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Original Article

A Blended ESP Learning Model Integrated with Digital Literacy

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Abstract: Contemporary nursing practice requires professionals to integrate English communication, nutritional literacy, and digital competence to support interdisciplinary healthcare. However, English for Specific Purposes (ESP) curricula often fail to address these competencies in an integrated manner. This study conducted a multidimensional needs analysis to identify the ESP learning materials and pedagogical approaches required to enhance nutritional awareness among undergraduate nursing students. A mixed-methods sequential explanatory design was employed with 46 nursing students in Bali, Indonesia. Data were collected through a 70-item questionnaire and semi-structured interviews and analyzed using quantitative and qualitative approaches. The findings revealed strong support for an ESP curriculum integrating nutrition and digital technology. Students identified limited mastery of medical and nutritional terminology as a major challenge affecting their ability to read scientific literature and communicate effectively in clinical settings. They also expressed a clear preference for blended learning because of its flexibility and interactive learning opportunities. These findings highlight the need for contextualized, technology-enhanced ESP materials that integrate language learning with professional nursing competencies. The study contributes practical guidance for designing ESP curricula that better prepare nursing students for digitally supported and internationally oriented healthcare practice.

Keywords :
English for Specific Purposes (ESP); Blended learning: Digital health literacy; Nutrition literacy, Nursing education

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INTRODUCTION

Effective communication is a fundamental competency in nursing, directly influencing patient safety, clinical outcomes, and satisfaction (Brinkert, 2010; Stewart, 1995). Beyond interpersonal skills, nurses are increasingly expected to communicate effectively in English to access evidence-based knowledge, collaborate internationally, and

provide culturally responsive care (Anggayana et al., 2016; Bramhall, 2014; Heisterkamp et al., 2025; Sudipa et al., 2020; Xu et al., 2025). In the Society 5.0 era, these competencies extend to integrating digital health literacy and nutrition literacy, enabling nurses to interpret global health information and apply international nutritional guidelines within technology-enhanced healthcare environments. However, many nursing students in Indonesia continue to face challenges in accessing English-language scientific resources due to limited technical vocabulary and insufficient exposure to discipline-specific English. This gap highlights the need for an English for Specific Purposes (ESP) approach that systematically aligns students' communicative, pedagogical, and technological needs with the demands of contemporary nursing education.

Traditional teacher-centered instruction often limits nursing students' ability to apply technical English in authentic clinical contexts, particularly in nutrition-related communication (Mancin, Reggiani, et al., 2023). Recent studies demonstrate that blended learning and English as a Medium of Instruction (EMI) effectively enhance language proficiency, clinical competence, and medical terminology through technology-enhanced learning environments (Abu Farha et al., 2021; Alotaibi et al., 2025; Anderson, 2025; Haroen et al., 2024). Meanwhile, the growing importance of nutritional care requires nurses to possess integrated competencies in English communication, nutrition, and digital health literacy to improve patient outcomes (Bauer et al., 2025; Mancin, Reggiani, et al., 2023; Mancin, Sguanci, et al., 2023). However, validated ESP learning materials that integrate these competencies remain scarce, particularly in multicultural healthcare settings such as Bali, Indonesia (Anggayana et al., 2016; Flowerdew & Wan, 2010; Peršolja, 2025). Therefore, integrated case-based ESP and blended learning offer a promising pedagogical approach for strengthening nursing students' professional communication and clinical competencies (Abu Farha et al., 2021; Bauer et al., 2025; Haroen et al., 2024).

The integration of English proficiency and nutrition literacy is particularly important in global health-tourism destinations such as Bali, Indonesia, where nursing professionals serve linguistically and culturally diverse patient populations (Anggayana et al., 2016). This context requires a Global Englishes perspective that extends beyond general language proficiency to functional communication skills applicable to authentic nursing practice (Flowerdew & Wan, 2010; Montakantiwong & Funada, 2025; Rogerson-Revell, 2008). Responding to these demands, the present study adopts the ADDIE framework to develop an integrated ESP-Nutrition module delivered through blended learning (Branch, 2009). Unlike conventional ESP instruction that primarily emphasizes language acquisition, the proposed model integrates clinical nutrition content with digital health literacy to strengthen students' ability to access, evaluate, and apply English-language health information in professional contexts (Bauer et al., 2025; Peršolja, 2025). This integrated instructional framework is expected to enhance nursing students' communicative competence, digital confidence, and professional readiness for increasingly technology-driven and internationally connected healthcare environments.

Within this context, English for Specific Purposes (ESP) provides an appropriate pedagogical framework for integrating language learning with professional nursing

competencies by emphasizing discipline-specific communication that is directly applicable to clinical practice (Anggayana et al., 2016; Stötzer et al., 2025). The growing adoption of English-medium education further highlights the need to combine English proficiency with digital health literacy, enabling students to access, interpret, and apply evidence-based healthcare information in professional settings (Alotaibi et al., 2025; Almayez et al., 2025; Heisterkamp et al., 2025; Yue & Saad, 2025). Moreover, incorporating clinical content, such as nutrition, into blended and case-based learning environments has been shown to improve language proficiency, conceptual understanding, and professional readiness among healthcare students (Abu Farha et al., 2021; Bauer et al., 2025; Haroen et al., 2024; Khan & Khan, 2024). Therefore, integrating ESP, nutrition literacy, digital health literacy, and evidence-based instructional strategies provides a comprehensive pedagogical framework for preparing nursing students to meet the interdisciplinary demands of contemporary healthcare practice.

Blended learning has become an effective pedagogical approach in nursing education by combining face-to-face and technology-mediated learning to enhance knowledge acquisition, clinical competence, learner engagement, and digital health literacy (Abusabeib, 2025; Almayez et al., 2025; Anggayana et al., 2016; El-Zeftawy & Hassan, 2016; Jowsey et al., 2020; Ramadhanty et al., 2022; Yue & Saad, 2025). However, the integration of English for Specific Purposes (ESP), nutrition literacy, and digital health literacy within Indonesian nursing curricula remains fragmented, limiting students' ability to access and apply international evidence-based healthcare resources (Anggayana et al., 2016; Bauer et al., 2025; Mancin, Reggiani, et al., 2023; Peršolja, 2025). Moreover, validated ESP learning materials that systematically integrate these competencies through blended learning remain scarce (Haroen et al., 2024). Therefore, this study employs the ADDIE (Analysis, Design, Development, Implementation, and Evaluation) framework to identify undergraduate nursing students' multidimensional learning needs and develop an integrated ESP learning model that supports English communication, nutrition literacy, and digital health literacy for professional nursing practice in the Society 5.0 era.

METHOD

This study employed a Research and Development (R&D) design using the ADDIE (Analysis, Design, Development, Implementation, and Evaluation) framework to develop an integrated English for Specific Purposes (ESP) learning model incorporating nutrition literacy and digital health literacy (Branch, 2009). A sequential explanatory mixed-methods design was adopted to combine quantitative and qualitative evidence throughout the development process (Creswell, 2010). The study was conducted at a nursing higher education institution in Bali, Indonesia, involving 46 undergraduate nursing students selected through purposive sampling based on their enrollment in the Bachelor of Nursing program and completion of foundational English courses. Quantitative data were collected through a structured questionnaire to identify students' multidimensional learning needs, followed by semi-structured interviews to explain and enrich the quantitative findings. The developed learning materials were subsequently evaluated using normalized gain (N-gain) analysis to measure their effectiveness in improving students' learning outcomes.

Participation was voluntary, informed consent was obtained from all participants, and demographic characteristics are presented in Table 1.

Table 1. Participant Demographics (N=46)

Characteristic	Category	Frequency (n)	Percentage (%)
Gender	Female	42	91
	Male	4	9
Age (years)	19	1	2
	20	3	7
	21	26	57
	22	14	30
	23	2	4
Last Education	High School	44	96
	Bachelor's	2	4

Two instruments were employed for data collection. A quantitative questionnaire consisting of 70 items on a five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree) was developed to examine students' perceptions of English language use, digital technology, integrated ESP–nutrition learning needs, and blended learning. To complement the quantitative findings, a semi-structured interview protocol comprising 20 open-ended questions was used to explore students' experiences, learning challenges, and preferences regarding English, nutrition literacy, and instructional approaches in nursing education.

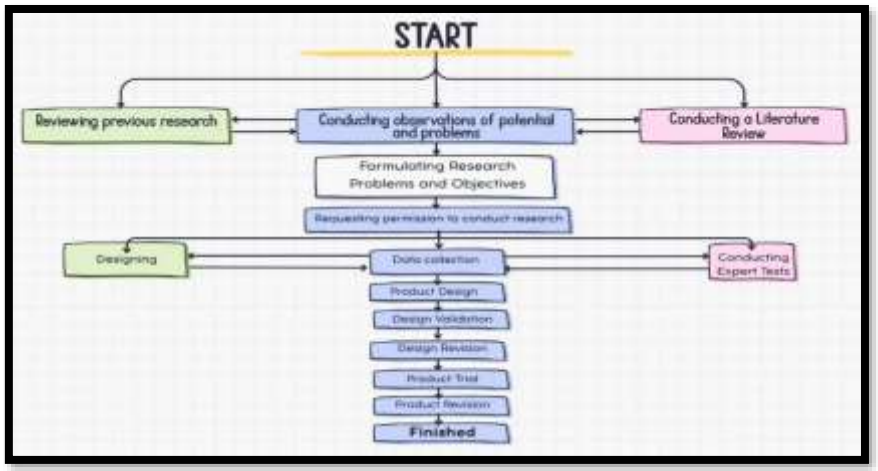

Figure 1. The Systematic Research Workflow of the Integrated ESP-Nutrition Material Development

Figure 1 presents the overall research procedure based on the Research and Development (R&D) framework using a sequential explanatory mixed-methods design. The study commenced with a needs analysis through field observations, a 70-item questionnaire administered to 46 undergraduate nursing students, and semi-structured interviews to identify learners' needs in English for Specific Purposes (ESP), nutrition literacy, and digital health literacy. Following institutional approval and informed consent, the findings informed the design, development, and expert validation of an integrated ESP learning module, which was subsequently implemented through blended learning and evaluated using pre-test and post-test measures. To ensure methodological rigor, the

instruments were validated by two experts in English pedagogy and clinical nutrition, with content validity assessed using the Gregory formula and internal consistency examined through Cronbach's alpha. The effectiveness of the developed learning materials was further determined using normalized gain (N-gain) analysis, classifying learning improvements into low, moderate, and high categories based on established educational benchmarks. The content validity of the research instruments was evaluated using the Gregory content validity model, as presented in Table 2, to determine the level of agreement between expert judges regarding the relevance and appropriateness of each instrument item (Gregory, 2015).

Table 2. Model of Content Validity (Gregory, 2015)

		EXPERT JUDGE 1	
		Weak Relevance (item rated 1 or 2)	Strong Relevance (item rated 3 or 4)
EXPERT JUDGE 2	Weak Relevance (item rated 1 or 2)	A	B
	Strong Relevance (item rated 3 or 4)	C	D

Content validity was determined using the Gregory content validity coefficient (Gregory, 2015). Data were analyzed using a two-phase strategy consistent with the sequential explanatory mixed-methods design. Quantitative data obtained from the 46 questionnaires were analyzed using descriptive statistics in SPSS to calculate the mean and standard deviation of each Likert-scale item, providing an overview of students' perceptions and learning needs. Qualitative data from the semi-structured interviews were transcribed verbatim and analyzed using thematic analysis following the procedures of data reduction, data display, and conclusion drawing/verification proposed by Miles et al. (2019). The qualitative findings were subsequently used to explain and enrich the quantitative results, providing a comprehensive understanding of students' needs for the development of the integrated ESP learning materials.

RESULT AND DISCUSSION

The integration of quantitative and qualitative findings revealed a consistent pattern of students' learning needs. Questionnaire results demonstrated strong agreement on the importance of integrating English proficiency, digital literacy, and technology-enhanced learning ($M = 4.52$, $SD = 0.586$), while interview data highlighted the need for structured learning to overcome technical vocabulary limitations in accessing international nutrition resources. These findings indicate students' readiness for active, technology-mediated learning, supporting previous studies that emphasize active engagement in developing healthcare competencies and the role of digital learning in strengthening technical English and application (Bauer et al., 2025; Khan & Khan, 2024; Mancin, Reggiani, et al., 2023).

The questionnaire results indicate a high level of student readiness for technology-integrated learning. Students strongly agreed that blended learning enhances their medical English proficiency ($M = 4.43$, $SD = 0.544$) and that technology-based health education is more interactive than conventional instruction ($M = 4.54$, $SD = 0.622$). These findings

demonstrate that students are well prepared to engage with digital learning environments, supporting the implementation of integrated ESP learning materials. In the context of Bali as an international healthcare and tourism destination, technology-enhanced learning provides opportunities for students to develop medical and nutritional terminology before clinical practice, thereby strengthening their communicative competence and confidence when interacting with culturally diverse patients.

Digital health literacy emerged as a key competency for accessing and applying nutrition information in technology-mediated learning. Students strongly agreed that English proficiency was essential for understanding WHO nutrition guidelines (M = 4.39, SD = 0.682) and expressed a strong need for up-to-date English-language clinical learning resources (M = 4.52, SD = 0.505). These findings are consistent with Bauer et al. (2025), who emphasized that digital access to nutrition knowledge is fundamental for preparing nursing students for contemporary clinical practice. The interview data further reinforced this result, as one participant stated, *"Mastering English is important in nursing and nutrition because it helps access the latest knowledge... and opens up wider career opportunities"* (Student 1). These findings demonstrate that digital health literacy serves as a practical bridge between local nursing education and international healthcare standards. The implementation of the developed interactive learning modules in classroom settings is illustrated in Figure 2.

Figure 2. Implementation of Blended ESP Learning through Interactive Digital Modules

This figure documents the classroom-based implementation phase of the developed digital module. The visualization captures nursing students interacting with the hybrid platform via personal laptops during a synchronous session facilitated by the instructor. Observational data during this session indicates high student engagement with the digital learning resources, where technology acts as an active scaffolding medium to augment traditional face-to-face feedback. However, the real-world execution also highlighted pedagogical constraints, particularly regarding minor technical latency and varying baseline levels of individual digital orientation among students. Rather than replacing instructor input, this blended configuration allows students to navigate technical medical-nutritional terminology independently at their own pace before transitioning to

collaborative communicative tasks, thereby providing an empirical baseline for technology-mediated vocational instruction.

The classroom visualization illustrates the active participation of students within this technology-integrated educational environment. This observed behavioral engagement aligns with the descriptive metrics from the research questionnaires, where students strongly noted that course materials combining English and nutrition content increased their baseline motivation to learn (M = 4.50; SD = 0.548). Utilizing personal digital devices in a synchronous setting allows students to navigate English-language medical information, directly supporting the instructional goal of building digital health literacy alongside specialized vocational knowledge.

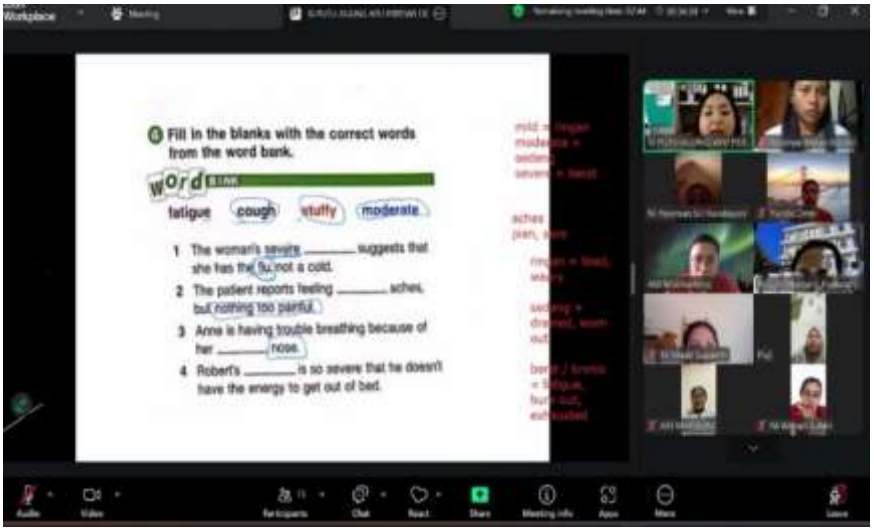

Figure 3. Collaborative Group Discussion during the Implementation of Blended ESP Learning

This figure illustrates the classroom interaction during a face-to-face session where students, organized into small peer clusters, engage in structured discussions based on the core materials accessed via the digital module. This activity highlights the social-constructivist aspect of the blended learning model, where students interact with their peers to clarify medical-nutrition terminology and practice professional communication in English. This interactive phase is designed to assist students in transitioning from individual digital comprehension to collaborative problem-solving. Through these peer-to-peer dialogues, students negotiate the meanings of complex medical-nutrition terminology and practice professional clinical communication in English. Observational tracking during this phase indicates that such collaborative dynamics support situational confidence and communicative practice in English for Specific Purposes (ESP) settings. However, real-world classroom execution also revealed challenges in group dynamics, particularly minor imbalances in individual participation rates and varying baseline linguistic proficiencies among students. By documenting this interaction, the study demonstrates how the blended approach facilitates not only conceptual mastery of nutrition but also the development of critical interpersonal skills required in the global healthcare sector.

Table 3. Content Validity Analysis of the Research Instrument Using the Gregory (2015) Formula

		EXPERT JUDGE 1	
		Weak Relevance (item rated 1 or 2)	Strong Relevance (item rated 3 or 4)
EXPERT JUDGE 2	Weak Relevance (item rated 1 or 2)	11, 21, 30	7, 18, 26, 38, 54, 61
	Strong Relevance (item rated 3 or 4)	2, 16, 19, 42, 47, 57, 64, 70	1, 3, 4, 5, 6, 8, 9, 10, 12, 13, 14, 15, 17, 20, 22, 23, 24, 25, 27, 28, 29, 31, 32, 33, 34, 35, 36, 37, 39, 40, 41, 43, 44, 45, 46, 48, 49, 50, 51, 52, 53, 55, 56, 58, 59, 60, 62, 63, 65, 66, 67, 68, 69

The content validity of the research instrument was calculated using the Gregory (2015) formula to ensure the alignment of the questionnaire items with the objectives of developing integrated ESP-nutrition materials. Based on the evaluation by two expert judges, there was a high level of agreement on 53 items rated as having strong relevance by both experts (Cell D), while other items were categorized into Cell A (3 items), Cell B (6 items), and Cell C (8 items), reflecting varying levels of relevance according to each expert's perspective. Through this calculation, a content validity coefficient of 0.76 was obtained, indicating that the questionnaire instrument falls within the high validity category for measuring students' digital literacy readiness and nutrition awareness. This figure provides a robust scientific foundation, confirming that the developed learning tools have met the criteria for conceptual and structural feasibility prior to their implementation in the blended learning process.

Cronbach's Alpha	N of Items
.990	70

Figure 4. Reliability Statistics Analysis for the Research Instrument

As illustrated in Figure 4, the internal consistency testing of the 70-item digital readiness instrument yielded a Cronbach's Alpha coefficient of 0.990. It indicates that the instrument possesses exceptionally high and stable reliability for consistently measuring the research variables. In the context of developing ESP materials and nutrition awareness, this figure provides assurance that each questionnaire item can deliver dependable results if reused under similar conditions, ensuring that the data derived from the blended learning implementation holds internationally accountable scientific validity.

The perceived imperative of english and digital literacy in contemporary nursing, the data unequivocally indicates that students perceive English proficiency and digital literacy not as optional extras but as core professional competencies essential for a successful nursing career in the 21st century. The questionnaire results show remarkably high levels of agreement on items related to the importance of these skills. For instance, students strongly agreed with the statements that "English skills and digital literacy are two important competencies for today's nurses" (M=4.52, SD=0.586) and that "the ability to speak English will open up wider career opportunities in the healthcare field" (M=4.59, SD=0.541). This quantitative consensus is further illuminated by the qualitative data, where students articulated the pragmatic reasons behind this belief. One student explained,

"Mastering English is important in nursing and nutrition because it helps access the latest knowledge, improves communication with international patients/health workers, and opens up wider career opportunities" (Student 1). Another student directly linked this need to their local context, stating, "it is very important because in this era, basic English is needed for communication, especially since Bali has many foreign tourists" (Student 2). This aligns with broader findings that English proficiency is a critical competency with significant professional ramifications(Almayez et al., 2025).

Beyond career opportunities, students view English as a critical tool for professional development and the delivery of evidence-based care. They recognize that "many scientific references and the latest research use this language English" (Student 6). This understanding demonstrates a sophisticated awareness that English proficiency is directly linked to lifelong learning and the ability to apply the most current international clinical guidelines in their practice. Similarly, the role of technology was seen as integral to modern nursing, particularly in patient education. Students overwhelmingly agreed that "the nurse's role in patient education is increasingly important in the digital era" (M=4.54, SD=0.546) and that "technology can help nurses improve patient health literacy" (M=4.50, SD=0.624). This perspective moves beyond viewing technology as a mere information repository and frames it as an active tool for enhancing patient care and communication.

Table 4. Mean Scores and Standard Deviations for Key Questionnaire Constructs

Construct / Representative Item	Item No.	Mean (M)	Std. Dev. (SD)
Perceived Importance of English & Digital Skills			
English skills and digital literacy are two important competencies for today's nurses.	46	4.52	0.586
The ability to speak English will open up wider career opportunities.	35	4.59	0.541
The nurse's role in patient education is increasingly important in the digital era.	40	4.54	0.546
Technology can help nurses improve patient health literacy	44	4.50	0.624
Needs for Integrated ESP-Nutrition Content			
Course materials that combine English and nutrition content make me more motivated to learn.	52	4.50	0.548
I feel that English-language nutrition materials are more up-to-date.	63	4.35	0.674
My ability to read WHO nutrition guidelines is influenced by my English skills.	66	4.39	0.682
Attitudes Toward Blended Learning & Technology			
Blended learning improves my ability in medical English.	56	4.43	0.544
Health education based on technology is more interactive than traditional methods.	26	4.54	0.622
I hope the campus provides more English-language nutrition learning resources (books, videos, apps).	70	4.52	0.505

Bridging the lexical gap, identifying specific needs for an integrated esp-nutrition curriculum. While students are highly motivated to learn English, the data reveals a significant gap between their general linguistic aspirations and their specific, functional needs within the nursing context. Their primary challenge is not a lack of understanding

of general English grammar but a struggle with the specialized lexicon of medicine and nutrition. When asked about the challenges of learning nutrition in English, a recurring theme was the difficulty of the terminology. Students reported that "many medical and nutritional terms are difficult to understand" (Student 1) and that their main difficulty was "the technical terms, complex scientific texts, and a lack of specific vocabulary" (Student 21). These findings highlight the need for ESP instruction that integrates discipline-specific vocabulary, authentic learning materials, and blended learning strategies to enhance students' language proficiency and support effective learning in nursing education.

This identified lexical gap informs the explicit requests voiced by the participants regarding their target learning materials. The data indicates a clear demand for a structured ESP curriculum focused primarily on the functional, communicative tasks required in professional nursing settings. They desire materials that prioritize "medical vocabulary, reading scientific journals, and clinical communication (such as patient interviews and health education)" (Student 1). Another student specified the need for "public speaking about equipment, vitamins, medicine, asking about the patient's condition, and so on" (Student 3). This indicates a rejection of a one-size-fits-all, General English approach in favor of a curriculum that is deeply contextualized and immediately applicable to their clinical practice. The strong agreement on questionnaire items such as "I believe that teaching nutrition terms in English improves my understanding of nutrition" (M=4.46, SD=0.546) further substantiates this need for an integrated vocabulary-building approach. The students' feedback provides a powerful, data-driven mandate for designing materials that bridge the gap between abstract language knowledge and functional professional communication.

Figure 5. Group-Based Peer Learning and Data Collection during the Blended ESP Implementation

This figure documents the collaborative environment during the classroom-based component of the instructional intervention. Students are organized into small peer clusters to engage in interactive tasks centered around the digital module. This collaborative framework is designed to provide an operational setting where students can practice specialized English for Specific Purposes (ESP) and nutrition terminology through peer interaction. The small-group arrangement allows the instructor to move between clusters,

offering immediate feedback and clarifying technical clinical-nutritional concepts. Rather than definitively validating full procedural fidelity or long-term psychological impacts, this visual documentation illustrates the planned execution of the pedagogical intervention phase within the Research and Development (R&D) design. The observed behavioral participation during these sessions reflects the high readiness indicators and student engagement evaluated throughout the implementation process.

Students demonstrated a strong preference for a blended learning approach to support the integration of English and nutrition education. Questionnaire results showed high agreement that combining English and nutrition content increased learning motivation (M = 4.50, SD = 0.548), supported medical English development (M = 4.43, SD = 0.544), and highlighted the need for English-language nutrition learning resources (M = 4.52, SD = 0.505). These findings are consistent with previous research indicating that blended learning enhances communication competence and learning engagement among nursing students (Haroen et al., 2024). The interview data further explained this preference, with one participant stating, *"Blended learning helps me understand nutrition material more effectively because it combines online learning that is flexible with face-to-face learning that is interactive, so I can access material anytime while also discussing it directly..."* (Student 7). Overall, the findings suggest that blended learning provides an appropriate pedagogical framework for integrating English communication, nutrition literacy, and technology-enhanced learning in nursing education, although its long-term effectiveness should be further examined across diverse learning contexts.

The developed blended learning model is designed to optimize instructional delivery by integrating online and face-to-face pedagogical components. Within this hybrid framework, the online environment provides a balanced space where nursing students can interact with complex, specialized medical terminology independently before participating in collaborative communication tasks during synchronous sessions. This structural approach aligns with the classroom perspective of Khan & Khan (2024), who note that technology-mediated instruction supports non-native English learners in breaking down technical jargon within specialized disciplines. In this R&D context, the digital availability of integrated resources ensures that students can revisit demanding clinical nutrition concepts at their own pace. Rather than establishing a direct comparative superiority over conventional face-to-face methods which falls outside the exploratory scope of this single cohort design this digital flexibility serves as a practical scaffolding mechanism that fosters a positive baseline for self-regulated learning among future healthcare professionals.

The qualitative themes summarized in Table 5 provide contextual insights into how students perceive the operational division between online and face-to-face modalities. Rather than assuming an innate pedagogical design competence among participants, their reflections indicate a practical preference for situational convenience and structural flexibility. Online elements videos and glossaries were valued primarily for self-paced content review, whereas face-to-face classroom blocks provided a synchronous platform for clarifying lingering terminological confusion with peers. For instance, one student detailed this operational balance: "Blended learning helps me understand nutrition material more effectively because it combines online learning that is flexible with face-to-face

learning that is interactive, so I can access material anytime while also discussing it directly..." (Student 7). Furthermore, some students expressed intrinsic motivation to share their localized insights within peer-led learning groups, as noted by Student 36. However, the generalizability of these preferences must be cautiously framed, as individual student responses may be heavily mediated by external confounding variables, including private internet reliability and variations in home-study environments.

Table 5. Thematic Analysis of Interview Data with Illustrative Quotations

Theme	Description of Theme	Illustrative Quotations
Professional Imperative for English	Students view English not just as a school subject but as an essential tool for career advancement, evidence-based practice, and providing quality care in a globalized context.	"*Mastering English is important. it helps access the latest knowledge, improves communication with international patients and opens up wider career opportunities.*" (Student 1) "*International clinical guidelines (such as from the WHO or CDC) use English, so health workers need to understand them to apply evidence-based practice*." (Student 36)
The Lexical Challenge in ESP	The primary difficulty in learning is not general grammar but the specialized and complex terminology of medicine and nutrition, leading to a demand for contextualized, task-based learning materials.	"*The challenges I experience are that many medical and nutritional terms are difficult to understand and a lack of specific vocabulary in the field of nutrition*." (Student 1) "*The most needed material is medical English specific to nursing, such as medical terms, reading scientific journals, clinical communication with patients, and writing nursing reports in English.*" (Student 23)
Preference for Blended Learning	Students strongly favor a blended learning model that combines flexible, self-paced online learning for content acquisition with interactive face-to-face sessions for discussion, practice, and application.	"*Blended learning helps because it combines online learning that is flexible with face-to-face that is interactive, so I can access material anytime while also discussing it directly to deepen understanding.*" (Student 7) "*Through online platforms I can repeat difficult nutrition material anytime. Face-to-face in class gives an opportunity to ask the lecturer directly or discuss with friends.*" (Student 25)
Readiness as Agents of Change	Students express a high degree of motivation and readiness to apply their integrated skills, viewing themselves as future agents of change in bilingual health education.	"*I feel quite ready to be an agent of change in English-language nutrition education because I am able to understand basic terms, access international sources, and re-convey the information.*" (Student 12) "*I am ready to be an agent of change. I have the motivation to share knowledge with my peers through small mentoring or learning communities.*" (Student 36)

To systematically bridge the student-reported demands for specialized language structures, case-based learning tasks were embedded within the instructional design. Marcu (2020)emphasizes that formulating functional ESP courses requires a continuous loop of analytical refinement to align language features strictly with vocational tasks. In this study, the integrated cases required students to navigate technical health scenarios and practice functional descriptions of dietary guidelines in English. While prior scholarship suggests that case-based clinical nutrition training can support professional outcomes in health sciences cohorts (Abu Farha et al., 2021), the present exploratory analysis focuses

on student engagement and language familiarity rather than direct clinical performance metrics. This specialized focus is evidenced in the qualitative interviews, where students explicitly requested targeted language assistance, describing their core target as an "English basic that leans toward the health world" (Student 23). As shown in Figure 6, the classroom observation documents the synchronous phase of the instructional implementation.

Figure 6. Student Engagement & Individual Progress Tracking in the Blended Learning Environment

This figure documents the structural setup of the blended learning classroom. The image illustrates students interacting with the digital learning platform via personal laptops while the instructor monitors their task progression. Chronologically, this face-to-face block followed individual online modules. While the photographic record confirms physical presence and individual task engagement, it serves strictly as a procedural validation of the ADDIE design sequence rather than an empirical measurement of cognitive learning outcomes or localized feasibility.

Furthermore, this visualization captures the "Implementation" stage where the lecturer monitors the digital progress of each student, ensuring that the learning objectives related to nutrition awareness are being met. This proactive monitoring allows for immediate pedagogical intervention, addressing specific linguistic or conceptual hurdles that students might encounter while studying the ESP material. The active and focused behavior observed in this image correlates with the positive student responses recorded in the post-implementation questionnaire, where the majority of participants expressed increased confidence in their ability to provide nutritional education to international patients. This image serves as strong visual evidence of the feasibility and practicality of the developed instructional materials within a real-world educational setting.

The role of instructional design, particularly the use of the ADDIE model, ensured that the developed materials were both systematic and scientifically grounded. Developing functional ESP courses requires a meticulous analysis of learner needs to ensure that the content focus and language focus are perfectly aligned. Marcu (2020) emphasizes that designing functional ESP courses involves a continuous loop of evaluation and revision,

which was strictly followed in this study's development phase. This rigorous process resulted in high content validity, as confirmed by the expert judges' evaluations.

Addressing the specific challenges identified by students, such as the difficulty of technical medical vocabulary, remains a priority for ESP curriculum developers. The use of interactive bilingual media and digital glossaries can mitigate these hurdles, making global literature like WHO guidelines more accessible. Research indicates that pedagogical innovations that incorporate local wisdom and digital adaptations contribute to sustainable educational development in Indonesia. By grounding the ESP materials in the context of Bali's health tourism, the curriculum becomes more responsive to the unique socio-economic demands of the region. To establish statistical precision and eliminate vague descriptive labels, Table 6 reports the exact mean scores and standard deviations derived from the 5-point Likert scale questionnaire.

Table 6. Student Perceptions and Competency Assessment in Nutrition-Integrated ESP

No	Indicators	Mean (M)	Std. Dev. (SD)
1	Understanding balanced nutrition for patient recovery	4.46	0.546
2	Providing basic dietary instructions for chronic diseases	4.35	0.674
3	Confidence in professional medical communication	4.39	0.682
4	Perception of English media for global nutrition access	4.52	0.505
5	Readiness for technology-integrated blended learning	4.43	0.544

The standardized metrics in Table 6 demonstrate a strong and consistent statistical consensus across all targeted indicators, with low standard deviations indicating highly uniform participant responses. This uniform pattern confirms a positive baseline perception regarding the integration of digital media and technical vocabulary building. However, the presence of potential response bias particularly social desirability bias arising from the students' awareness of the developer's research role must be considered. While these positive perceptions suggest that digital glossaries and structured media make international guidelines more accessible, distinguishing between self-reported confidence and objective clinical competence remains a critical boundary for sustainable educational development in regional health tourism sectors.

These findings also provide important pedagogical implications for curriculum design in nursing education. The consistently positive responses support the integration of blended learning environments that combine digital learning resources, contextualized ESP materials, and structured vocabulary instruction. Such an approach can enhance students' engagement, promote independent learning, and strengthen their ability to understand professional nursing texts. Nevertheless, future instructional practices should complement students' self-perceptions with authentic performance assessments to ensure that improved confidence is accompanied by measurable gains in language proficiency and professional competence. Based on the findings of the needs analysis, an integrated digital learning module was designed to address students' linguistic and professional learning needs. The module combines English for Specific Purposes (ESP), nutrition awareness, and digital health literacy within a blended learning framework to support contextualized

learning and strengthen students' academic and professional competencies. The proposed module is presented in Figure 7.

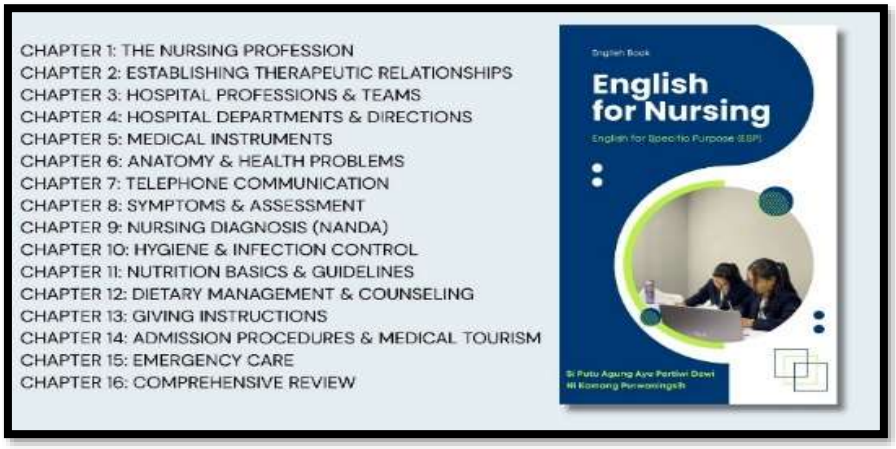

Figure 7. Digital Learning Module for Integrated ESP and Nutrition Awareness

This figure illustrates the structural interface and conceptual layout of the newly developed digital learning module, titled "English for Nursing: Building Nutrition Awareness Through Blended English Learning". Designed specifically as an instructional resource for healthcare students, the application integrates targeted English communication prompts with foundational topics of nutrition literacy. As shown in the visualization, the module adopts a structured content hierarchy, featuring specific sections dedicated to the definitions of clinical nutritional components such as carbohydrates, proteins, and fats. This thematic represents the concrete output of the Development phase within the ADDIE instructional design cycle, mapping out the specialized vocabulary requirements identified during the preceding needs analysis.

The rapid digital transformation of healthcare has fundamentally reshaped the competencies required of nursing graduates, extending beyond clinical knowledge to include English communication, digital health literacy, and nutrition literacy. As healthcare services become increasingly technology-driven and internationally connected, nursing professionals must be capable of accessing, evaluating, and applying digital health information while communicating effectively in English. Digital health literacy encompasses the ability to locate, interpret, and critically evaluate health information from digital sources for evidence-based decision-making (Norman & Skinner, 2006; Chan et al., 2022). Likewise, health literacy has evolved into a fundamental educational objective because it enables healthcare professionals to deliver accurate health information and support informed patient decision-making (Nutbeam, 2000). In parallel, nutrition literacy has gained increasing recognition as a core professional competency, equipping nurses to provide evidence-based nutritional assessment, education, and intervention in diverse healthcare settings (Robinson & Zamora, 2021). These competencies are particularly important in contemporary nursing education, where graduates are expected to integrate language, technology, and clinical knowledge within authentic professional practice.

The increasing reliance on digital information also requires students to develop higher-order digital learning competencies. Beyond technical skills, learners must demonstrate the ability to critically read, interpret, and synthesize complex scientific and clinical information from multiple digital sources (Coiro, 2021). Universities worldwide are therefore redesigning curricula to foster digital competence, lifelong learning, and interdisciplinary collaboration in response to rapid technological change (Duderstadt, 2020). Recent evidence further suggests that digital competence significantly enhances students' learning engagement and self-directed learning, both of which are essential for professional education in healthcare disciplines (Huang & Yang, 2024). Consequently, nursing education should integrate digital literacy into instructional practices rather than treating it as a supplementary skill.

Within this context, English for Specific Purposes (ESP) provides an appropriate pedagogical framework for preparing nursing students to communicate effectively in academic and professional healthcare environments. A systematic needs analysis remains the cornerstone of ESP curriculum development because it ensures that instructional content reflects learners' linguistic, academic, and occupational requirements (West, 1994). Accordingly, ESP instruction should extend beyond general English by integrating discipline-specific vocabulary, authentic clinical communication, and contextualized learning activities that promote meaningful language use. Furthermore, developing self-directed learners has become an important educational objective, as autonomous learning enables students to continuously update their professional knowledge and adapt to rapidly changing healthcare environments (Robinson & Persky, 2020). Such learner-centered approaches are particularly relevant for nursing education, where continuous professional development is essential throughout one's career.

Blended learning has emerged as one of the most effective instructional approaches for supporting these educational goals. By combining face-to-face interaction with online learning environments, blended learning promotes flexibility, collaboration, reflective thinking, and deeper knowledge construction (Garrison & Kanuka, 2004; Akyol & Garrison, 2011). More recent studies demonstrate that technology-enhanced learning environments improve students' engagement, digital competence, and academic achievement while encouraging independent learning and active participation (Palalas & Wark, 2020; West & Borup, 2022). Recent studies have demonstrated that technology-enhanced learning environments and innovative digital instructional media significantly improve students' conceptual understanding, digital competencies, higher-order thinking skills, and engagement across various educational contexts, highlighting the growing importance of integrating digital pedagogies into higher education to foster meaningful and sustainable learning outcomes (Hanum, 2026; Rahmawati, 2026; Vriska et al., 2026). In addition, mobile and digital learning technologies provide greater accessibility to educational resources and create more flexible learning opportunities that support both classroom and self-directed learning (Pegrum et al., 2013). Collectively, these findings indicate that blended learning offers substantial pedagogical value for integrating language instruction with professional healthcare education.

Despite these advances, relatively few studies have examined how ESP, nutrition literacy, and digital health literacy can be systematically integrated within a blended learning framework for undergraduate nursing education, particularly in developing countries. Existing studies tend to investigate these constructs independently, providing limited guidance for curriculum developers seeking interdisciplinary instructional models. Therefore, a comprehensive needs analysis is essential to identify students' linguistic, technological, and professional learning requirements before designing effective learning materials (Daulay & Neviyarni, 2025; Saputra et al., 2025; Talitha et al., 2025). Addressing this gap, the present study provides an empirical foundation for developing an integrated ESP learning model that combines English communication, nutrition literacy, and digital health literacy through blended learning to better prepare nursing students for the evolving demands of contemporary healthcare practice.

To facilitate asynchronous self-pacing, the module architecture hosts multimedia elements, including embedded video links and health-related podcasts. These features are engineered to expose non-native English-speaking students to international nutrition information and global dietary guidelines. However, within the empirical boundaries of this current study, these integrated digital features serve as a structured framework for content delivery rather than a verified intervention. This exploratory section is strictly limited to describing the structural alignment of the module's pedagogical interface. Consequently, broad inferences regarding unmediated linguistic improvements, platform usability tracking, or direct student system interaction fall outside the present descriptive scope and remain dependent on future continuous usability evaluation cycles.

CONCLUSION

This multidimensional needs analysis establishes a strong empirical foundation for reorienting English for Specific Purposes (ESP) education in undergraduate nursing programs toward an integrated, learner-centered, and technology-enhanced approach. The convergence of quantitative and qualitative evidence demonstrates that nursing students require an ESP curriculum that extends beyond language proficiency to incorporate nutrition literacy and digital health literacy within authentic professional contexts. These findings underscore the importance of blended learning in supporting contextualized language acquisition, fostering independent learning, and strengthening students' readiness for contemporary healthcare practice. Consequently, this study contributes to the advancement of ESP and nursing education by providing an evidence-based framework to guide the design of interdisciplinary learning materials that are pedagogically sound, clinically relevant, and responsive to the evolving demands of healthcare education.

Despite these contributions, the findings should be interpreted in light of several limitations, including the single-institution setting, relatively small sample size, and predominance of female participants, which may limit the transferability of the results to other educational contexts. Nevertheless, the consistency of the mixed-method evidence provides a reliable foundation for the subsequent phases of the Research and Development (R&D) process. Future studies should focus on the systematic development, expert validation, and experimental evaluation of the proposed learning materials across multiple

institutions to examine their effectiveness in improving English communication, nutrition literacy, digital health literacy, and professional competencies among nursing students. Such research will further strengthen the evidence base for integrated ESP pedagogy and support curriculum innovation in nursing education within increasingly digital and globally connected healthcare environments.

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