of prototype development, evaluation, and refinement. The research was conducted at a private university in East Java, Indonesia, involving 84 undergraduate pharmacy students enrolled in an English for Pharmacy course. Data were collected through multiple sources to ensure methodological triangulation. These included expert validation of instructional materials, pre- and post-assessments measuring pharmaceutical vocabulary mastery and syntactic accuracy, document analysis of students' written pharmaceutical texts, and focus group interviews with purposively selected participants representing different proficiency levels. Quantitative data were analyzed to examine improvements in lexical and syntactic performance, while qualitative data were analyzed thematically to explore students' learning experiences and perceptions of the instructional model.
Contribution	This study contributes to the field of ESP by proposing a structured instructional model that systematically integrates vocabulary mastery and syntactic development within authentic pharmaceutical discourse. The Absyak Model advances ESP pedagogy by demonstrating how corpus-informed lexical instruction, syntactic scaffolding, and genre-based writing tasks can be combined to support professional language competence in pharmacy education. Its distinctive contribution lies in formalizing these elements as a single, replicable design (the six-stage A-B-S-Y-A-K sequence) refined through Design-Based Research, offering instructional designers and ESP practitioners a transferable template for discipline-specific materials development and, more broadly, for technical and healthcare communication where lexical precision and syntactic accuracy carry professional and patient-safety consequences.
Findings	The findings indicate that implementing the Absyak Model was associated with significant within-group gains in students' mastery of pharmaceutical terminology and in their ability to apply syntactic structures appropriate to pharmaceutical texts. Students demonstrated improved competence in recognizing specialized vocabulary, interpreting contextual meanings, and applying morphological patterns commonly found in pharmacological discourse. In addition, learners showed enhanced accuracy in producing structured pharmaceutical summaries and explanations, particularly in the use of passive constructions, clause embedding, and nominalization. The iterative design process also revealed that contextual authenticity and disciplinary alignment of learning materials played a critical role in facilitating meaningful engagement with pharmaceutical texts. Nevertheless, variations in initial language proficiency influenced the pace of syntactic development, and some complex grammatical constructions required sustained instructional reinforcement. Because the study used a single-group pre-test/post-test design without a control condition, these results are presented as evidence of the development and feasibility of the materials and of immediate learning improvement, rather than as proof of comparative or sustained instructional effectiveness.
Recommendations for Practitioners	Educators in pharmacy and other health-related programs are encouraged to incorporate corpus-informed vocabulary instruction, authentic pharmaceutical texts, and structured syntactic scaffolding into ESP curricula. Instructional materials should integrate repeated lexical exposure and guided writing tasks that

	gradually move from controlled practice toward independent production of pharmaceutical discourse.
Recommendations for Researchers	Future research should explore the implementation of similar instructional models across different disciplinary contexts within health sciences education. Researchers are also encouraged to investigate the interaction between lexical development and syntactic competence in specialized academic writing using mixed-method approaches.
Impact on Society	Strengthening pharmacy students' ability to interpret and produce pharmaceutical texts accurately contributes to improved professional communication, safer dissemination of drug information, and enhanced collaboration within global healthcare environments.
Future Research	Further studies should examine the long-term impact of the Absyak Model through longitudinal research designs and larger multi-institutional samples. Additional investigation may also focus on integrating digital corpus tools and automated linguistic analysis to support the sustained development of specialized academic language.
Keywords	design-based research, English for Specific Purposes, pharmaceutical texts, syntactic accuracy, vocabulary mastery

INTRODUCTION

Research on English for Specific Purposes (ESP) has consistently underscored the importance of aligning language instruction with the epistemological and communicative demands of specific disciplines, particularly in health sciences, where terminological precision and syntactic clarity directly affect professional performance. Foundational ESP scholarship has emphasized needs analysis and genre specificity as central principles in material development, arguing that discipline-sensitive instruction enhances relevance and transferability of learning outcomes (Dudley-Evans & St. John, 1998; Hyland, 2022; Hyland & Jiang, 2021). Within health-related domains, studies have demonstrated that mastery of technical vocabulary significantly predicts learners' comprehension of specialized texts and their ability to participate in professional discourse communities (Fan, 2024; Niedźwiedzka et al., 2009). Similarly, research in academic writing and applied linguistics has shown that syntactic complexity and accuracy are closely associated with textual clarity, credibility, and disciplinary conformity, particularly in scientific and medical writing (Moslehi & Kafipour, 2022; Wu et al., 2023). These strands of research collectively establish vocabulary mastery and syntax accuracy as foundational constructs for engaging effectively with pharmaceutical texts such as drug monographs, research articles, and clinical documentation.

Despite this robust body of knowledge, several limitations remain evident. First, much ESP material development in health sciences continues to privilege general communicative competence over systematic instruction in discipline-specific lexical bundles, morphological patterns, and collocational networks that characterize pharmaceutical discourse (Hu & Chen, 2022; Yacoub, 2025). While vocabulary research has advanced through corpus-informed lists and lexical profiling tools, empirical interventions that operationalize vocabulary mastery as depth of word knowledge, including form, meaning, use, and collocation within pharmaceutical genres, remain limited. Second, syntactic instruction in ESP contexts often focuses on surface-level grammatical correctness rather than on functional syntactic accuracy, defined as the appropriate deployment of clause structures, passive constructions, nominalizations, and hedging devices typical of scientific reporting (Mauludin et al., 2026; Slamet et al., 2025). Existing studies have reported improvements in general writing fluency following ESP interventions, yet fewer have isolated syntactic accuracy as a measurable outcome for discipline-bound texts. Third, research on teaching materials frequently evaluates effectiveness through short-term

achievement gains without iterative refinement grounded in design-based principles, thereby limiting theoretical advancement and pedagogical robustness (Chiu et al., 2023; Wang & Xu, 2026; Zhou, 2025).

These gaps suggest the need for a theoretically grounded and empirically validated instructional model that integrates vocabulary mastery and syntax accuracy within authentic pharmaceutical texts. In the present study, vocabulary mastery is operationalized as learners' breadth and depth of pharmaceutical lexical knowledge, encompassing accurate recognition, contextual interpretation, morphological awareness, and productive use of technical terminology and multiword units. Syntax accuracy is operationalized as the precise and contextually appropriate use of grammatical structures characteristic of pharmaceutical discourse, including complex noun phrases, passive voice constructions, conditional statements, and clause embedding in written tasks. Pharmaceutical texts are defined as authentic or pedagogically adapted documents such as drug information leaflets, research abstracts, and case-related summaries that reflect the linguistic conventions of the field. The Absyak Model of English Teaching Materials is conceptualized as an iterative, design-informed instructional framework that systematically integrates needs-based content selection, corpus-informed lexical targeting, structured syntactic scaffolding, and cyclical evaluation to enhance alignment between linguistic form and disciplinary function. The name "Absyak" is an acronym formed from the six sequential components of the model: Activation of disciplinary schema, Building of lexical networks, Structural scaffolding of syntax, Yielding of guided production, Authentic application, and Knowledge consolidation and feedback (A-B-S-Y-A-K). Throughout this paper, the term is treated as a proper noun and capitalized consistently as the Absyak Model.

The novelty of the model is threefold and distinguishes it from prior ESP frameworks. First, whereas genre-based pedagogy, corpus-informed vocabulary instruction, and form-focused grammar instruction have typically been applied as separate strands, the Absyak Model integrates all three into a single staged sequence in which lexical and syntactic targets are derived from the same pharmaceutical corpus and rehearsed within the same authentic genre. Second, unlike conventional ESP coursebooks that are designed once and evaluated only through end-of-course achievement, the model is generated and revised through iterative Design-Based Research cycles, so that the sequence itself, and not only the learning outcome, is an empirical product of the study. Third, the model is purpose-built for pharmaceutical discourse rather than adapted from general medical English, treating vocabulary mastery and syntactic accuracy as mutually reinforcing and jointly assessed constructs. This explicit articulation of what the model is, and how it differs from existing approaches, is intended to make its rationale accessible to an international readership.

Although prior research has examined ESP vocabulary instruction, genre-based pedagogy, and grammar-focused interventions separately, few studies have integrated these dimensions into a coherent model specifically targeting pharmaceutical texts and evaluated it through iterative refinement processes. Furthermore, the interrelationship between vocabulary mastery and syntax accuracy as complementary predictors of textual comprehension and production in pharmaceutical discourse remains underexplored. Consequently, a comprehensive model that simultaneously addresses lexical precision, structural accuracy, and disciplinary authenticity is warranted to advance both theory and practice in the development of ESP materials.

In response to these identified gaps, the study addresses the following research questions (RQs):

1. To what extent does the Absyak Model of English Teaching Materials enhance pharmacy students' vocabulary mastery in pharmaceutical texts?
2. To what extent does the Absyak Model of English Teaching Materials improve pharmacy students' syntax accuracy in producing pharmaceutical texts?

LITERATURE REVIEW

ESP AND PHARMACEUTICAL DISCOURSE

ESP has evolved as a discipline grounded in the principle that language instruction must reflect the communicative practices, genres, and epistemologies of particular professional communities (Dudley-Evans & St. John, 1998; Hyland, 2022; Swales, 1987). Within scientific and medical domains, genre-based and corpus-informed approaches have demonstrated that disciplinary texts exhibit recurrent rhetorical moves, lexical bundles, and grammatical patterns that differ substantially from those of general academic English (Karahan İter & Yeşilyurt, 2024). Research in medical and health sciences education further indicates that students' difficulties often stem not from general language deficiency but from limited familiarity with field-specific discourse conventions and terminological density (Al-rashed & Latif, 2025; Hamad et al., 2025). Although ESP scholarship has generated models for needs analysis and materials evaluation, empirical studies focusing specifically on pharmaceutical discourse remain comparatively limited. Existing materials frequently adapt general medical English resources without systematically analyzing the lexical and syntactic features of pharmaceutical texts such as drug monographs, patient information leaflets, and research abstracts. This indicates a conceptual and pedagogical gap in tailoring ESP frameworks to the distinctive linguistic ecology of pharmacy, thereby necessitating a more specialized and theoretically anchored instructional model.

VOCABULARY MASTERY IN PHARMACEUTICAL TEXTS

Vocabulary knowledge constitutes a multidimensional construct encompassing breadth, depth, collocational control, and morphological awareness (González-Fernández, 2022; Rezai et al., 2026; Wright et al., 2022). In disciplinary contexts, lexical competence extends beyond the recognition of technical terms to include understanding of semantic nuances, word-formation processes, and phraseological patterns embedded in authentic texts (Arora et al., 2023; Fan, 2024). Corpus-based studies have identified the prevalence of specialized lexical bundles and formulaic sequences in scientific writing, underscoring their role in signaling stance, procedure, and evidentiality (Estaji & Montazeri, 2022; Yacoub, 2025). However, instructional interventions in health-related ESP programs have often prioritized isolated lists of terminology or definitional exercises, which may enhance surface-level recognition but do not consistently foster productive, contextually appropriate use. Moreover, empirical evidence suggests that without structured recycling and contextualization, gains in technical vocabulary are vulnerable to attrition (Q. Huang, 2025; Y. Huang et al., 2024). Despite these insights, few studies have operationalized vocabulary mastery in pharmacy education as an integrated construct that combines receptive accuracy, productive deployment, morphological sensitivity, and collocational appropriateness within authentic pharmaceutical texts. This lacuna highlights the need for pedagogical designs that systematically embed vocabulary learning within genre-specific discourse practices.

SYNTAX ACCURACY AND SCIENTIFIC WRITING CONVENTIONS

Syntactic accuracy plays a critical role in shaping clarity, precision, and disciplinary credibility in scientific communication. Research in applied linguistics has documented the prominence of complex noun phrases, passive constructions, conditional clauses, and nominalizations in academic and scientific prose (Sun & Zhang, 2023; Xu & Casal, 2023). These structures function not merely as grammatical forms but as rhetorical resources that condense information, express caution, and foreground processes over agents. Studies on second language academic writing have demonstrated that syntactic development is closely associated with learners' ability to produce discipline-aligned texts (Shen et al., 2023; Taye & Teshome, 2025). Nevertheless, grammar instruction in ESP contexts often remains decontextualized, focusing on rule explanation rather than functional application within authentic genres. While some interventions report improvements in overall writing scores, fewer studies isolate syntactic accuracy as a distinct, measurable outcome in specialized domains such as pharmacy (Li & Xu, 2025; Shanavas et al., 2024). Furthermore, limited attention has been given to how vocabulary

knowledge and syntactic control interact to facilitate comprehension and production of dense pharmaceutical texts. This theoretical and empirical gap suggests the importance of integrating syntactic scaffolding with lexical targeting in a coherent instructional framework.

THEORETICAL FRAMEWORK AND THE STUDY CONTEXT

The present study is informed by an integration of genre-based pedagogy, corpus-informed vocabulary instruction, and Design-Based Research principles. Genre theory emphasizes explicit modeling of disciplinary conventions and staged scaffolding to support learners' participation in professional discourse communities (Hyland, 2022; Swales, 1987). Corpus-informed approaches advocate systematic identification of high-frequency lexical items and syntactic patterns characteristic of target texts (Gao et al., 2022). Design-Based Research contributes an iterative methodology that links theory refinement with classroom implementation, enabling continuous adjustment of instructional prototypes based on empirical evidence (Elledervová, 2022; Reimann, 2011). Within the context of a private university in East Java, Indonesia, pharmacy students engage with English-language pharmaceutical references and research sources that demand high levels of lexical precision and structural control. However, existing instructional materials have not consistently integrated corpus-based lexical analysis, functional syntactic scaffolding, and iterative validation processes. Responding to these theoretical and contextual considerations, this study aims to develop and validate an Absyak Model of English Teaching Materials designed to enhance pharmaceutical vocabulary mastery and syntactic accuracy.

POSITIONING THE ABSYAK MODEL AMONG EXISTING ESP FRAMEWORKS

Read together, the strands reviewed above expose a recurring tension rather than a settled consensus. Corpus-informed work demonstrates what specialized vocabulary and syntax look like in expert texts but stops short of prescribing how these features should be sequenced for instruction; genre-based pedagogy supplies a staging logic but is rarely tied to empirically derived lexical and syntactic targets; and form-focused grammar studies report measurable gains yet typically isolate single structures from the discourse in which they function. A parallel tension appears on the methodological side: studies that evaluate ESP materials through one-off achievement testing can establish that learning occurred but cannot show how the materials themselves were improved, whereas the few Design-Based Research accounts of ESP coursebook design (Elledervová, 2022) foreground iterative refinement but are seldom anchored to the dense, safety-critical register of pharmacy. Existing pharmaceutical English interventions, in turn, tend to adapt general medical English resources rather than analyze the distinctive lexical and syntactic ecology of drug monographs, leaflets, and abstracts (Karahan İlter & Yeşilyurt, 2024). These limitations are not independent; each leaves the same gap untouched: the absence of a model that derives lexical and syntactic targets from the target discourse, sequences them through an explicit genre-based progression, and is itself refined by evidence.

The Absyak Model is positioned at the intersection of these traditions and is intended to resolve, rather than merely combine, the tensions above. In contrast to genre-based frameworks that treat vocabulary and grammar as background and to corpus-informed approaches that produce word lists without a teaching sequence, the model uses a single pharmaceutical mini-corpus to specify both the lexical and syntactic objectives of each unit, then rehearses them through a controlled-to-free genre progression. In contrast to coursebook-design studies that report a finished product, the model exposes its own design history through three refinement cycles, so that the instructional sequence is presented as a tested artifact. This framing also clarifies the study's relevance beyond applied linguistics: by treating the materials as a designed, iteratively evaluated instructional artifact, the work speaks directly to instructional-design theory and educational innovation, and the corpus-building and automated lexical-profiling tools used to construct and assess the materials connect it to technology-supported language learning of the kind that concerns the broader informing-science readership.

METHODOLOGY

RESEARCH DESIGN

This study employed a Design-Based Research approach to systematically develop, implement, evaluate, and refine the Absyak Model of English Teaching Materials with the dual objective of enhancing pharmaceutical vocabulary mastery and syntactic accuracy in pharmaceutical texts. Design-Based Research was selected for its suitability in generating both practical instructional solutions and theoretical contributions through iterative cycles of design, enactment, analysis, and redesign (Reimann, 2011). The design process consisted of four interrelated phases.

The first phase involved problem analysis and needs assessment. A diagnostic lexical and syntactic screening test was administered to identify baseline proficiency in pharmaceutical terminology, morphological awareness, collocational control, complex noun phrase construction, passive voice usage, and clause embedding in short pharmaceutical summaries. In addition, a document analysis of existing instructional materials was conducted to examine lexical coverage, syntactic scaffolding, and alignment with authentic pharmaceutical genres. Findings from this phase informed the initial design specifications of the Absyak Model, particularly in structuring lexical progression and syntactic sequencing.

The second phase entailed prototype development. The initial Absyak prototype integrated corpus-informed pharmaceutical vocabulary lists, structured syntactic modeling activities, genre-based reading tasks, guided writing tasks, and formative feedback cycles. Lexical targets were organized into semantic clusters, including pharmacodynamics, dosage instructions, contraindications, and adverse effects. Syntactic targets included passive constructions in process descriptions, conditional statements in precaution clauses, and nominalizations in research abstracts.

The third phase consisted of iterative implementation and refinement across three instructional cycles, each lasting four weeks. After each cycle, data from vocabulary and syntax assessments, written output analysis, and focus group interviews were analyzed to identify strengths and limitations of the materials. Modifications were made to task sequencing, lexical recycling frequency, syntactic scaffolding intensity, and contextual authenticity.

The fourth phase focused on summative evaluation to determine the extent to which the Absyak Model enhanced vocabulary mastery and syntactic accuracy, directly addressing the two research questions. Pre- and post-test comparisons, effect size calculations, and qualitative triangulation were employed to assess improvements in lexical precision and structural control in pharmaceutical texts.

To avoid inconsistency, the same four-phase account of Design-Based Research is used throughout the paper: (1) problem analysis and needs assessment, (2) prototype development, (3) iterative implementation and refinement across three cycles, and (4) summative evaluation. The three refinement cycles in Phase 3 are nested within this single framework and do not constitute a separate model.

It should be stated at the outset that the summative evaluation followed a single-group pre-test/post-test design. All 84 participants received the Absyak Model intervention, and no control or comparison group was used. Consequently, the pre-to-post gains reported below quantify within-group change and the developmental refinement of the materials; they are not, and are not interpreted as, evidence of effectiveness relative to an alternative method. Table 1 summarizes the activities, data sources, and resulting refinements associated with each phase.

Table 1. Overview of the Design-Based Research process across the four phases

Phase	Key activities	Data collected	Resulting refinements
1. Problem analysis and needs assessment	Diagnostic lexical and syntactic screening; document analysis of existing materials; lexical profiling of a 250,000-word pharmaceutical mini-corpus	Baseline scores; coverage gaps in current materials; high-frequency term list (420 items)	Design specifications for lexical progression and syntactic sequencing
2. Prototype development	Construction of the six-stage A-B-S-Y-A-K units; expert validation of materials and instruments	Content validity index (0.92); reliability coefficients; expert review notes	Revision of items, rubric descriptors, and task wording before piloting
3. Iterative implementation and refinement (3 cycles, 4 weeks each)	Delivery of units; end-of-unit quizzes; iterative written drafts; focus-group feedback after each cycle	Formative quiz data; draft analyses; refinement logs; interview transcripts	Adjustments to task sequencing, lexical recycling frequency, scaffolding intensity, and text authenticity
4. Summative evaluation	Parallel-form post-testing; document analysis of final outputs; qualitative triangulation	Pre/post comparisons; effect sizes; corpus-based indices; thematic findings	Consolidated final version of the model and recommendations for future cycles

THE PARTICIPANTS

The participants consisted of 84 undergraduate pharmacy students enrolled in the third semester of a Bachelor of Pharmacy program at a private university in East Java, Indonesia. Participants were selected using stratified purposive sampling to ensure representation across proficiency levels and academic performance bands. Inclusion criteria included completion of foundational general English courses, active enrolment in pharmaceutical content courses requiring English references, and consent to participate in all DBR cycles. Students with prolonged absence exceeding 20 percent of instructional sessions were excluded to maintain data integrity. To mitigate selection bias, class lists were stratified based on prior English GPA and randomly proportioned within proficiency strata. No participant had prior exposure to specialized pharmaceutical English modules. Demographic and academic variables were collected to ensure transparency and control for confounding factors. The sample comprised the entire third-semester cohort enrolled in the English for Pharmacy course in the academic year of data collection; the figure of 84, therefore, reflects a whole-population census of the eligible cohort rather than a sample drawn to a pre-specified target.

A sensitivity analysis using G*Power indicated that, for a paired-samples comparison at $\alpha = .05$ and power = .80, this sample is adequate to detect within-group effects as small as Cohen's $d \approx 0.31$, well below the effects ultimately observed, supporting the statistical adequacy of the cohort for the analyses reported. In terms of institutional and curricular context, the program is a four-year Bachelor of Pharmacy at a private Indonesian university in which core pharmacy content is taught in Indonesian, while key reference materials, drug databases, and research sources are in English; students had completed two general English courses but, as noted, had received no prior discipline-specific pharmaceutical English instruction. Proficiency was operationalized through prior English GPA bands (high, medium, low; see Table 2), which were used both to stratify recruitment and, subsequently, to examine differential gains.

Table 2. Demographic profile of the participants (n = 84)

Variable	Category	Frequency (n)	Percentage (%)
Gender	Female	62	73.81
	Male	22	26.19
Age	19 years	28	33.33
	20 years	41	48.81
	21 years	15	17.86
Prior English GPA	High (3.50–4.00)	21	25.00
	Medium (3.00–3.49)	39	46.43
	Low (2.50–2.99)	24	28.57
Frequency of Accessing English Pharmaceutical Sources	Regular	31	36.90
	Occasional	37	44.05
	Rare	16	19.05
Experience in Academic Writing in English	Yes	29	34.52
	No	55	65.48

INSTRUMENTS

Multiple instruments were employed to ensure methodological triangulation and alignment with the research questions.

First, the Pharmaceutical Vocabulary Mastery Test was adapted from validated ESP lexical assessments and corpus-based pharmaceutical word lists (Karahan İlter & Yeşilyurt, 2024). The instrument consisted of 50 items across four dimensions: terminological recognition, contextual meaning interpretation, morphological awareness, and collocational accuracy. Content validity was evaluated by three experts in ESP and pharmaceutical education using a Content Validity Index procedure, yielding an overall CVI of 0.92. Internal consistency reliability demonstrated strong coefficients: recognition ($\alpha = 0.88$), contextual interpretation ($\alpha = 0.91$), morphological awareness ($\alpha = 0.86$), collocational accuracy ($\alpha = 0.89$), and overall ($\alpha = 0.93$).

Second, the Syntactic Accuracy in Pharmaceutical Writing Test required students to compose structured summaries of drug information and short explanatory paragraphs based on clinical scenarios (Sime et al., 2024). A detailed analytic rubric was adapted from established academic writing assessment frameworks, focusing on grammatical accuracy, clause-structure complexity, accuracy of passive constructions, nominalization usage, and syntactic appropriateness. Inter-rater reliability between two trained evaluators reached 0.90 using Cohen's kappa. Internal consistency across rubric dimensions yielded α values ranging from 0.84 to 0.92.

Third, document analysis protocols were employed to examine lexical density, error patterns, clause-embedding frequency, and syntactic error ratios in students' written output. Automated corpus tools were used to calculate lexical sophistication indices and the mean length of clauses.

Fourth, focus group interviews were conducted with 18 purposively selected participants from high-, medium-, and low-proficiency groups. A semi-structured interview guide explored perceptions of lexical difficulty, the effectiveness of syntactic scaffolding, and material authenticity. To mitigate interviewer bias, standardized prompts were used, interviews were audio-recorded and transcribed verbatim, and member checking was conducted to confirm interpretive accuracy.

PROTOTYPE SPECIFICATION OF THE ABSYAK MODEL OF ENGLISH TEACHING MATERIALS

The Absyak Model of English Teaching Materials was conceptualized as a structured, corpus-informed, and genre-oriented instructional prototype specifically engineered to enhance pharmaceutical vocabulary mastery and syntactic accuracy in pharmaceutical texts. The prototype was developed through systematic alignment between disciplinary discourse analysis, lexical profiling of pharmaceutical corpora, and syntactic pattern mapping derived from authentic drug monographs, research abstracts, patient information leaflets, and clinical case summaries. The model integrates explicit lexical instruction, functional syntactic scaffolding, guided genre analysis, controlled-to-free production cycles, and embedded formative feedback mechanisms.

Conceptual architecture of the Absyak Model

The Absyak Model is organized into six interconnected instructional components implemented cyclically within each learning unit (Figure 1):

1. **A** – Activation of Disciplinary Schema: Learners activate prior pharmaceutical knowledge through guided preview tasks using authentic excerpts. This phase introduces thematic lexical clusters and rhetorical purposes of the target genre.
2. **B** – Building Lexical Networks: Pharmaceutical vocabulary is introduced through corpus-informed high-frequency lists, morphological decomposition exercises, collocation mapping, and semantic field grouping. Vocabulary mastery is operationalized in terms of breadth, depth, morphological awareness, and collocational control.
3. **S** – Structural Scaffolding of Syntax: Target syntactic structures are explicitly modeled based on genre analysis. These include passive constructions in drug mechanism descriptions, conditional clauses in contraindications, complex noun phrases in compound drug naming, and nominalizations in research abstracts.
4. **Y** – Yielding Guided Production: Learners complete structured writing tasks such as completing partially constructed pharmaceutical summaries, reformulating active sentences into passive constructions, and integrating lexical bundles into contextually appropriate clauses.
5. **A** – Authentic Application: Students produce independent written pharmaceutical texts, including drug information summaries and short evidence-based explanations using target vocabulary and syntactic forms.
6. **K** – Knowledge Consolidation and Feedback: Feedback cycles include peer review checklists, instructor analytic rubrics, lexical density analysis, and syntactic error profiling. Iterative revisions are required to reinforce retention and structural precision.

Each unit follows a 120-minute instructional cycle with integrated lexical recycling intervals every two sessions to enhance retention and productive accuracy.

Instructional structure and content mapping

The prototype consists of eight instructional units delivered over twelve weeks (Table 3). Each unit targets a specific pharmaceutical genre and corresponding lexical and syntactic features.

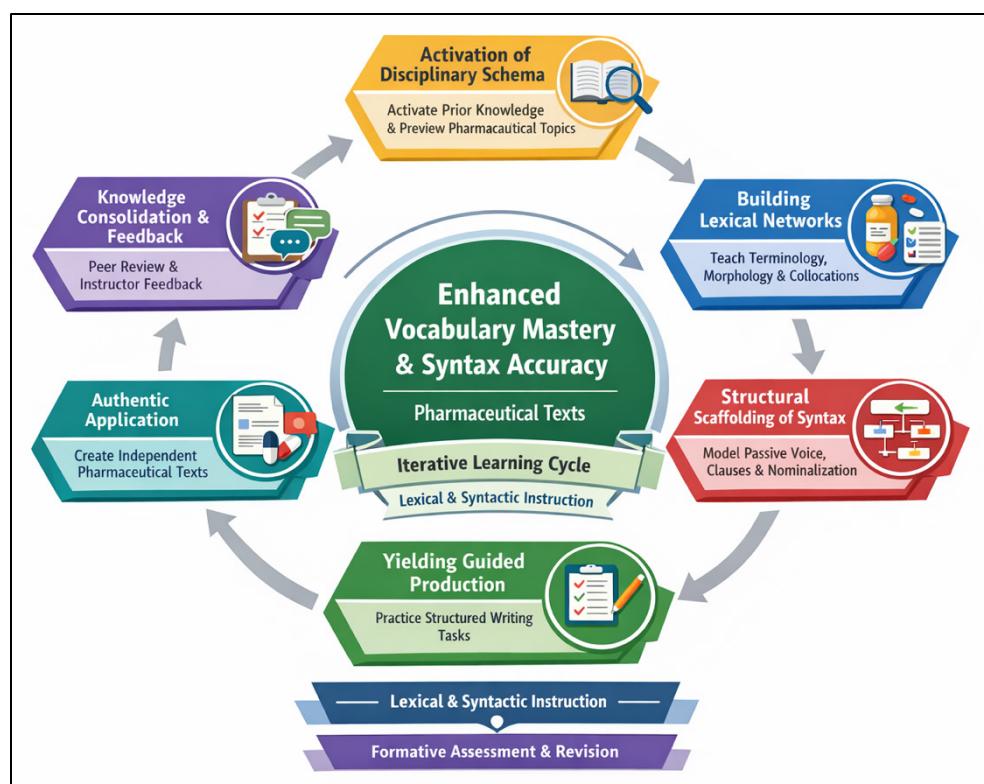


Figure 1. The conceptual architecture of the Absyak model

Table 3. Prototype specification of the Absyak model

Unit	Pharmaceutical genre	Lexical focus	Syntactic focus	Learning tasks	Assessment focus
1	Drug Monograph Overview	Drug classification, dosage terminology, administration routes	Passive voice in process descriptions	Terminology matching, passive transformation drills, guided summary writing	Terminological recognition and passive accuracy
2	Pharmacodynamics Explanation	Mechanism-related verbs, biochemical processes	Complex noun phrases and nominalization	Morphological analysis, clause condensation exercises	Noun phrase complexity index
3	Contraindications and Precautions	Risk-related collocations, modal verbs	Conditional clauses and modal constructions	Risk scenario writing, condition-based sentence construction	Conditional accuracy ratio
4	Adverse Effects Reporting	Symptom descriptors, severity markers	Clause embedding and subordination	Error correction tasks, paraphrasing activities	Clause embedding frequency

Unit	Pharmaceutical genre	Lexical focus	Syntactic focus	Learning tasks	Assessment focus
5	Clinical Case Summary	Diagnostic vocabulary, patient descriptors	Cohesive devices and referential clarity	Case-based guided writing	Cohesion and syntactic coherence score
6	Research Abstract	Academic lexical bundles, evidential verbs	Nominalization and hedging structures	Abstract reconstruction and expansion	Nominalization density
7	Patient Information Leaflet	Instructional verbs, safety warnings	Imperatives and parallel structures	Instruction drafting task	Structural parallelism accuracy
8	Integrated Pharmaceutical Report	Cumulative lexical set	Integrated syntactic structures	Independent report writing	Overall lexical sophistication and syntactic accuracy

Lexical specification framework

Lexical targets were derived from a 250,000-word mini-corpus of pharmaceutical texts compiled from open-access drug databases and research abstracts. Word frequency analysis identified 420 high-frequency pharmaceutical terms. These were categorized into:

- Core pharmaceutical terminology (38 percent)
- Morphologically complex derivatives (27 percent)
- Collocational bundles (21 percent)
- Functional academic connectors (14 percent)

Each unit incorporated approximately 50 to 60 lexical items with structured recycling across three subsequent units. Mastery benchmarks required 85 percent recognition accuracy and 75 percent productive accuracy.

Syntactic target mapping

Syntactic features were mapped using clause-level and phrase-level analysis. Baseline diagnostic results indicated frequent errors in passive formation, clause embedding, and nominalization. Therefore, syntactic progression followed increasing structural complexity:

- Sentence-level transformation tasks
- Clause integration exercises
- Paragraph-level structural modeling
- Independent genre production

Accuracy was calculated using the error-free clause ratio, target structure realization rate, and syntactic complexity index measured by mean length of clause and dependent clause frequency.

Formative and iterative feedback mechanisms

Each unit incorporated structured feedback loops. Instructor feedback used analytic rubrics specifying lexical precision, collocational appropriateness, morphological accuracy, passive construction accuracy, clause integration, and overall syntactic coherence. Peer feedback employed standardized checklists to reduce subjective bias. Automated lexical profiling tools were utilized to measure lexical density and sophistication.

DATA COLLECTION PROCEDURES

Data collection was conducted systematically across three iterative Design-Based Research cycles over a twelve-week intervention period. Procedures were aligned directly with the two research objectives, namely, measuring enhancement of pharmaceutical vocabulary mastery and improvement of syntactic accuracy in pharmaceutical text production.

At the preliminary stage, participants completed a standardized pre-test consisting of the Pharmaceutical Vocabulary Mastery Test and the Syntactic Accuracy in Pharmaceutical Writing Task. The vocabulary test measured terminological recognition, contextual interpretation, morphological awareness, and collocational accuracy. The writing task required participants to compose a 250 to 300-word pharmaceutical summary based on an authentic drug monograph excerpt. Baseline lexical density, error-free clause ratio, passive construction accuracy, and nominalization usage were recorded.

Following the pre-test, the Absyak Model intervention was implemented through structured instructional sessions. Data during the intervention phase were gathered through formative vocabulary quizzes administered at the end of each unit, structured syntactic drills, iterative written drafts, and feedback logs on prototype refinement. All written outputs were digitally archived and coded for longitudinal comparison (Table 4).

Table 4. Intervention implementation framework of the Absyak model

Week	Unit focus	Lexical target	Syntactic target	Assessment activity	Data collected
1	Diagnostic and Schema Activation	Core pharmaceutical terms	Baseline sentence structure	Pre-test	Vocabulary and syntax baseline scores
2–3	Drug Monograph	Dosage, administration	Passive constructions	Unit quiz 1	Terminology accuracy rate
4–5	Pharmacodynamics	Mechanism verbs, derivatives	Complex noun phrases	Unit quiz 2	Noun phrase complexity index
6–7	Contraindications	Risk collocations	Conditional clauses	Draft writing task	Conditional accuracy ratio
8–9	Adverse Effects	Symptom descriptors	Clause embedding	Draft revision	Error-free clause ratio
10	Research Abstract	Academic lexical bundles	Nominalization and hedging	Writing task 2	Nominalization density
11	Integrated Report Drafting	Cumulative vocabulary	Integrated syntactic structures	Independent writing	Lexical sophistication score
12	Post-Assessment	Comprehensive lexical set	Comprehensive syntactic structures	Post-test	Comparative performance data

At the completion of the intervention, participants completed parallel-form post-tests equivalent in difficulty and structure to the pre-tests. Parallel forms were developed through lexical item rotation and genre variation to minimize testing effect bias. Focus group interviews were conducted with a stratified subgroup representing high, medium, and low baseline proficiency levels to explore perceptions of lexical development and the effectiveness of syntactic scaffolding. Interviews were audio-recorded, transcribed verbatim, and verified through member checking to ensure interpretive accuracy.

To mitigate instrumentation bias, all test forms underwent pilot testing with a comparable cohort prior to the main study. Inter-rater reliability for syntactic scoring was maintained through calibration training sessions and blind double-marking of 30% of scripts.

DATA ANALYSIS

Quantitative data were analyzed using descriptive and inferential statistical techniques. For RQ1, improvement in vocabulary mastery was examined using paired-samples t-tests comparing pre- and post-test scores across four lexical dimensions. Effect sizes were calculated using Cohen's d to determine the magnitude of change. Lexical sophistication was measured through type-token ratio, lexical density percentage, and correct collocation frequency per 100 words. For RQ2, the syntactic accuracy analysis involved calculating the error-free clause ratio, the percentage of accurate passive constructions, the percentage of correct conditional clause formation, and the nominalization frequency per 250 words. Mean length of clause and dependent clause ratio were used as indicators of syntactic complexity. Paired-sample t-tests were conducted to assess the statistical significance of gains, with a significance level set at 0.05.

Qualitative data from written drafts were coded using a deductive framework derived from syntactic categories and lexical functions targeted in the intervention. Two independent coders analyzed the data, achieving an inter-coder agreement rate of 0.91. Interview transcripts were subjected to thematic analysis to identify patterns related to lexical retention, structural clarity, and perceived difficulty. Triangulation across quantitative scores, textual analysis, and qualitative insights strengthened interpretive validity. To mitigate analytical bias, statistical assumptions were checked before testing, outliers were examined using standardized residuals, and blind coding procedures were implemented during textual analysis (Braun & Clarke, 2006).

ETHICAL CONSIDERATIONS

Ethical approval was obtained from the institutional academic review board before data collection (IRB No. 2.7.8/UNIPDA.5/LT/2025). Participants were informed about the study objectives, procedures, voluntary participation rights, and confidentiality measures through written consent forms. Data were anonymized using numerical codes, and all digital files were stored in password-protected databases accessible only to the research team. To minimize power imbalance bias, participation or performance in the study did not influence course grades. Assessment scores used for research purposes were separated from official academic evaluation records. During interviews, participants were assured that their responses would not affect their academic standing, which encouraged candid feedback. Transparency, confidentiality, voluntary participation, and data integrity were strictly maintained throughout all phases of the study to ensure ethical rigor and credibility of findings.

RESULTS

RQ 1. TO WHAT EXTENT DOES THE ABSYAK MODEL OF ENGLISH TEACHING MATERIALS ENHANCE PHARMACY STUDENTS' VOCABULARY MASTERY IN PHARMACEUTICAL TEXTS?

To address RQ1, multiple sources of quantitative and qualitative data were analyzed to examine the impact of the Absyak Model on pharmacy students' vocabulary mastery. Three complementary instruments were used: the Pharmaceutical Vocabulary Mastery Test, the Syntactic Accuracy in Pharmaceutical Writing Test (used here to support the interpretation of lexical context), and document analysis of students' written outputs. The Pharmaceutical Vocabulary Mastery Test was adapted from validated ESP lexical assessments and corpus-based pharmaceutical word lists. It included 50 items covering four dimensions: terminological recognition, contextual meaning interpretation, morphological awareness, and collocational accuracy. Before inferential testing, the distribution of gain scores

was screened for normality (Shapiro-Wilk) and for outliers using standardized residuals; no transformation was required. Paired-samples t-tests were selected because each participant contributed a matched pre- and post-test score on the same instrument, making the within-subjects comparison the appropriate test of pre-to-post change; the significance threshold was set a priori at $p = .05$ (two-tailed). Cohen's d is reported alongside each test because statistical significance with a whole-cohort sample does not by itself convey the magnitude of change, and effect sizes allow readers to judge practical importance independently of sample size. Throughout, these statistics describe within-group change over the intervention period; in the absence of a control group, they should not be read as estimates of the model's effect relative to other instruction.

The results in Table 5 demonstrate that students exhibited statistically significant improvements across all dimensions of pharmaceutical vocabulary mastery. Terminological recognition showed the largest absolute increase, reflecting enhanced ability to accurately identify core pharmaceutical terms such as drug classes, dosages, routes of administration, and pharmacological actions. Contextual meaning interpretation also improved substantially, with students demonstrating increased proficiency in inferring the meaning of terms within authentic pharmaceutical sentences, indicating successful integration of lexical knowledge in context. Morphological awareness and collocational accuracy both showed marked gains, indicating improved understanding of word-formation patterns and the correct pairing of pharmaceutical terminology with syntactically and semantically appropriate collocations. Effect sizes across all dimensions were large (Cohen's $d > 1.6$), signifying the practical significance of these gains beyond statistical detection.

Table 5. Pre-test and post-test results of pharmaceutical vocabulary mastery ($n = 84$)

Dimension	Pre-test mean	SD	Post-test mean	SD	Mean gain	t-value	p-value	Cohen's d
Terminological Recognition (Max 15)	8.47	2.11	12.96	1.48	4.49	18.62	0.000	2.03
Contextual Meaning Interpretation (Max 15)	7.92	2.25	12.21	1.67	4.29	16.84	0.000	1.84
Morphological Awareness (Max 10)	4.36	1.78	7.81	1.29	3.45	15.27	0.000	1.66
Collocational Accuracy (Max 10)	4.11	1.65	7.54	1.33	3.43	14.98	0.000	1.62
Overall Score (Max 50)	24.86	5.48	40.52	4.12	15.66	22.41	0.000	2.44

To examine how lexical improvements translated into authentic writing, the Syntactic Accuracy in Pharmaceutical Writing Test provided complementary data by focusing on the productive application of vocabulary in structured summaries and explanatory paragraphs. Pre- and post-intervention scores were analyzed to assess students' ability to incorporate precise terminology accurately in context. As illustrated in Table 6, all dimensions of vocabulary application in writing demonstrated significant improvement. Terminology integration and collocational accuracy showed particularly high gains, indicating that the Absyak Model effectively facilitated transfer from recognition to productive use. Morphological application gains suggest that students increasingly produced correct derivations of phar-

maceutical terms, improving precision in context. Contextual appropriateness gains reflected students' improved ability to select vocabulary aligned with discourse function in pharmaceutical texts. The large Cohen's *d* values across dimensions confirm the robustness of these instructional effects.

Table 6. Pre-test and post-test results of vocabulary use in writing tasks (*n* = 84)

Writing dimension	Pre-test mean	SD	Post-test mean	SD	Mean gain	t-value	p-value	Cohen's <i>d</i>
Terminology Integration (Max 15)	7.21	2.31	12.18	1.53	4.97	19.08	0.000	2.08
Contextual Appropriateness (Max 10)	4.02	1.72	7.45	1.31	3.43	17.12	0.000	1.88
Morphological Application (Max 10)	3.89	1.68	7.12	1.27	3.23	15.65	0.000	1.78
Collocational Accuracy (Max 15)	6.11	2.15	11.32	1.84	5.21	18.94	0.000	2.12
Overall Writing Score (Max 50)	21.23	5.26	37.07	4.05	15.84	22.89	0.000	2.46

Document analysis was conducted using automated corpus tools to examine lexical density, type-token ratio, and accurate collocation usage in students' written outputs, providing an additional layer of empirical verification of improvements in vocabulary mastery. Table 7 demonstrates that students' written outputs not only contained more technical vocabulary but also exhibited higher lexical sophistication. Lexical density increased by 12.22 percentage points, indicating more concentrated use of content-specific terms relative to function words. The type-token ratio rose from 0.41 to 0.56, indicating greater lexical variety. Correct collocation frequency nearly doubled, and morphologically accurate derivative usage increased significantly, reflecting improved precision in word formation. The mean length of clause also increased, suggesting that students could produce longer, more syntactically complex structures integrating accurate vocabulary, thereby reinforcing both lexical and structural mastery.

Table 7. Document analysis of students' written pharmaceutical outputs (*n* = 84)

Lexical indicator	Pre-intervention mean	SD	Post-intervention mean	SD	Mean gain	t-value	p-value	Cohen's <i>d</i>
Lexical Density (%)	46.72	4.38	58.94	3.75	12.22	17.15	0.000	1.87
Type-Token Ratio	0.41	0.06	0.56	0.05	0.15	14.38	0.000	1.57
Correct Collocation Frequency (per 100 words)	6.14	1.23	12.87	1.14	6.73	16.92	0.000	1.85

Lexical indicator	Pre-intervention mean	SD	Post-intervention mean	SD	Mean gain	t-value	p-value	Cohen's d
Morphologically Accurate Derivatives (%)	61.43	7.32	84.76	5.98	23.33	18.04	0.000	1.97
Mean Length of Clause (words)	11.82	1.34	14.57	1.21	2.75	12.36	0.000	1.46

In variation by proficiency level, the overall vocabulary and writing gains were disaggregated by the three prior-GPA proficiency bands used at recruitment (Table 8). All three bands recorded statistically significant pre-to-post gains. The largest absolute gains occurred in the low and medium bands (mean gains of 16.79 and 16.28, respectively), narrowing the gap with the high band (mean gain 13.10). Effect sizes were largest in the low-proficiency band ($d = 2.85$), followed by the high band ($d = 2.35$) and the medium band ($d = 2.24$), indicating that students entering with the weakest pharmaceutical vocabulary benefited disproportionately from the scaffolded sequence. This pattern indicates that the scaffolded sequence supported lower-proficiency learners without disadvantaging stronger ones. However, the low band remained below the high band in absolute post-test scores (36.63 vs. 43.76), consistent with the observation that some complex structures required sustained reinforcement.

Table 8. Overall vocabulary and writing gains by proficiency band (n=84)

Proficiency band	n	Vocab pre (M)	Vocab post (M)	Mean gain	Cohen's d
High (3.50–4.00)	21	30.67	43.76	13.10	2.35
Medium (3.00–3.49)	39	24.44	40.72	16.28	2.24
Low (2.50–2.99)	24	19.83	36.63	16.79	2.85
Overall	84	24.68	40.31	15.63	2.37

Overall, results from the Pharmaceutical Vocabulary Mastery Test, the writing assessment, and document analysis converge to provide robust evidence that the Absyak Model significantly enhanced pharmacy students' vocabulary mastery. Students demonstrated measurable improvements in recognition, contextual interpretation, morphological awareness, collocational accuracy, and productive integration of terminology in authentic pharmaceutical writing. Statistically significant gains, high effect sizes, and enhanced lexical sophistication collectively indicate that the intervention effectively bridged the gap between vocabulary knowledge and functional application in specialized texts.

RQ2: TO WHAT EXTENT DOES THE ABSYAK MODEL OF ENGLISH TEACHING MATERIALS IMPROVE PHARMACY STUDENTS' SYNTAX ACCURACY IN PRODUCING PHARMACEUTICAL TEXTS?

RQ2 was addressed using both quantitative and qualitative evidence. Quantitatively, syntactic accuracy was measured with the Syntactic Accuracy in Pharmaceutical Writing Test, scored for error-free clause ratio, accurate passive constructions, correct conditional formation, and use of nominalizations, using the same paired-samples procedure and assumption checks described for RQ1. Table 9 summarizes the pre- and post-intervention results. All indices improved significantly with large effect sizes, indicating gains in the specific structures targeted by the model rather than in general fluency alone. As with RQ1, these are within-group changes and, absent a control group, are interpreted as

immediate learning improvement rather than comparative effectiveness. The qualitative focus-group data reported below were used to interpret and contextualize these quantitative gains.

Table 9. Pre- and post-test results for syntactic accuracy in pharmaceutical writing (n = 84)

Syntactic indicator	Pre (M)	Post (M)	Mean gain	P	Cohen's d
Error-free clause ratio (%)	54.10	78.43	24.33	<.001	2.16
Accurate passive constructions (%)	48.49	81.23	32.75	<.001	2.23
Correct conditional formation (%)	44.82	77.19	32.37	<.001	1.88
Nominalization use (per 250 words)	3.69	7.96	4.27	<.001	1.76

To address RQ2, qualitative data were obtained through focus group interviews with 18 purposively selected participants representing high, medium, and low proficiency levels. A semi-structured interview guide explored participants' perceptions regarding three main areas: the perceived lexical difficulty of the materials, the effectiveness of syntactic scaffolding provided by the Absyak Model, and the authenticity of the pharmaceutical texts included in the instructional units. Thematic analysis was employed to identify patterns and sub-themes, and responses were coded to provide a structured understanding of students' experiences and the model's impact on syntactic accuracy. The analysis produced three primary themes: Syntactic Comprehension and Application, Scaffolded Sentence Construction, and Perceived Authenticity and Transferability of Texts.

Theme 1: Syntactic comprehension and application

This theme explores how participants perceived their understanding and application of key syntactic structures in pharmaceutical writing (Table 10). Focus was placed on sentence construction, the use of the passive voice, conditional clauses, and nominalization in the context of drug descriptions and clinical scenarios. The following sub-themes were identified: Understanding Target Structures, Awareness of Common Errors, and Integration into Writing Tasks. The interview questions guiding this theme included: *How did the materials support your understanding of pharmaceutical sentence structures? Which syntactic features did you find most challenging? How did your writing change after using the materials?*

Table 10. Theme 1 – Syntactic comprehension and application

Sub-theme	Representative questions	Representative quotes
Understanding Target Structures	How did the materials support your understanding of pharmaceutical sentence structures?	<i>"The examples in the materials clarified how to construct passive sentences in drug mechanism descriptions" (P3).</i> <i>"I could finally distinguish between conditional and non-conditional clauses after the guided exercises" (P7).</i> <i>"The templates for nominalization helped me transform phrases into academic structures correctly" (P12).</i> <i>"Seeing repeated examples in context made recognizing complex noun phrases easier" (P15).</i>
Awareness of Common Errors	Which syntactic features did you find most challenging?	<i>"I often confused conditional constructions, but the exercises helped me notice the mistakes" (P1).</i> <i>"Initially, I misused nominalized forms in patient information summaries" (P5).</i> <i>"Passive voice placement was confusing, but reviewing model sentences improved my awareness" (P9).</i> <i>"Clause embedding was tricky at first, especially when describing mechanisms" (P18).</i>

Sub-theme	Representative questions	Representative quotes
Integration into Writing Tasks	How did your writing change after using the materials?	<i>"I started producing summaries with more accurate passive sentences"</i> (P2). <i>"My sentences in research abstracts became longer but more structurally correct"</i> (P6). <i>"I could combine clauses more coherently in my explanations"</i> (P11). <i>"Applying correct collocations along with syntactic forms improved the overall readability"</i> (P14).

Participants reported that the Absyak Model strengthened their comprehension of complex syntactic structures and facilitated their application in authentic writing tasks. The guided templates and repeated examples enhanced awareness of potential errors, particularly with passive constructions and nominalization. Students across proficiency levels noted that iterative exposure and contextualized exercises led to a gradual but noticeable improvement in sentence construction, allowing them to produce more cohesive and academically appropriate paragraphs.

Theme 2: Scaffolded sentence construction

This theme examines participants' experiences with the scaffolded approach embedded within the Absyak Model (Table 11). Sub-themes included Stepwise Sentence Building, Use of Guided Templates, and Feedback-Driven Refinement. Interview questions included: *How did the stepwise scaffolding influence your sentence construction? How helpful were the templates and model examples? How did feedback contribute to syntactic improvement?*

Table 11. Theme 2 – Scaffolded sentence construction

Sub-theme	Representative questions	Representative quotes
Stepwise Sentence Building	How did the stepwise scaffolding influence your sentence construction?	<i>"Breaking sentences into smaller parts helped me understand clause connections"</i> (P1). <i>"I felt less overwhelmed when constructing complex descriptions"</i> (P4). <i>"The step-by-step approach clarified which structures to prioritize in summaries"</i> (P10). <i>"It guided me from simple to more advanced syntactic forms"</i> (P16).
Use of Guided Templates	How helpful were the templates and model examples?	<i>"Templates for passive constructions and nominalization were extremely useful"</i> (P6). <i>"I referred to example sentences repeatedly to check my clause integration"</i> (P7). <i>"Model paragraphs provided a clear pattern to follow"</i> (P12). <i>"Seeing the correct use of conditionals in context gave me confidence"</i> (P17).
Feedback-Driven Refinement	How did feedback contribute to syntactic improvement?	<i>"Feedback pointed out where my sentences were too fragmented"</i> (P2). <i>"Instructor comments helped me correct repeated passive voice errors"</i> (P3). <i>"Peer review highlighted unclear clause embeddings in my drafts"</i> (P9). <i>"Iterative revisions after feedback made my paragraphs more coherent"</i> (P15).

Participants consistently emphasized that the scaffolded instructional design reduced cognitive load, allowing them to focus on mastering one syntactic feature at a time. Guided templates and model examples provided concrete structures for learners to emulate, and feedback cycles highlighted specific areas requiring refinement. The integration of peer and instructor feedback supported iterative improvement, enabling learners to internalize syntactic rules and produce grammatically precise sentences. Scaffolded construction was particularly effective in helping students with medium and lower proficiency levels bridge gaps in structural awareness.

Theme 3: Perceived authenticity and transferability of texts

This theme captures participants' perceptions of the real-world relevance and applicability of the pharmaceutical texts used in the Absyak Model (Table 12). Sub-themes include Authentic Language Exposure, Relevance to Academic and Clinical Tasks, and Transfer to Independent Writing. Guiding questions included: *How authentic did you find the materials? How did exposure to real pharmaceutical texts influence your writing? Were you able to apply these structures to your own summaries and explanations?*

Table 12. Theme 3 – Perceived authenticity and transferability of texts

Sub-theme	Representative questions	Representative quotes
Authentic Language Exposure	How authentic did you find the materials?	<i>"The drug monographs felt very close to what pharmacists actually write" (P8).</i> <i>"Research abstracts used in the exercises were like real journal articles" (P13).</i> <i>"Patient information leaflets helped me see practical language usage" (P5).</i> <i>"I appreciated the vocabulary and syntax reflected professional standards" (P1).</i>
Relevance to Academic and Clinical Tasks	How did exposure to real pharmaceutical texts influence your writing?	<i>"I could transfer structures from the exercises to my class assignments" (P16).</i> <i>"The conditional clauses I practiced were directly applicable to clinical scenario summaries" (P2).</i> <i>"Complex noun phrases from the materials improved my report writing" (P10).</i> <i>"Learning syntactic patterns in real texts helped me organize information logically" (P12).</i>
Transfer to Independent Writing	Were you able to apply these structures to your own summaries and explanations?	<i>"I now write summaries independently using proper clause embedding" (P4).</i> <i>"Passive voice and nominalization became easier to implement in new texts" (P7).</i> <i>"I can structure my paragraphs more coherently without referring to examples constantly" (P18).</i> <i>"Collocations and lexical bundles from the materials naturally appear in my writing" (P9).</i>

Participants highlighted that the authenticity of materials enhanced engagement and relevance, reinforcing the practical application of learned syntactic structures. Exposure to real pharmaceutical texts allowed learners to observe how complex sentences are constructed in professional contexts, bridging the gap between classroom exercises and independent writing. Transferability was particularly evident in participants' ability to replicate passive constructions, nominalizations, and clause integration in new, unmodeled writing tasks, indicating internalization of structural rules and improved syntactic confidence.

Overall, findings from the focus group interviews indicate that the Absyak Model substantially contributed to students' syntactic accuracy in pharmaceutical texts. Participants consistently noted that guided scaffolding, template usage, iterative feedback, and exposure to authentic texts collectively enhanced their comprehension and production of complex sentence structures. Improvements were observed across multiple syntactic dimensions, including passive voice, conditional clauses, clause embedding, and nominalization. The qualitative data underscore the effectiveness of the integrated model in supporting learners with diverse proficiency levels, promoting both structured development and independent application of professional writing conventions.

DISCUSSION

The findings of the present study provide a nuanced understanding of how a systematically developed, corpus-informed instructional model can enhance both vocabulary mastery and syntactic accuracy in specialized English for pharmaceutical contexts. The integration of the Absyak Model, with its carefully sequenced lexical and syntactic components, aligns with theoretical perspectives that emphasize the interdependence between vocabulary knowledge and syntactic competence in domain-specific writing. The evidence from the study demonstrates that targeted interventions using authentic, discipline-specific texts and structured scaffolding can address gaps commonly observed in ESP instruction, particularly in technical fields such as pharmacy, where lexical density and structural complexity present significant challenges to learners (Q. Huang, 2025; Y. Huang et al., 2024). By operationalizing vocabulary not only in terms of recognition but also through contextual application, morphological awareness, and collocational precision, the study extends prior work that often focused narrowly on receptive knowledge or rote memorization, thereby advancing the discourse on effective ESP pedagogy (Alrashed & Latif, 2025; Chiu et al., 2023; Karahan İlter & Yeşilyurt, 2024).

The enhancement of vocabulary mastery observed in this study underscores the importance of corpus-informed design, which supports learners in acquiring high-frequency and functionally relevant terms within authentic pharmaceutical genres. Prior research has highlighted the limitations of conventional ESP materials, which frequently lack systematic lexical sequencing and fail to provide repeated exposure across varied contexts (Wu et al., 2023; Zhou, 2025). The iterative prototype development in the Absyak Model, including explicit morphological and collocational exercises, addresses these deficiencies, ensuring that learners not only recognize specialized terms but also apply them accurately in production tasks. Furthermore, the incorporation of structured lexical recycling and scaffolded writing opportunities contributes to deeper cognitive processing of vocabulary, consistent with dual-coding and cognitive load frameworks, which posit that repeated contextualized practice enhances retention and transfer to authentic discourse (Fan, 2024; Moslehi & Kafipour, 2022). In synthesizing these approaches, the study offers a model that moves beyond mere recognition of pharmaceutical terms toward mastery of their functional deployment in professional texts.

The study's findings also reveal that syntactic accuracy can be significantly strengthened through scaffolded, genre-focused interventions that provide learners with explicit models and opportunities for iterative practice. This supports theoretical frameworks that emphasize the role of structural scaffolding and genre awareness in developing domain-specific writing proficiency (Hu & Chen, 2022; Mauludin et al., 2026). Previous studies in ESP and English for Academic Purposes (EAP) have often identified persistent challenges in the production of complex sentences, passive constructions, conditional clauses, and nominalizations, particularly in learners with limited prior exposure to authentic scientific texts (Wu et al., 2023; Yacoub, 2025). The Absyak Model's approach, integrating controlled-to-free production cycles, targeted syntactic drills, and formative feedback, allows learners to internalize structural norms while gradually gaining independence, thus addressing gaps in syntactic precision that traditional ESP materials seldom resolve. This aligns with evidence suggesting that learners benefit most from interventions that explicitly link form, function, and context rather than relying solely on implicit exposure (Hyland, 2022).

Moreover, the study demonstrates that the combination of authentic text exposure and structured scaffolding facilitates the transfer of learned syntactic structures to independent writing tasks. While prior research has acknowledged the challenge of applying theoretical syntactic knowledge to practical production, particularly in specialized registers (Shanavas et al., 2024; Shen et al., 2023; Xu & Casal, 2023), the Absyak Model's iterative design and genre-oriented exercises appear to bridge this gap. Learners' ability to embed clauses, utilize nominalizations, and maintain cohesion in pharmaceutical summaries suggests that syntactic competence is not merely a by-product of general language ability but can be cultivated through targeted, contextually grounded interventions. These findings reinforce the notion that ESP instruction should integrate form-focused instruction within meaningful communicative frameworks to achieve functional writing proficiency (Q. Huang, 2025; Y. Huang et al., 2024).

Critically, the study highlights that systematic instructional design must account for learner variability. The differentiated impact across high-, medium-, and low-proficiency participants suggests that scaffolded sequencing, template-based guidance, and iterative feedback can mitigate disparities in syntactic and lexical acquisition, thereby providing structured pathways for learners who might otherwise struggle with complex pharmaceutical texts. This addresses a limitation noted in prior research, in which uniform ESP materials often fail to accommodate varying learner competencies, leading to uneven outcomes (Arora et al., 2023). Furthermore, the integration of document analysis and corpus-informed evaluation provides greater precision and transparency in assessing lexical and syntactic gains, going beyond self-reported or superficial measures common in earlier studies (Estaji & Montazeri, 2022; Yacoub, 2025).

In synthesizing these findings, it is evident that a well-structured, research-based instructional model, such as the Absyak Model, can significantly enhance the depth and applicability of vocabulary and syntactic knowledge in pharmaceutical English. The study advances current understanding by demonstrating that vocabulary mastery and syntactic accuracy are mutually reinforcing when embedded within authentic genres, scaffolded learning cycles, and iterative feedback mechanisms. The implications extend to curriculum design, material development, and assessment strategies in ESP, highlighting the potential for targeted, evidence-based interventions to overcome persistent gaps in specialized language acquisition. Collectively, these insights underscore the value of integrating corpus-informed design, syntactic scaffolding, and authentic text exposure to foster functional proficiency in domain-specific English.

It is worth specifying which components of the model most plausibly account for the observed gains, rather than attributing improvement to the package as a whole. Three features are the strongest candidates. First, deriving lexical and syntactic targets from the same pharmaceutical mini-corpus meant that learners repeatedly encountered the same high-frequency terms and structures across genres, and the convergence of the recognition, writing, and document-analysis measures (Tables 5–7) is consistent with the recycling and contextualization that the corpus-informed design was intended to produce. Second, the controlled-to-free production sequence in the Yielding and Authentic Application stages appears central to transfer: the largest writing gains were in terminology integration and collocational accuracy (Table 6), precisely the abilities that guided-to-independent practice targets, and the focus-group accounts of moving from template-supported to independent writing point in the same direction. Third, the iterative feedback loops in the Knowledge Consolidation stage are the most likely driver of the syntactic gains in passive and conditional accuracy (Table 9), since these structures were most often flagged in refinement logs and addressed through successive drafts. Conversely, the smaller and slower gains in clause embedding and nominalization suggest that explicit modeling alone was insufficient for the most cognitively demanding structures, which is informative for future iterations.

These interpretations must be set against prior work reporting more modest results, and this comparison clarifies what the present study does and does not establish. Studies of decontextualized vocabulary and grammar instruction have repeatedly found that recognition gains do not reliably transfer to

production and are vulnerable to attrition (Q. Huang, 2025; Y. Huang et al., 2024), and longitudinal writing interventions have shown that syntactic development is typically slow and uneven (Wu et al., 2023; Xu & Casal, 2023). The present results extend this literature by showing that integrated, corpus-anchored, genre-staged instruction can produce parallel gains in recognition and production within a single course, and they refine it by identifying clause embedding and nominalization as structures that resist short-term intervention. At the same time, the study does not challenge the cautionary findings of that prior work on durability, because it shares their central limitation: gains were measured immediately after instruction, in a single group, without a control or delayed post-test. The appropriate claim is therefore narrow but defensible – the Absyak Model is a feasible, expert-validated set of materials that yielded large immediate within-group improvements – while claims of effectiveness relative to other methods, or of sustained competence, await a controlled and longitudinal design.

A practical consideration concerns the preparation effort the model requires relative to common practice. Compiling and profiling the 250,000-word corpus, mapping syntactic targets to genres, and constructing analytic rubrics demanded substantially more front-loaded design time than selecting an off-the-shelf ESP coursebook. This cost is, however, largely non-recurring and is partly offset by the automated lexical-profiling tools used to generate word lists and to score lexical density and sophistication, which reduce the marginal effort of producing and assessing each subsequent unit. For practitioners, the realistic implication is that the model is most efficiently adopted at the program or departmental level, where the initial corpus and template investment can be amortized across cohorts, rather than rebuilt by individual instructors.

Several limitations bound these conclusions. The study was conducted with a single third-semester cohort at one private Indonesian university, so generalization to other institutions, proficiency profiles, and curricular structures is not warranted without replication. The single-group pre-test/post-test design cannot rule out maturation, repeated testing, or instructor effects, and the absence of a delayed post-test leaves the durability of gains unknown. Proficiency-level analysis indicated that lower-proficiency learners, while improving substantially, did not reach the post-test levels of their higher-proficiency peers, and the most complex structures required reinforcement that a twelve-week intervention could only partly provide. Regarding transferability, the model's architecture — corpus-derived targets, genre staging, controlled-to-free production, and iterative feedback — is in principle portable to other health-science and professional ESP settings such as nursing, medicine, and laboratory science, provided the corpus and genre set are rebuilt for the target discipline; what is discipline-specific is the content, not the design logic. Internationally, the model is intended first as a solution for the described Indonesian context, but because the design steps are not tied to any local feature, adaptation elsewhere would require re-running the needs analysis and corpus profiling rather than transplanting the pharmaceutical materials directly.

CONCLUSION

The present study demonstrates that the Absyak Model of English Teaching Materials can be developed and validated as a feasible instructional design and that its implementation was associated with marked immediate improvements in pharmacy students' vocabulary mastery and syntactic accuracy in producing pharmaceutical texts through a systematic integration of corpus-informed lexical instruction, genre-oriented scaffolding, and iterative feedback mechanisms. Findings indicate that learners were able to expand their terminological recognition, contextual understanding, morphological awareness, and collocational control, while simultaneously improving the accuracy and complexity of their syntactic constructions, including passive voice, clause embedding, and nominalization. These gains highlight the model's capacity to address gaps in traditional ESP materials, particularly in bridging the divide between receptive knowledge and productive application in authentic professional contexts. Nonetheless, some variability in outcomes was observed across proficiency levels, suggesting that learners with lower baseline skills may require additional scaffolding or extended practice cycles

to achieve comparable results. The study underscores practical implications for ESP curriculum design, advocating for the integration of authentic texts, structured lexical recycling, and targeted syntactic templates to foster both precision and confidence in professional writing. Limitations include the study's focus on a single institution and a relatively small sample size, which may limit generalizability. Future research could expand the model's application across diverse educational contexts and explore longitudinal impacts on professional communication competence. Overall, the study confirms the potential of research-informed, structured interventions to enhance domain-specific language proficiency and provides actionable guidance for material development and instructional strategies.

The originality of this work lies not in any single technique but in their integration: the Absyak Model is, to our knowledge, the first ESP design to derive lexical and syntactic targets from a single pharmaceutical corpus, sequence them through an explicit six-stage genre progression, and refine that sequence through Design-Based Research cycles, thereby treating the instructional sequence itself as an empirical, transferable artefact rather than a fixed coursebook. In stating its contribution, the study deliberately distinguishes two kinds of claim. The first, which the evidence supports, is that a discipline-specific, corpus-anchored model can be designed, expert-validated, and shown to produce large immediate within-group gains in pharmaceutical vocabulary and syntactic accuracy. The second, which this study does not claim, is that the model is superior to alternative instruction or that its gains endure over time; establishing these requires controlled and longitudinal designs, which we identify as the priority for future work. Framed this way, the study's broader relevance extends beyond pharmacy: it offers instructional designers and ESP practitioners a reusable, technology-supported design logic for any field in which precise lexis and accurate syntax carry professional consequences, and it contributes to safer, clearer healthcare communication by treating discipline-specific language proficiency as a designable, evidence-informed outcome rather than an incidental by-product of general English instruction.

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