A SELF-REGULATED ENGLISH MEDICAL TERMINOLOGY E-MODULE: DESIGN AND VALIDATION FOR HEALTH SCIENCES STUDENTS

[1*]**Farida Noor Rohmah**, [1]**Yuyun Nailufar**, [1]**Royan Utsani**

[1]Universitas 'Aisyiyah Yogyakarta, Indonesia

Corresponding author email: faridanoor88@unisayogya.ac.id

ABSTRACT

English for Medical Purposes (EMP) is essential for equipping health science students to communicate proficiently in both academic and clinical environments. Nonetheless, current English for Specific Purposes (ESP) programs frequently prioritize general proficiency over the systematic instruction of discipline-specific vocabulary via digital platforms. This study aimed to create and validate a self-directed e-module intended to improve medical English terminology acquisition among health science students. The study employed a Research and Development (R&D) methodology based on the ADDIE model, encompassing the design, development, implementation, and assessment phases. The Canva-based e-module integrated multimedia components, including pronunciation audio, interactive exercises, and self-assessment activities. Expert validation yielded an average feasibility score of 91.25% for material aspect and 93.75% for media aspect, while student practicality reached 89.02%, indicating strong pedagogical and technological soundness. The results confirm that systematic instructional design combined with interactive digital tools effectively supports autonomous vocabulary learning in ESP contexts. This study contributes a replicable framework for localized digital material development in medical English education, advancing learner autonomy and engagement in health science programs.

How to cite: Rohmah, F. N., Nailufar, Y., & Utsani, R. (2025). A Self-Regulated English Medical Terminology E-Module: Design and Validation for Health Sciences Students. *Jo-ELT (Journal of English Language Teaching) Fakultas Pendidikan Bahasa & Seni Prodi Pendidikan Bahasa Inggris IKIP*, *12*(2), 354–368. https://doi.org/10.33394/jo-elt.v12i2.17402

INTRODUCTION

In the context of globalized healthcare, proficiency in English, especially in medical language, has emerged as a crucial skill for health science students globally. The precise application of medical English in documentation, reporting, and interprofessional communication guarantees patient safety and improves the quality of clinical operations (Lysanets & Bieliaieva, 2018). Given that English is the prevailing medium for research dissemination, professional training, and international collaboration (Outemzabet & Sarnou, 2023), students in non-English-speaking regions like Indonesia encounter the dual challenge of understanding intricate medical discourse and effectively utilising specialised terminology.

The problem is exacerbated by the etymological origins of medical terminology, predominantly sourced from Latin and Greek, rendering them lexically and morphologically intricate for EFL learners (Burhonova, 2024; Shepard & Rose, 2023). In the absence of comprehensive education or adequate exposure to real usage, students frequently encounter challenges in reading medical materials, comprehending diagnostic procedures, and communicating effectively in academic or clinical settings.

Despite the recognised significance of English for Specific Purposes (ESP) in medical and health science, its implementation is constrained in numerous universities. ESP courses frequently emphasise general English skills over specialised discourse and vocabulary (Chan et al., 2022; Li & Heron, 2021). This mismatch renders students inadequately equipped for the communicative and lexical requirements of their field (Weisi & Ashrafabadi, 2018). In Indonesia, where English is generally taught as a foreign language, ESP instruction remains predominantly teacher-centered and reliant on textbooks, offering limited opportunities for autonomous learning or genuine interaction with medical contexts (Mustofa & Wirza, 2023). Such methodologies constrain learner autonomy and motivation which become two critical elements necessary for attaining significant vocabulary acquisition and communicative proficiency in ESP (Yang et al., 2022).

Recent advancements in digital education and Mobile-Assisted Language Learning (MALL) present potential alternatives for enhancing ESP instruction. Technology-based tools have demonstrated the capacity to enhance learner engagement, interaction, and contextually rich language exposure when effectively included into pedagogical design (Fauzi et al., 2023; Rafiq et al., 2021). Nonetheless, numerous digital ESP resources are general and do not correspond with the disciplinary and cultural requirements of learners (Saridah et al., 2024). For example, widely known platforms like Quizlet and Anki facilitate rote memorisation but rarely incorporate genuine medical information or systematic reflection (Wanda et al., 2016). Empirical research from Indonesian higher education demonstrates that locally generated ESP materials tailored to learners' professional contexts can improve engagement and perceived relevance (Fadlia et al., 2022). Nevertheless, limited research has recorded the methodical design, production, and validation of localised, discipline-specific digital ESP materials informed by recognised instructional design frameworks.

To address this gap, this study developed and validated a self-regulated e-module for learning English medical terminology, specifically designed for Indonesian health science students. The module was developed in accordance with the ADDIE instructional design paradigm (Branch, 2009), which provides a systematic yet adaptable framework for integrating pedagogy, material, and technology. The five iterative steps of ADDIE (Analysis, Design, Development, Implementation, and Evaluation) enable systematic enhancement of the product to guarantee pedagogical integrity and technological functionality (Richey & Klein, 2014). The self-regulated learning framework introduced by Zimmerman (2002) underpins the e-module, promoting learners to autonomously plan, monitor, and assess their progress, an essential skill for continuous professional improvement in medical settings.

Accordingly, this study aims to (1) design a self-directed e-module for learning English medical terminology, (2) validate the module through expert evaluation, and (3) evaluate its practicality and usability among health science students. This research theoretically expands existing ESP literature by merging instructional design principles with explicit vocabulary instruction (Nation, 2013) and communicative learning theory (Long, 2014). It offers a repeatable framework for creating localised, technology-enhanced resources that foster learner autonomy and facilitate vocabulary acquisition in EMP instruction.

RESEARCH METHOD
Research Design
This study utilized a Research and Development (R&D) methodology, guided by the ADDIE instructional design model. The ADDIE paradigm comprises five iterative phases: Analysis, Design, Development, Implementation, and Evaluation (Branch, 2009), and was chosen for its methodical yet adaptable framework, facilitating ongoing enhancement during the development of instructional products. In comparison to other instructional design frameworks, ADDIE was deemed more appropriate for this study due to its clear, adaptable process for technology-based learning resources and its extensive application in ESP and EFL material development. According to Spatioti et al. (2022), the cyclical stages of ADDIE facilitate systematic evaluation and formative feedback in distance learning contexts, rendering it especially beneficial for technology-enhanced education which aligns with the aims of this study.

Although this research concentrated on the four subsequent phases, the initial Analysis phase was completed during a previous needs assessment involving health science students. The outcomes of that phase guided the selection of medical terminology, learning objectives, and the design of the digital platform. The Design and Development phases encompassed organizing the content and developing a self-guided e-module for learning English medical terminology via the Canva platform. The Implementation phase involved a limited pilot with target users from the Faculty of Health Sciences, whereas the Evaluation phase encompassed expert validation and student feedback to evaluate the feasibility and practicality of the developed e-module.

Subject
During the validation phase, two expert validators were deliberately chosen according to their professional expertise and their relevance to the content and media design of the e-module. The material expert served as a lecturer in English Education with over ten years of experience in teaching ESP. The media expert was an instructor with expertise in instructional technology and digital media design, possessing significant experience in developing interactive learning resources for higher education. Their combined expertise was considered adequate for verifying both the pedagogical and technical components of the developed e-module. During the implementation phase, the e-module was tested through a pilot study involving 46 undergraduate nursing students from the Faculty of Health Sciences at a private university in Yogyakarta. All participants were in their second semester and had previously completed their first English course in semester 1, rendering them appropriate target users for EMP instruction. They were chosen via purposive sampling, reflecting the genuine learner population for which the module was intended. The sample size of 46 students was deemed sufficient for a preliminary field trial in an R&D study (Gall et al., 2003), as the primary goal was to assess practicality and user experience rather than to achieve statistical generalization. Table 1 illustrates the allocation of research subjects throughout the phases.

Table 1
Research subjects

No	Phases	Respondents	Total
1	Validation	ESP expert	1 lecturer
		Media expert	1 lecturer
2	Implementation	A class of Faculty of Health Sciences	46 students

Data were gathered through an online self-regulated trial conducted via the university's Learning Management System (LMS). Students independently accessed and completed the e-

module over a two-week period prior to providing responses to a standardized practicality questionnaire and an open-ended feedback form. All participants gave informed consent, and their involvement was entirely voluntary.

Instruments

Two instruments were utilized in this study to assess the quality and feasibility of the developed e-module: (1) expert validation instrument including material and media expert instruments, and (2) a student practicality questionnaire. Each instrument was either developed or modified based on established educational evaluation frameworks and subjected to validation prior to full-scale implementation.

1. Expert Validation Instruments

The material validation instrument was adapted from Widoyoko (2016) and the Indonesian National Education Standards Board (Badan Standar Nasional Pendidikan, 2020) to evaluate the content, language, presentation, motivation, and adaptability aspects of the e-module. Multiple indicators were revised to align with the context of EMP, specifically focusing on the precision and comprehensiveness of medical terminology, the pertinence of multimedia resources to vocabulary acquisition, and the facilitation of independent learning. Validation items were evaluated by an ESP specialist in English education and a media expert in instructional technology to guarantee both contextual and construct validity. Each item was evaluated on a 4-point Likert scale (1 = Poor, 4 = Excellent), and inter-rater reliability between the two experts was confirmed through consistency assessments and deliberation of divergent ratings (Miles et al., 2014). The instrument's structure and indicators are detailed in Table 2.

Table 2
Validation instrument of e-module material eligibility

Aspect	Indicators
Content Eligibility	1. Material aligns with the learning objectives.
	2. Learning activities align with the learning objectives.
	3. Accuracy of English medical terminology vocabulary.
	4. Depth of English medical terminology vocabulary.
	5. Accuracy of images in clarifying the material.
	6. Clarity of audio regarding vocabulary.
	7. Ability of video to support content clarity.
	8. Appropriateness of multimedia activity quantity.
Language Eligibility	9. Clarity of sentences explaining the material.
	10. Clarity of instructional sentences in each activity.
	11. Accuracy of spelling in the text.
	12. Accuracy of punctuation, capitalization, and writing mechanics.
	13. Grammatical correctness of the module.
Material Presentation	14. Logical sequencing of material.
	15. Presentation supports independent learning.
	16. Presentation supports learner reflection or self-evaluation.
Motivational Aspect	17. Overall attractiveness of multimedia in capturing attention to learn medical terminology.
	18. Multimedia stimulates motivation to learn medical terminology.
Adaptability	19. Ease of multimedia use for students with various characteristics.
	20. Ease of understanding and using the module independently.

The media validation instrument evaluated three primary aspects: the introduction of the e-module, the presentation of information, and user control/accessibility. Its structure adhered to the quality dimensions of digital learning media proposed by Cakır & Solak (2015) and Martín-Gutiérrez et al. (2017), emphasizing visual appeal, readability, navigation functionality, and cross-device compatibility. All indicators were modified to align with the Canva-based

format of the developed e-module. Before validation, both instruments were pilot-tested with two academics who were not participants in the main study to verify item clarity and relevance. The instrument's structure and indicators are delineated in Table 3.

Table 3
Validation instrument of e-module media eligibility

Aspect	Indicators
E-Module Introduction	1. Clarity of the e-module title.
	2. Attractiveness of the e-module title display.
Information Presentation	3. Color choices are appropriate and do not hinder readability.
	4. Fonts used are legible.
	5. Layout is systematic.
	6. Design is consistent and visually appealing.
	7. Image and illustration quality support content comprehension.
	8. Videos/animations are clear and relevant to the material.
User Control and Accessibility	9. Navigation menus are intuitive and easy to use.
	10. Hyperlinks or interactive buttons function properly in embedded media.
	11. Interactive exercises function properly.
	12. The e-module is accessible on various devices (PC, tablet, smartphone).

2. Student Practicality Instrument

The student practicality questionnaire was adapted from validated instruments utilized in evaluations of technology-enhanced learning studies (Alqurashi, 2019; Martín-Gutiérrez et al., 2017). It comprised five primary dimensions namely usability, learning effectiveness, visual attractiveness, clarity of presentation, and alignment with learning objectives. Each evaluated on a 4-point Likert scale (1 = Strongly Disagree, 4 = Strongly Agree). The scale anchors were evaluated for interpretability via a brief pre-trial involving five nursing students to confirm consistent understanding. Alongside the quantitative questionnaire, open-ended inquiries were incorporated to collect qualitative insights regarding learner perceptions, difficulties, and recommendations. The qualitative data were examined through thematic analysis (Braun & Clarke, 2006), encompassing the coding of responses, the identification of recurring patterns, and their organization into overarching themes (e.g., usability, clarity, engagement). This process facilitated the triangulation of quantitative findings and offered more comprehensive insights into learner experiences. The indicators used in the instrument are presented in Table 4.

Table 4
Student practicality assessment instrument

Aspect	Indicator
Ease of Use	The e-module is easy to use and understand.
Learning Efficiency	The e-module helps in understanding the material more quickly.
Visual Appeal and Design	The layout and design of the e-module are attractive and comfortable.
Readability and Comprehension	The language used in the e-module is easy to understand.
Relevance to Learning Needs	The content of the e-module is relevant to the students' learning needs.

Data Analysis

This study's results were examined using both quantitative and qualitative methodologies to provide a thorough assessment of the e-module's design, feasibility, and practicality. This

combination conforms to the R&D paradigm, wherein product development undergoes ongoing refinement through iterative validation and assessment (Gall et al., 2003).

Quantitative data obtained from expert validation and student practicality questionnaires were analyzed using Microsoft Excel through descriptive statistics. The mean score of each item was transformed into a percentage to assess its feasibility or practicality according to Arikunto's (2010) criteria: Very Less Feasible = 0–20%, Less Feasible = 21–40%, Fairly Feasible = 41–60%, Feasible = 61–80%, Very Feasible = 81–100%. The internal consistency reliability of each Likert-based instrument was assessed using Cronbach's alpha, resulting in coefficients of 0.87 for material validation, 0.85 for media validation, and 0.89 for the student practicality questionnaire. These metrics signify substantial reliability (Cohen et al., 2018). Although inferential statistical testing was not the primary focus of the study, an exploratory analysis was conducted to compare mean scores across items. No significant differences were observed among categories, indicating the instrument's consistency across various dimensions. Future research may expand upon this by examining subgroup differences (e.g., gender or previous digital learning experience) through inferential techniques such as t-tests or ANOVA to enhance the generalizability of the findings.

Qualitative data obtained from open-ended expert and student responses were examined through Braun & Clarke's (2006) six-phase thematic analysis. The procedure encompassed familiarization, preliminary categorization, theme identification, theme review, naming, and reporting. Common codes derived from expert feedback included *"terminology accuracy," "activity clarity,"* and *"interface consistency."* From students' responses, representative codes such as *"easy navigation," "motivating visuals,"* and *"time-efficient learning"* led to broader themes of *usability, engagement,* and *learning support.*

Data triangulation was utilized to cross-validate and blend the findings of experts and students (Creswell & Clark, 2018). Convergence transpired as both groups highlighted the module's lucidity, aesthetic appeal, and functionality. Minor discrepancies, such as professionals advocating for a more profound contextualization of terminology while students prioritized multimedia appeal, were reconciled by harmonizing instructional precision with learner engagement in future iterations. Consequently, both expert rigor and user perspective were given equal importance in the refinement of the final edition of the e-module.

RESEARCH FINDINGS AND DISCUSSION
Research Findings
Analysis Phase

Although the primary focus of this study is on the Design, Development, Implementation, and Evaluation phases from ADDIE, the Analysis phase is briefly discussed to contextualise the e-module design foundations. The needs analysis, conducted with 62 students from nursing, public health, and midwifery programs, identified shared difficulties in memorizing and applying English medical terminology in the absence of visual or contextual aids. Students demonstrated a pronounced preference for digital, multimodal, and self-directed resources that incorporate audio pronunciation and interactive activities. The findings significantly influenced the e-module's learning objectives and multimedia design, ensuring it met learners' genuine demands for autonomy and multimodal exposure.

Design Phase

The e-module was designed systematically in three stages: (1) gathering relevant material to match the learning objectives, (2) selecting appropriate digital technologies for module development, and (3) developing the module's structure and content. First, content compilation was based on the results of the need analysis, which revealed that students needed help learning and remembering English medical terms. The vocabulary pieces were chosen for their

relevance to nursing, public health, and midwifery settings, and they were organised into theme groups such as medical tools, bodily systems, diseases, and clinical processes. Each term was accompanied by a definition, a visual representation, an audio pronunciation, and a sentence example. The learning goal for each course was to improve students' abilities to recognise, pronounce, and use medical terms in academic and clinical settings.
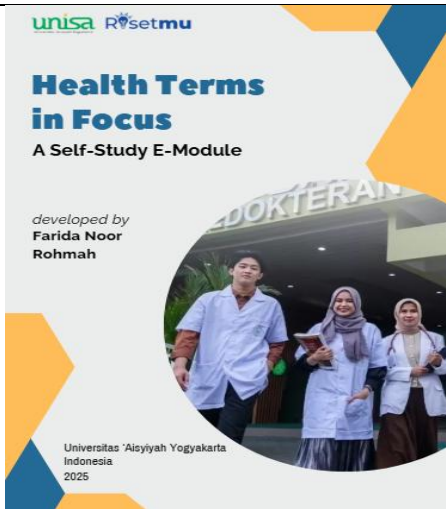
Second, Canva was chosen as the primary tool for developing the e-module. This application was chosen for its accessibility, convenience of use, and multimedia integration features, which enabled the creation of interactive and visually appealing learning content. Canva permitted the integration of text, photos, videos, and audio components, resulting in a versatile, multimodal learning experience that could be accessed from numerous devices.
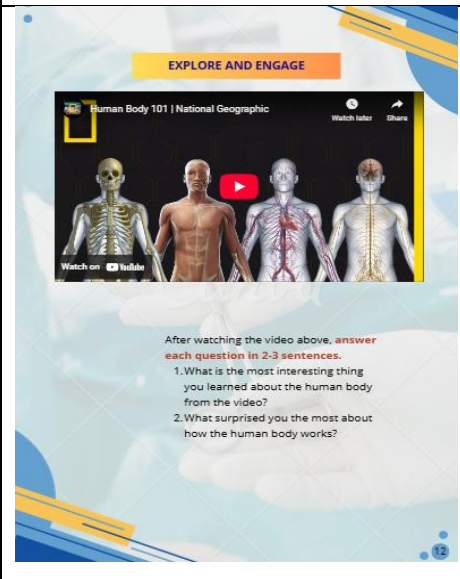
Third, the module content was structured clearly and consistently to encourage individual study. Each lesson began with a vocabulary list, followed by interactive tasks such as term-image matching, definition identification, drag-and-drop activities, and multiple-choice tests. Pronunciation aids and brief reflective exercises were also provided to promote active learning and self-evaluation. The navigation was designed to be user-friendly, allowing students to move through the content at their own leisure.

Development Phase

During the development phase, the e-module was created in the form of an initial draft, suitable for expert confirmation. The researcher compiled the entire manuscript, organised the content using the previously planned framework, and generated a prototype with Canva. The content was then thoroughly examined to guarantee its accuracy, consistency, and fit with the learning objectives of English medical terminology training for health science students.

Table 6
E-Module content overview

Screenshot	Type	Descriptions/ Functions
	Cover page of the e-module	Shows the title page and visual layout of the e-module.

| | Vocabulary presentation page | Displays vocabulary terms with definitions, images, and audio buttons. |
| | Audio and video feature in the module | Demonstrates the use of embedded audio and video for pronunciation and context. |

The e-module was created with Canva and organized into topical sections to facilitate the learning of English medical terminology for health faculty students. The e-module, named "Health Terms in Focus", is meant to assist learners in establishing a robust foundation in medical terminology through self-directed, interactive learning. The subject integrates practical language functions with authentic healthcare settings to equip students for academic and clinical communication. The cover page offers an aesthetically pleasing opening, explicitly articulating the title and objective of the module while emphasizing the healthcare topic. The vocabulary presentation pages comprise specific medical terminology accompanied by definitions, contextual sample sentences, graphic demonstrations, and pronunciation assistance via integrated audio. These sections correspond with the module's learning outcomes, encompassing the proficiency in fundamental medical terminology, the description of body systems, the interpretation of common medical acronyms, and the comprehension of terms associated with tools, procedures, and emergencies. Students participate in interactive exercises, including matching tasks and quizzes, aimed at enhancing vocabulary retention and promoting active involvement. Audio and video components are incorporated to improve comprehension and auditory skills, especially regarding pronunciation and contextual grasp of vocabulary. Reflection was integrated into the design. These pages enable students to evaluate

their own learning and consolidate essential concepts, fostering metacognitive awareness and autonomous study practices.

The e-module is available in two formats: an online version featuring interactive multimedia and real-time updates (accessible at https://bit.ly/HealthTermsinFocus), and a blended PDF version that permits offline study but lacks interactive elements. The module has four distinct learning stages: *Understanding the Concept*, *Engage and Explore*, *Hands-On Activity*, and *Apply Your Knowledge*, a flow designed to guide students from input to application in a self-regulated learning environment.

Expert Validation Result

To assess the quality of the e-module, two experts were included in the validation process: a material expert and a media expert. The material expert evaluated the content's accuracy, depth, and relevance to the students' academic and professional requirements. Meanwhile, the media expert worked on the e-module's visual layout, multimedia integration, and readability to ensure it was interesting and accessible across several platforms. Each expert used a standardised validation instrument with Likert-scale items that were then transformed into percentages to assess feasibility levels. Open-ended comment areas were also included for further in-depth qualitative input. Table 7 shows the criteria used to interpret percentage scores.

Table 7
Validation results and average feasibility by aspect

Expert	Aspect	% Score	Category	Summary of Suggestions
Material Expert	Content Eligibility	90.63%	Very Feasible	1. Add reflection/self-evaluation.
	Activity Eligibility	96.25%	Very Feasible	
	Language Eligibility	90.00%	Very Feasible	
	Instructional Eligibility	100.00%	Very Feasible	2. Fix broken links.
	Motivational Aspect	75.00%	Feasible	3. Align task with vocabulary input.
	Adaptability	100.00%	Very Feasible	
Average		**91.25%**	**Very Feasible**	
Media Expert	E-Module Introduction	100.00%	Very Feasible	1. Improve audio playability (avoid new tabs).
	Information Presentation	91.67%	Very Feasible	
	User Control & Accessibility	93.75%	Very Feasible	2. Use one consistent quiz platform.
Average		**93.75%**	**Very Feasible**	3. Revise video citation format.

According to Table 7, both experts rated the e-module as highly applicable. The materials expert indicated an overall mean feasibility score of 91.25%, classified as Very Feasible. The module earned the highest scores in instructional presentation and adaptability (100%), validating that its structure and format efficiently facilitated self-paced learning. Nevertheless, the motivational component earned a score of 75%, indicating that although the content was pedagogically strong, its design may be improved to increase engagement. The expert advised integrating reflective prompts and additional interactive components to maintain learner motivation. The material expert also provided qualitative feedback aimed at enhancing pedagogy. She suggested incorporating reflection prompts to enhance learner self-assessment and realigning assignments with prior vocabulary instruction to reinforce the continuity of learning. As she stated, *"The content is solid, but students need more reflection and reinforcement after each topic to stay engaged and consolidate the vocabulary."*

The media expert scored an average grade of 93.75% (Very Feasible), noting the e-module's coherence, visual design, and device compatibility. Nonetheless, his remarks

underscored the enhancement of technical proficiency and user experience. He specifically proposed integrating music on the same site and standardizing quiz styles to facilitate more seamless interaction. He stated, *"Integrate all media elements within a single interface to prevent students from opening new tabs—this will enhance the module's seamlessness."*

Following expert examination, the e-module was revised in accordance with the validators' comments. Revisions included increasing instruction clarity, altering image placement, removing language and terminology problems, and improving interactive components. These adjustments verified that the e-module satisfied both pedagogical and design criteria before moving on to the implementation phase with student users.

Implementation Phase

During the implementation phase, the researchers utilised the English Medical Terminology e-module with a group of 46 undergraduate students from the Nursing Study Program as trial subjects. The e-module served as a self-regulated tool during students' autonomous learning periods, concentrating on fundamental medical terminology frequently encountered in academic and clinical environments. Upon the completion of their learning activities utilising the e-module, the researchers administered a practicality questionnaire to get the students' feedback. The questionnaire aimed to assess five dimensions: ease of use, efficiency of use, visual design quality, language clarity, and relevance to learning needs. The outcomes from this instrument were utilised to evaluate the practical value of the e-module from the user's perspective and formed the foundation for assessing the overall practicality of the product in real learning environments.

Evaluation Phase

The result of the practicality test presented in Table 8 demonstrates that the e-module was regarded as highly practical in all aspects.

Table 8
Student practicality evaluation results of the e-module

Aspect	Average Score	Percentage (%)	Category
Ease of Use	3.61	90.22%	Very Practical
Efficiency of Use	3.54	88.59%	Very Practical
Visual Design Quality	3.57	89.13%	Very Practical
Language Clarity	3.57	89.13%	Very Practical
Relevance to Learning Needs	3.52	88.04%	Very Practical
Overall score		89.02%	Very Practical

As demonstrated in Table 8, student evaluations remained consistently favorable across all indicators, with an overall practicality score of 89.02% (Very Practical). The most highly rated aspect was simplicity of use (90.22%), demonstrating that intuitive design and straightforward navigation were crucial to maintaining learner engagement. The lowest-rated dimension, relevance to learning requirements (88.04%), nonetheless received a "Very Practical" rating, indicating a strong alignment with course objectives.

Students' qualitative remarks confirmed these quantitative results. Many participants valued the multimodal presentation, remarking that the module "made learning medical terms less intimidating" and "helped me remember words because I could see and hear them together." Another student observed, "It was easy to follow, and the pictures made the terms stick in my mind." Regarding the motivational aspect, several students reiterated the expert's feedback, proposing more engaging activities: "I liked the videos, but it would be more fun if there were levels or short games after each topic." These viewpoints suggest that although

learners prioritized lucidity and accessibility, they also desired increased interactivity to maintain their motivation.

Discussion

This study developed, validated, and implemented a self-regulated e-module on English medical terminology for health science students using the ADDIE instructional design model. The innovative application of Canva positioned the platform not only as a creative production tool but as a pedagogically structured medium that enabled multimodal scaffolding through the integration of text, audio, visuals, and interactive features. This approach aligns with Mayer's multimedia learning theory, which highlights the benefits of dual-channel information processing for enhanced understanding and retention (Mayer & Fiorella, 2021). Previous research has demonstrated Canva's effectiveness in increasing creativity and student engagement (Fitria, 2024; Susanti et al., 2024); however, the present study expands this scope by implementing Canva for structured and self-regulated ESP instruction in a context where validated digital learning materials are still limited. Accordingly, the findings suggest that Canva can function as both a design environment and a pedagogical platform that supports autonomous acquisition of specialized vocabulary.

The expert validation results indicated high levels of material feasibility (91.25%) and media feasibility (93.75%), demonstrating that the e-module met recognized academic and technological standards for effective EMP instruction. Throughout the ADDIE process, instructional decisions were strongly supported by learning theory: multimedia principles informed content design and layout (Mayer et al., 2014), Nation's (2013) lexical acquisition framework guided the repeated and contextualized exposure to medical terminology through interactive exercises as encouraged by Long (2014), and Zimmerman's (2002) self-regulated learning principles shaped the inclusion of reflection and self-assessment components. Expert recommendations to enhance metacognitive opportunities, such as reflective activities, aligned with findings from Ebadi et al. (2023) emphasizing that autonomy-supportive digital learning environments can increase motivation and active engagement. Meanwhile, suggestions to refine audio and quiz integration reflected O'Connor and Andrews' (2018) findings that seamless interaction and uninterrupted access to multimedia enhance learner focus.

Student responses further confirmed the practicality and usability of the e-module, with the highest rating recorded for ease of use (90.22%). These results parallel those of Anam et al. (2023) and Septiyani et al. (2022), who found that Canva-based e-modules typically receive high usability ratings due to their intuitive interface and visually appealing design. Similarly, Natarajan et al. (2022) and Liem et al. (2024) reported that multimedia-rich learning materials lead to increased student satisfaction and engagement, supporting the view that visually integrated platforms facilitate sustained motivation in technology-enhanced ESP environments. However, the narrow scoring range (88–90%) suggests a possible ceiling effect (Sprenger & Schwaninger, 2021), indicating that excessively positive perceptions of innovative technology may limit variation in student responses. This implies that future evaluations may require diversified instruments or longitudinal methods to generate more nuanced interpretations. Student suggestions for more unified audio controls also align with research from Yang et al. (2022), showing that fragmented access to multimedia can disrupt attention and hinder learning continuity.

A comparison of expert validation and student evaluation reveals both convergence and divergence in priorities. Experts emphasized instructional quality, linguistic accuracy, and metacognitive depth, whereas students focused more on usability and visual appeal. This complementary alignment reflects the necessary balance between academic rigor and learner-centered design in digital ESP learning materials (Li & Heron, 2021). Qualitative comments reinforced this balance; for example, one expert highlighted that "the module successfully

integrates authentic materials with structured activities," while a student noted, "I could use it before my clinical placement to review terms." These insights affirm that Health Terms in Focus achieved both pedagogical soundness and practical relevance.

The findings contribute to the growing body of digital ESP pedagogy by offering a contextually grounded and empirically validated self-directed learning resource that addresses the lack of specialized vocabulary focus identified by Zhou and Wu (2024). The study demonstrates that Canva can serve as a multimodal learning platform capable of supporting structured input, interactive feedback, and learner autonomy, particularly beneficial in resource-limited settings such as Indonesia. Despite promising outcomes, the study is limited by its focus on feasibility and practicality rather than direct learning outcomes, such as retention and transfer of terminology into clinical communication. Without experimental or longitudinal testing, causal claims about learning impact cannot be fully established. Therefore, future research should adopt mixed-method or quasi-experimental designs to examine long-term learning gains and cognitive engagement. Expanding the module across other health science fields would also help determine scalability and broader pedagogical applicability.

Finally, the systematic use of the ADDIE model in this research provides a practical and replicable framework for developing digital instructional materials in ESP and technical education contexts. The design principles demonstrated, including multimodal reinforcement, structured task sequencing, interactive feedback, and learner autonomy, can serve as guidance for educators seeking to produce technology-enhanced learning resources that are both pedagogically effective and contextually relevant.

CONCLUSION

This research properly designed, developed, and validated a self-instructional e-module to improve health science students' proficiency in English medical terminology. Utilizing the ADDIE instructional design model, the project developed a multimedia-based learning resource that received high feasibility evaluations from content and media specialists, along with robust practicality ratings from students. These findings indicate that a well-structured, learner-centered digital module can function as an effective complement to conventional EMP instruction. The study advances theoretical understanding by demonstrating how the ADDIE model can be effectively utilized in the development of ESP materials, and offers a practical, replicable framework for designing self-regulated, multimedia-based learning tools that enhance learner autonomy and engagement in specialized English education.

Although the e-module exhibited strong pedagogical and technological feasibility, the study did not evaluate long-term learning outcomes such as vocabulary retention or the application of terminology in professional communication. Future investigations should consequently utilize experimental or longitudinal methodologies to assess its enduring effects. Teachers are advised to incorporate these modules into blended or flipped classroom settings to enhance learners' exposure to discipline-specific terminology, while curriculum developers and policymakers can facilitate the adoption of similar localized digital resources across a variety of health and technical disciplines. Overall, this study highlights the potential of carefully crafted, technology-supported self-learning resources to enhance ESP instruction and reconcile the divide between classroom constraints and real-world professional language application.

ACKNOWLEDGEMENT

from *RisetMu*, significantly aiding the study's inception and completion. The author recognizes the technical and scholarly contributions from colleagues and reviewers who provided helpful feedback during the manuscript's production.

REFERENCES

Alqurashi, E. (2019). Predicting student satisfaction and perceived learning within online learning environments. *Distance Education, 40*(1), 133–148. https://doi.org/10.1080/01587919.2018.1553562

Anam, C., Churiyah, M., & Pratama, N. Z. (2023). Improving learning outcomes and self-regulated learning through the development of web-based learning media with Canva platform. *International Journal of Multicultural and Multireligious Understanding, 10*(5), 376–386. https://doi.org/10.18415/ijmmu.v10i5.4820

Arikunto, S. (2010). *Prosedur penelitian: Suatu pendekatan praktik*. Rineka Cipta.

Badan Standar Nasional Pendidikan. (2020). *Instrumen penilaian buku teks pelajaran Bahasa Inggris SMA/MA/SMK*. BSNP.

Branch, R. M. (2009). *Instructional design: The ADDIE approach* (Vol. 722). Springer.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77–101.

Burhonova, G. (2024). Addressing students' lack of Latin knowledge in medical terminology. *International Journal of Research and Innovation in Social Science*. https://doi.org/10.47772/IJRISS.2024.8110160

Cakır, R., & Solak, E. (2015). Attitude of Turkish EFL learners towards e-learning through TAM model. *Procedia - Social and Behavioral Sciences, 176*, 596–601. https://doi.org/10.1016/j.sbspro.2015.01.515

Chan, S. M. H., Mamat, N. H., & Nadarajah, V. D. (2022). Mind your language: The importance of English language skills in an international medical programme (IMP). *BMC Medical Education, 22*(1), 1–7. https://doi.org/10.1186/s12909-022-03481-w

Cohen, L., Manion, L., & Morrison, K. (2018). *Research methods in education* (8th ed.). Routledge.

Creswell, J. W., & Clark, V. L. P. (2018). *Designing and conducting mixed methods research*. SAGE Publications.

Ebadi, S., Amini, Z., & Gheisari, N. (2023). On the relationship between mobile-based extramural activities and vocabulary development of EFL learners: A mixed-method study. *Smart Learning Environments, 10*(1). https://doi.org/10.1186/s40561-023-00252-y

Fadlia, F., Asra, S., Zulida, E., & Santosa, M. H. (2022). Developing ESP-based digital learning materials to support students' needs at Indonesian vocational schools: Perceived quality. *Journal of English Education and Linguistics, 10*(1), 40–53.

Fauzi, I., Juniardi, Y., & Wahyudin, W. (2023). Utilizing digital learning resources in English-specific purposes learning classroom: ESP teachers' perspectives. *Globish, 12*(2), 153–162. https://doi.org/10.31000/globish.v12i2.8449

Fitria, T. N. (2024). Using Canva in creating and designing e-module for English language teaching. *SAGA: Journal of English Language Teaching and Applied Linguistics, 5*(2), 111–122. https://doi.org/10.21460/saga.2024.52.194

Gall, M. D., Gall, J. P., & Borg, W. R. (2003). *Educational research: An introduction* (7th ed.). Pearson Education.

Li, Y., & Heron, M. (2021). English for general academic purposes or English for specific purposes? Language learning needs of medical students at a Chinese university. *Theory and Practice in Language Studies, 11*(6), 621–631. https://doi.org/10.17507/tpls.1106.05

Liem, I. K., Fatril, A. E., & Husna, F. A. (2024). Satisfaction of lecturers and undergraduate students of medical faculties in Indonesia towards online anatomy learning during COVID-19 pandemic. *BMC Medical Education, 24*(1), 1–9. https://doi.org/10.1186/s12909-024-05620-x

Long, M. H. (2014). *Second language acquisition and task-based language teaching*. Wiley-Blackwell.

Lysanets, Y. V., & Bieliaieva, O. M. (2018). The use of Latin terminology in medical case reports: Quantitative, structural, and thematic analysis. *Journal of Medical Case Reports, 12*(1), 1–10. https://doi.org/10.1186/s13256-018-1562-x

Martín-Gutiérrez, J., Mora, C. E., Añorbe-Díaz, B., & González-Marrero, A. (2017). Virtual technologies trends in education. *Eurasia Journal of Mathematics, Science and Technology Education, 13*(2), 469–486. https://doi.org/10.12973/eurasia.2017.00626a

Mayer, R. E., & Fiorella, L. (2021). *The Cambridge handbook of multimedia learning*. Cambridge University Press. https://doi.org/10.1017/9781108894333

Mayer, R. E., Lee, H., & Peebles, A. (2014). Multimedia learning in a second language: A cognitive load perspective. *Applied Cognitive Psychology, 28*(5), 653–660. https://doi.org/10.1002/acp.3050

Miles, M. B., Huberman, A. M., & Saldaña, J. (2014). *Qualitative data analysis: A methods sourcebook* (3rd ed.). Sage.

Mustofa, M. I., & Wirza, Y. (2023). Promoting learner autonomy through EFL textbook: The textbook facilitation and the students' and teacher's perceptions. *Journal on English as a Foreign Language, 13*(1), 289–313. https://doi.org/10.23971/jefl.v13i1.6056

Natarajan, J., Joseph, M. A., Al Shibli, Z. S., Al Hajji, S. S., Al Hanawi, D. K., Al Kharusi, A. N., & Al Maqbali, I. M. (2022). Effectiveness of an interactive educational video on knowledge, skill and satisfaction of nursing students. *Sultan Qaboos University Medical Journal, 22*(2), 546–553. https://doi.org/10.18295/squmj.2.2022.013

Nation, I. S. P. (2013). *Learning vocabulary in another language* (2nd ed.). Cambridge University Press. https://doi.org/10.1017/CBO9781139858656

O'Connor, S., & Andrews, T. (2018). Smartphones and mobile applications (apps) in clinical nursing education: A student perspective. *Nurse Education Today, 69*, 172–178. https://doi.org/10.1016/j.nedt.2018.07.013

Outemzabet, B., & Sarnou, H. (2023). Exploring the significance of English-based communication for a community of medical academics in a public university teaching hospital in Algeria. *English for Specific Purposes, 70*, 116–130. https://doi.org/10.1016/j.esp.2022.12.001

Rafiq, K. R. M., Hashim, H., & Yunus, M. M. (2021). Sustaining education with mobile learning for English for specific purposes (ESP): A systematic review (2012–2021). *Sustainability, 13*(17). https://doi.org/10.3390/su13179768

Richey, R. C., & Klein, J. D. (2014). *Design and development research: Methods, strategies, and issues*. Routledge.

Saridah, S., Sulaeman, D., Faturohmah, P. S., & Ruminda, R. (2024). Optimizing EFL learning: Digital native leverage mobile-assisted language learning (MALL). *Jo-ELT, 11*(1), 46–55. https://doi.org/10.33394/jo-elt.v11i1.11342

Septiyani, R. D., Aslami, I. F., Surani, D., & Bangsa, U. B. (2022). Developing ESP e-module course design based on Canva for law students. *Tarbawi, 8*(2), 174–180. https://doi.org/10.32678/tarbawi.v8i02.6706

Shepard, C., & Rose, H. (2023). English medium higher education in Hong Kong: Linguistic challenges of local and non-local students. *Language and Education, 37*(6), 788–805. https://doi.org/10.1080/09500782.2023.2240571

Spatioti, A. G., Kazanidis, I., & Pange, J. (2022). A comparative study of the ADDIE instructional design model in distance education. *Information, 13*(9), 1–20. https://doi.org/10.3390/info13090402

Sprenger, D. A., & Schwaninger, A. (2021). Technology acceptance of four digital learning technologies after three months' usage. *International Journal of Educational Technology in Higher Education, 18*(1). https://doi.org/10.1186/s41239-021-00243-4

Susanti, D. A., Purwitasari, E. D., & Sultonurohmah, N. (2024). Effectiveness of using the Canva application as a MI/SD science learning media. *Jurnal Riset Madrasah Ibtidaiyah (JURMIA), 4*(2), 102–118. https://doi.org/10.37680/basica.v4i2.6393

Wanda, D., Fowler, C., & Wilson, V. (2016). Using flashcards to engage Indonesian nursing students in reflection on their practice. *Nurse Education Today, 38*, 132–137. https://doi.org/10.1016/j.nedt.2015.11.029

Weisi, H., & Ashrafabadi, F. (2018). Do English courses offered at Kermanshah University of Medical Sciences fulfill students' future needs? *Educational Research in Medical Sciences, 7*(1), 7–9. https://doi.org/10.5812/erms.81403

Widoyoko, E. P. (2016). *Evaluasi program pembelajaran*. Pustaka Belajar.

Yang, D., Chen, P., Wang, H., Wang, K., & Huang, R. (2022). Teachers' autonomy support and student engagement: A systematic literature review of longitudinal studies. *Frontiers in Psychology, 13*. https://doi.org/10.3389/fpsyg.2022.925955

Zhou, W., & Wu, X. (2024). The impact of internal-generated contextual clues on EFL vocabulary learning: Insights from EEG. *Frontiers in Psychology, 15*. https://doi.org/10.3389/fpsyg.2024.1332098

Zimmerman, B. J. (2002). Becoming a self-regulated learner: An overview. *Theory Into Practice, 41*(2), 64–70. https://doi.org/10.1207/s15430421tip4102_2