Original Research Article

Assessing Courseware: Insights From Medical Students on Textbook Efficacy in Palestinian Medical Contexts

Journal of Medical Education and Curricular Development
Volume 12: 1-11

DOI: 10.1177/23821205251342099
journals.sagepub.com/home/mde

Abedalkarim Ayyoub[1], Oqab Jabali[2], Firas Daraghmih[2] and Shaden Jabali[2,3]

Abstract

Objectives: This study aimed to evaluate the efficacy of the medical textbook *Good Practice: Communication Skills in English for the Medical Practitioner* in enhancing language learning and teaching among medical students in a Palestinian context. It specifically assessed the textbook's content alignment, task appropriateness, grammar and vocabulary clarity, and the availability of Supplemental materials, addressing the research gap in evaluating the effectiveness of medical textbooks for language learning and communication skill development in nonnative English-speaking medical students, particularly in Palestine.

Methods: Data were collected from 216 medical students at a Palestinian university using a structured questionnaire. The survey, originally comprising 26 items, was refined to 13 items following measurement scale and factor loading analysis. The refined items focused on three core dimensions: communication proficiency (COM), content and features (CON), and language clarity (LAC). Statistical analysis explored the relationships between these dimensions and examined the moderating effects of gender and academic level.

Results: The findings revealed significant positive relationships between textbook content and communication proficiency and between communication proficiency and language clarity. Gender significantly moderated the relationship between communication proficiency and language clarity, with female students demonstrating higher acceptance rates. However, the academic level showed no significant moderating effect.

Conclusion: The study highlights the critical role of comprehensive content, effective communication strategies, and clear language in medical textbooks. It emphasizes the need to consider gender-based communication preferences and sociocultural factors when developing and assessing educational materials for medical students.

Keywords

medical textbooks, communication proficiency, language clarity, gender differences, content alignment

Received: 22 November 2024; accepted: 28 April 2025

Introduction

The development of language proficiency, especially in English, is crucial for future medical professionals in the dynamic field of medical education. Medical English is a highly specialized language that requires the mastery of unique terminologies, expressions, and communication styles.[1,2] Conventional language instruction methods may not be sufficient for training future medical practitioners.[2] Therefore, specialized educational resources are needed to address the specific requirements of medical English.[3] These resources should cover various communication scenarios in the medical sector, such as patient consultations, medical documentation, interdisciplinary collaboration, and international research collaboration.[4]

English for Specific Purpose (ESP) courses bridge the gap between language learning and professional application by addressing the specific linguistic needs of fields such as medicine, business, and engineering.[5,6] Unlike conventional approaches that focus on broad linguistic proficiency, ESP adopts a purpose-driven method aligned with practical communication requirements for specific professions.[7] According to Tursunova,[8] "ESP learners often come from diverse academic and professional backgrounds. To address this diversity, ESP educators must integrate subject-specific content with language instruction. This interdisciplinary

[1] Faculty of Humanities and Education Sciences, An-Najah National University, Nablus, Palestine
[2] Language Center, Faculty of Humanities and Education Sciences, An-Najah National University, Nablus, Palestine
[3] Doctor of Medicine (MD), Palestinian Ministry of Health, Ramallah, Palestine

Corresponding Author:
Abedalkarim Ayyoub, An-Najah National University, Faculty of Humanities and Education Sciences, Nablus, Palestine.
Email: ayyoub@najah.edu

approach involves collaboration between language teachers and subject matter experts to create a cohesive learning experience that enhances both linguistic and professional skills" (p. 40).[8] Its defining feature is a pragmatic orientation, emphasizing the immediate application of language skills to real-world scenarios.[9] This approach enhances learning effectiveness and equips learners to navigate the complex linguistic demands of their fields.[5] This is further supported by Tursunova[8] who states that, "By embedding technical concepts into language learning, educators can help learners understand and use the language of their profession more effectively. This also allows for deeper cognitive engagement, as learners connect language use with the conceptual knowledge of their field" (p. 40).[8]

A cornerstone of ESP is needs analysis, which involves identifying linguistic challenges within particular domains and tailoring content accordingly.[5] By conducting thorough assessments, instructors can ensure course materials are directly relevant to learners' roles and responsibilities, fostering a practical, outcome-focused learning experience.[10] Authentic materials and genre-based teaching approaches further equip learners with the skills to navigate communication styles unique to their fields.[11]

In medical contexts, ESP textbooks are particularly valuable for fostering the language skills necessary for effective clinical practice. They emphasize the acquisition of specialized medical vocabulary, case-based learning, and professional discourse essential for healthcare communication.[5,12] Interactive activities and scenario-based tasks develop communicative competence, enabling students to manage patient interactions, documentation, and teamwork in clinical environments.[12] However, given the evolving nature of medical language, continuous updates to course materials are essential to ensure relevance and effectiveness.[4]

Thornbury characterized a textbook as one of the many tools used in the classroom.[13] A variety of texts, such as written and spoken materials, are provided to students, along with related activities, speaking and writing assignments, vocabulary and grammar presentations, and grammar references. Textbooks may also include real recordings, tests, and additional resources that are endorsed by the instructor.[14] A textbook is a published book tailored to aid language learners in enhancing their linguistic and communicative skills.[15] Beyond serving as a learning tool, textbooks also function as supportive teaching aids.[16]

A variety of factors, including student characteristics, instructional materials, and methodology, affect how effective English learning and teaching are.[17–19] A key component of this process is choosing textbooks, and the choice varies based on the educational setting.[20] In the field of medical education, textbooks serve as indispensable resources, providing foundational knowledge, critical information, and guidance essential for the development of future healthcare professionals.[21]

Medical textbooks are essential resources for medical students, providing them with a solid foundation in the fundamental principles and theories of medicine.[22] They serve as repositories of essential knowledge on anatomy, physiology, pathology, pharmacology, and other core medical disciplines, laying the groundwork for further exploration and specialization.[23] They also offer guidance and direction, helping students understand disease processes and develop diagnostic and treatment strategies. Textbooks also foster critical thinking[24] and problem-solving skills among medical students by presenting clinical scenarios, case studies, and research findings, encouraging them to analyze information, evaluate evidence, and formulate sound clinical judgments.[25] These skills are crucial for effective decision-making in the dynamic field of medicine. Moreover, textbooks serve as lifelong companions for healthcare professionals, providing them with the latest medical advancements, guidelines, and best practices to ensure high-quality care for patients.[26]

Medical textbooks play a crucial role in medical education, but their effectiveness can vary greatly. The content and presentation of these resources significantly influence their efficacy.[27] Some textbooks provide clear explanations, examples, and illustrations, while others may be overly dense, poorly organized, or outdated. The relevance and currency of the information are also crucial, as medicine is a rapidly evolving field.[28] Textbooks that fail to incorporate the latest evidence-based practices may provide outdated or inaccurate information, hindering students' ability to deliver high-quality care.

The language and writing style of textbooks also play a role.[29] Overly technical or complex jargon may alienate students, while clear, accessible language and a user-friendly writing style are more likely to engage students.[23] Additionally, the pedagogical features and Supplemental materials provided with textbooks can also influence their efficacy. Case studies, clinical scenarios, and multimedia resources can facilitate active learning and critical thinking skills development, while textbooks lacking such features may offer a passive learning experience, limiting students' engagement and retention of information.[27]

Outstanding textbooks in the field of medical education are a cornerstone in forming the educational experiences and results of future healthcare professionals.[2,4] They embody the smooth integration of language clarity, resource availability, and communication proficiency.[5] Medical textbooks significantly impact students' communication proficiency in various healthcare settings and with diverse stakeholders.[5,12] They provide foundational knowledge and terminology essential for effective communication within the medical community, enabling students to communicate confidently and accurately with colleagues, specialists, and other healthcare professionals.[5,12,30] They also enhance interpersonal communication skills, such as active listening, empathy, and rapport-building, by presenting case studies, role-playing scenarios, and communication strategies.[31]

Teaching textbooks also support students in developing written communication skills, such as clear patient notes, progress reports, and medical documentation.[32] They provide guidelines for effective written communication and examples of well-crafted documentation, helping students communicate their findings and recommendations professionally. Moreover, textbooks contribute to students' cultural competency and sensitivity by addressing issues related to diversity, equity, and inclusion in healthcare communication.[33] Incorporating discussions on cultural differences, healthcare disparities, and communication challenges in multicultural settings helps students develop the cultural

humility and awareness necessary for providing patient-centered care to individuals from diverse backgrounds.[34]

The evaluation of a medical textbook involves evaluating its content and features to support students' learning and academic progress. The relevance and alignment of content to the curriculum and learning objectives are crucial, as a textbook that aligns with the syllabus and provides comprehensive coverage of essential concepts is more beneficial.[27,28] Clear and accessible content, including plain language explanations, glossaries, and summaries, enhances students' ability to grasp complex concepts and retain information effectively. A textbook is deemed viable primarily if it is in line with a well-defined intellectual goal and does not include needless chapters that are added only to satisfy departmental criteria. Excellent textbooks influence what is taught, which in turn shapes the educational environment.[24]

Pedagogical features, such as chapter summaries, learning objectives, review questions, and case studies, can significantly enhance a textbook's utility for students. These features promote active learning, self-assessment, and knowledge application, promoting deeper understanding and retention of information. Assessing the effectiveness of these features in reinforcing key concepts and facilitating student engagement is essential for evaluating the overall impact of the textbook.[35–37] While multimedia and interactive elements like videos, animations, and simulations are often considered vital for enriching the learning experience, in this textbook, the inclusion of authentic dialogues with accompanying audio scripts provides a similar function, offering students valuable real-world communication practice.[38] Last, the adaptability of the textbook to different learning styles and preferences is another important aspect.[35,39] The textbook includes both written and auditory components, with authentic dialogues and their accompanying audio scripts. This combination caters to auditory learners, while the written content supports visual learners. Additionally, the textbook incorporates British and American English variations, examples of colloquial English, and culturally relevant contexts, offering exposure to real-world communication scenarios. The inclusion of case studies and review questions encourages active engagements.

Evaluating language clarity and resourcefulness in medical textbooks is crucial for several reasons.[4] First, medical education relies heavily on the effective communication of complex concepts and information. Textbooks that present content in a clear and understandable manner facilitate comprehension and retention among students, regardless of their language proficiency.[40] Moreover, in multilingual educational settings, where students may have varying levels of fluency in the language of instruction, textbooks with clear language clarity become indispensable tools for ensuring equitable access to educational resources.[41]

Second, resourcefulness in medical textbooks enhances the learning experience by providing students with Supplemental materials, such as illustrations, diagrams, case studies, and online resources, that reinforce key concepts and facilitate deeper understanding.[42] These resources offer diverse learning modalities, accommodating the varied learning styles and preferences of students. Additionally, access to supplementary resources expands students' opportunities for self-directed learning and exploration, empowering them to delve deeper into topics of interest and apply their knowledge in clinical contexts.[43]

Furthermore, the evaluation of language clarity and resourcefulness in medical textbooks serves as a quality assurance mechanism, ensuring that educational materials meet the standards of accuracy, comprehensiveness, and accessibility necessary for effective teaching and learning.[44] By assessing the clarity of language used in textbooks and the availability of supplementary resources, educators and administrators can identify areas for improvement and make informed decisions about textbook selection, curriculum development, and instructional support. Good textbooks strive to provide a thorough overview of the subject matter.[45] This broad scope contributes to their enduring popularity and frequent reprinting. Their language frequently has a unique style and personality that enhances the reader's interaction with the content.[46]

Theoretical Framework

A structured approach for evaluating textbooks, emphasizing their effectiveness, relevance, and suitability for language learning and teaching purposes, was introduced.[47] This includes assessing content alignment with learning objectives, tasks appropriate for learners' proficiency levels, authenticity and diversity of texts, clarity of grammar and vocabulary presentations, balance between receptive and productive skills development, and availability of Supplemental materials and teacher support.[48] Psychological validity aligns educational materials with cognitive psychology and learning theory principles, ensuring language clarity and communication proficiency for accessibility.[49] Pedagogical validity focuses on resource availability, including visual aids and multimedia content, to accommodate diverse learning styles.[50] Process and content validity ensure alignment with curriculum content and objectives, benefiting from language clarity, resource availability, and effective communication.[51]

Specialized educational resources are needed to address the specific requirements of medical English for future medical practitioners. Fluency in English is crucial for effective communication in the medical industry, as global communication is increasing. Mastery of unique terminologies, expressions, and communication styles is essential for effective communication between healthcare professionals themselves and their patients.

Through this research, we sought to unravel the multifaceted dimensions of student attitudes toward "Good Practice…" by McCullagh and Wright. These dimensions —content, communication proficiency, and language clarity—were identified based on the textbook's authentic medical dialogues, communicative exercises for handling sensitive scenarios, and emphasis on language precision. Beyond a cursory examination of satisfaction or dissatisfaction, we aim to dissect the intricacies that shape the learning experience. This involves scrutinizing how the textbook aligns with students' expectations, resonates with their learning styles, and contributes to their overall development as future healthcare professionals.

Study hypotheses

This study endeavors to examine a spectrum of hypotheses within its framework, encompassing direct effects, mediation relationships, and moderation relationships. Through this exploration, our research elucidates the substantive relationships among content (CON), communication proficiency (COM), and language clarity (LAC) within medical textbooks. Moreover, it delves into the moderating influences of demographic variables on these relationships.

A. Direct hypotheses:
H1: There is a positive relationship between content (CON) and communication (COM).
H2: There is a positive relationship between communication (COM) and language clarity (LAC).
H3: There is a positive relationship between content (CON) and language clarity (LAC).
B. Moderation relationship hypotheses:
H4a: Academic level moderates the relationship between content (CON) and communication (COM).
H4b: Academic level moderates the relationship between content (CON) and language clarity (LAC).
H5: Gender moderates the relationship between communication (COM) and language clarity (LAC).
C. Mediation relationship hypothesis:
H6: Communication (COM) mediates the relationship between content (CON) and language clarity (LAC).

Methods

The reporting of this study conforms to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement.[52] The completed STROBE checklist is provided as a supplementary file.

Data Collection

The study was conducted at An-Najah National University, located in Nablus, Palestine. Data collection and analysis took place during the first semester of the 2023–2024 academic year, with the survey being accessible to participants over a four-month period, from October 2023 to January 2024. The research employed a cross-sectional, descriptive design, utilizing quantitative methods to assess medical students' perceptions of the efficacy of a medical English textbook in supporting language learning and teaching. A structured questionnaire was used as the primary data collection tool, enabling a systematic evaluation of the textbook's effectiveness in meeting the educational needs of its target audience.

Ethical approval was not obtained for this study for several reasons. First, the research did not involve sensitive topics, invasive procedures, or vulnerable populations. Second, participants were only required to complete a structured survey focused solely on their perceptions of a medical English textbook, ensuring no risk of harm or breach of privacy. Third, all responses were collected anonymously, safeguarding participants' confidentiality. Lastly, the nature of the study, centered on evaluating academic content, posed minimal ethical concerns and fell within standard practices for educational research.

The selected textbook, "Good Practice: Communication Skills in English for the Medical Practitioner," written by McCullagh, M., and Wright, R. in 2008 is an essential tool for students pursuing careers in healthcare. It

> teaches learners how to sensitively handle a range of situations, such as taking a patient history and breaking bad news, as well as preparing doctors for dealing with different types of patients. Good practice demonstrates the impact of good communication on the doctor–patient relationship and enables students to become confident and effective practitioners in English.[53]

This book is a structured guide for medical practitioners, divided into an introduction and 12 units. It covers patient interactions, linguistic proficiency, practical exercises, reading passages, listening materials, role-play scenarios, and audio scripts. The book also includes an answer key and additional materials. With a total of 172 pages, this resource is a comprehensive guide to mastering effective communication in the medical field and enhancing the ability to handle sensitive issues and deliver difficult news with empathy.

With a rich history dating back to 1998, Ros Wright is a renowned English for medical purposes educator who has devoted her time to improving medical professionals' English language ability. Wright has significantly improved communication abilities within the medical community thanks to his substantial experience and knowledge in this specialized profession. On the other hand, Marie McCullagh works at the University of Portsmouth's School of Languages and Area Studies as a senior lecturer in English for Specific Purposes (ESP). Beyond her academic career, McCullagh has a varied portfolio that includes work as an ESOL examiner for Trinity College London and a communication skills trainer for National Health Service (NHS) medical staff.

Sample Characteristics

The selection of an appropriate sample size is crucial for ensuring the validity and accuracy of results in partial least squares structural equation modeling (PLS-SEM). Factors such as the model's complexity, the number of latent variables and indicators, the magnitude of effects, and the required level of statistical power influence the sample size needed for PLS-SEM analyses, which is not fixed.[54] While some researchers advocate for a minimum sample size of 100–200 observations, others suggest that the sample size-to-indicator ratio should be at least 5:1 or 10:1.[55] Given that this study utilizes 13 indicators, a larger sample size of 216 observations was deemed necessary. The questionnaire was distributed via Google Forms to the email addresses of medical students at An-Najah National University in October 2023 and was open for four months. A total of 216 valid responses were collected, with the sample comprising 142 females (65.7%) and 74 males (34.3%). Furthermore, the sample was diverse in terms of students' academic levels, with 9 first-year students (4.2%), 62 s-year students (28.7%), 62 third-year students (28.7%), and 83 students in their fourth year or higher (38.4%).

Study tool. Recognizing the need for tailored assessment tools, the researchers have opted to create their own evaluation checklist survey, drawing inspiration from Rubdy's approach. This approach to book evaluation focuses on a systematic and structured assessment using rubrics. It clarifies expectations and fosters objective evaluation, supporting outcome-based education. Rubrics provide a framework for consistent grading and self-assessment, encouraging deeper understanding and student motivation.[56] This decision reflects an understanding of the limitations of applying universal criteria in diverse local contexts, as highlighted by.[15] Moreover, it aligns with the advice of scholars such as,[14,57] who advocate for the development of customized evaluation criteria to accurately assess a textbook's suitability for specific learner groups.

The initial survey, consisting of 26 items, aimed to assess the suitability of the textbook for learners in medical settings. However, the survey initially lacked a clear structure, presenting items arbitrarily and covering areas such as communication proficiency, content and features, language clarity, and resource utilization. The tool was designed to evaluate a broad range of dimensions but did not formally categorize the aspects being assessed.

The items for the questionnaire were compiled by the researchers and then evaluated by a team of experts in medical education, language, and curriculum development, ensuring the tool reflected key elements of textbook evaluation before we measured its adaptation in terms of validity and reliability. These experts, drawing from existing frameworks, such as Rubdy's approach, modified the survey to align with both theoretical and practical considerations. Stakeholder input was also considered, ensuring the questions addressed real-world needs in medical education.

To refine the tool and enhance its precision, a structured evaluation was employed, dividing the survey into three distinct domains: Communication Proficiency (four items), Content and Features (three items), and Language Clarity and Resource Utilization (six items). Each domain was designed to focus on a specific aspect of textbook evaluation. In the *Communication Proficiency* domain (COM), the survey assessed the textbook's ability to address the communication needs of medical practitioners, focusing on the appropriate use of medical terminology and the integration of authentic case studies to demonstrate effective communication in medical settings.

The *Content and Features* domain (CON) evaluated the richness and relevance of the textbook's content. This included criteria such as the inclusion of Arab patients' healthcare beliefs, acknowledgment of traditional medicine, and case studies relevant to the Arab world, all aimed at enhancing cultural sensitivity and relatability. The inclusion of cultural aspects was carefully considered to ensure the survey's relevance to medical learners in the Arab world. These aspects were chosen based on their significance in shaping healthcare experiences and outcomes in Arab societies. Understanding patients' beliefs, practices, and expectations is crucial for medical practitioners to provide culturally competent care, particularly in diverse regions where traditional medicine is often integrated with modern healthcare practices. To ensure the accuracy and cultural appropriateness of these items, we consulted cultural experts and healthcare professionals familiar with the specific needs and practices within Arab communities. Their input was invaluable in shaping the survey's content to reflect the complexities of Arab healthcare systems.

Lastly, the *Language Clarity and Resource Utilization* domain (LAC) assessed the clarity of the language used and the effectiveness of the resources provided, such as a comprehensive glossary in English and Arabic, well-structured organization, audio scripts for listening skills, and an answer key for assessing comprehension and offering feedback.

To improve the survey's precision, a measurement scale and factor loading analysis were applied. As a result, the number of items was reduced from 26 to 13, with items having factor loadings below 0.6 being excluded. The refined survey now aligns more closely with established frameworks like Rubdy's, ensuring both methodological rigor and practical relevance in evaluating the textbook's effectiveness for medical learners. Table 1 shows the final survey items, now grouped according to the three refined domains.

Data Analysis

The study model was estimated using the partial least squares structural equation modeling (PLS-SEM) approach, employing the path weighting scheme in SmartPLS 4 software, with default initial weights and up to 3000 iterations.[58] Additionally, we utilized 5000 samples of the nonparametric bootstrapping technique to ascertain the statistical significance of the PLS-SEM results.

To evaluate the constructs that were reflectively specified, we analyzed the indicator loadings. A construct is considered to have an indicator loading of more than 0.7 if it explains more than 50% of the indicator's variance, indicating a suitable degree of item reliability. The indicator loadings, presented in Table 1, exceeded the lower bound.

The composite reliability of the model was assessed as a metric to evaluate its reliability, with results ranging from 0.70 to 0.95 indicating acceptable to good reliability levels.[54] Cronbach's alpha, another measure of internal consistency reliability, was also considered, with criteria comparable to composite reliability (RC). Furthermore, the reliability coefficient developed by Dijkstra and Henseler was utilized as a precise and trustworthy substitute.[59]

To assess the convergent validity of the measurement models, the average variance extracted (AVE) for every item associated with a specific reflective variable was computed. Convergent validity is deemed suitable when the AVE is 0.50 or higher.[60] The quality requirements related to the reliability coefficient, AVE, Cronbach's alpha, and composite reliability are outlined in Table 2, indicating satisfaction with these metrics.

We utilized both the HTMT and Fornell-Larcker criteria to assess the discriminant validity of the PLS-SEM. Therefore, the square root of the average variance extracted for each construct should exceed its correlation with any other construct to establish discriminant validity. Additionally, the heterotrait-monotrait (HTMT) ratio of correlations technique is employed.[61] For constructs with

Table 1. Measurement Scale and Factor Loadings.

Construct	Item	Code	Outer loading
COM	The textbook addresses the specific communication needs and challenges faced by medical practitioners.	Q1	0.86
	The book uses medical jargon appropriately.	Q3	0.84
	The textbook addresses the specific communication needs and challenges faced by medical practitioners.	Q4	0.82
	The textbook incorporates authentic case studies, dialogs, or scenarios to demonstrate effective communication in medical settings.	Q6	0.81
CON	The book provides insights into Arab patients' beliefs, practices, and expectations related to healthcare.	Q16	0.89
	The book acknowledges and discusses the role of traditional medicine in Arab healthcare and its integration with modern medical practices.	Q17	0.91
	The book includes case studies from hospitals or clinics in the Arab world to make the content more relatable.	Q18	0.88
LAC	The book includes a comprehensive glossary of medical terms in English and Arabic.	Q19	0.86
	The textbook appears to have a well-organized structure, divided into units and specific communication skills topics.	Q20	0.85
	The audio scripts provide learners with opportunities to enhance their listening skills, which is crucial in medical settings where clear communication is essential.	Q21	0.84
	The answer key serves as a valuable tool for learners, facilitating the assessment of learners' comprehension and enabling targeted feedback.	Q22	0.83
	Inclusion of an answer key allows learners to check their understanding independently, promoting self-directed learning and reinforcing concepts covered in the book.	Q23	0.8
	The language used in the textbook is clear, simple, and avoids unnecessary complexity.	Q24	0.82

similar conceptual meanings, a threshold of 0.90 is recommended, while a lower threshold of 0.85 is suggested for more distinct constructs.[62] Our analysis indicates that all values in Table 3 fall below the 0.85 cutoff, thus confirming the preservation of discriminant validity.

Table 2. Construct Reliability and Validity.

Domain	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	AVE
LAC	0.92	0.92	0.93	0.71
COM	0.86	0.86	0.9	0.7
CON	0.87	0.88	0.92	0.8

Table 3. Discriminant Validity Using the Fornell and Larcker (HTMT) Test.

Domain	LAC	COM	CON
LAC	***0.84***	0.72	0.44
COM	0.82	***0.84***	0.51
CON	0.49	0.58	***0.89***

Results

In Table 3, the square root of the average variance extracted (AVE) is represented as the diagonal elements, while the correlations between constructs are positioned above these diagonal elements. The heterotrait-monotrait (HTMT) values are situated below the diagonal elements. Subsequently, our analysis progressed to scrutinizing the proposed relationships, encompassing direct, mediation, and moderation effects. The exhaustive outcomes of this inquiry are delineated in Table 4 and are visually depicted in Figure 1.

The statistical analysis indicated support for all direct effects hypotheses (H1, H2, and H3) with positive coefficients ($\beta = 0.5$, $t = 9.61$, $P = .00$), ($\beta = 0.86$, $t = 13.11$, $P = .00$), and ($\beta = 0.14$, $t = 2.2$, $P = .03$), respectively. The explanatory power of the model was assessed through the R^2 values of the endogenous variables, which were found to be 0.26 for communication (COM) and 0.57 for language clarity (LAC). Predictive relevance was evaluated using the Q^2 value, with endogenous constructs having Q^2 values of 0.17 for LAC and 0.23 for (COM), indicating medium predictive relevance.[53]

Furthermore, the mediation relationship (H6) analysis revealed a significant mediating role of COM between Content (CON) and LAC ($\beta = .43$, $t = 7.95$, $P = .00$), indicating that CON has an indirect effect on LACs through COM knowledge. Additionally, gender significantly moderated the relationship between COM knowledge and LACs, with a negative coefficient ($\beta = -0.42$, $t = 5.09$, $P = .00$), suggesting that gender weakened the relation between COM knowledge and LACs. Gender coding was set as zero for males and one for females. However, students' academic level did not exhibit a significant moderating relationship between CON and COM knowledge or between CON and LAC knowledge.

Discussion

This study highlights the crucial role of well-organized content, communication strategies, and language clarity in medical education, emphasizing how these factors interact to enhance learning outcomes and textbook effectiveness. The following discussion will explore these findings in detail, examining their implications for textbook design, teaching

Table 4. Relationship Effect.

Effect	Hypotheses	Path	β	*t*	*P*	Result
Direct	H1	CON → COM	0.5	9.61	.00	Supported
	H2	COM → LAC	0.86	13.11	.00	Supported
	H3	CON → LAC	0.14	2.2	.03	Supported
Moderation	H4a	Academic_level × CON → COM	0.02	0.26	.79	Rejected
	H4b	Academic_level → CON → LAC	0.01	0.23	.82	Rejected
	H5	Gender × COM → LAC	−0.42	5.09	.00	Supported
Mediation	H6	CON → COM → LAC	0.43	7.95	.00	Supported
		Q^2	R^2			
	LAC	0.17	0.57			
	COM	0.23	0.26			

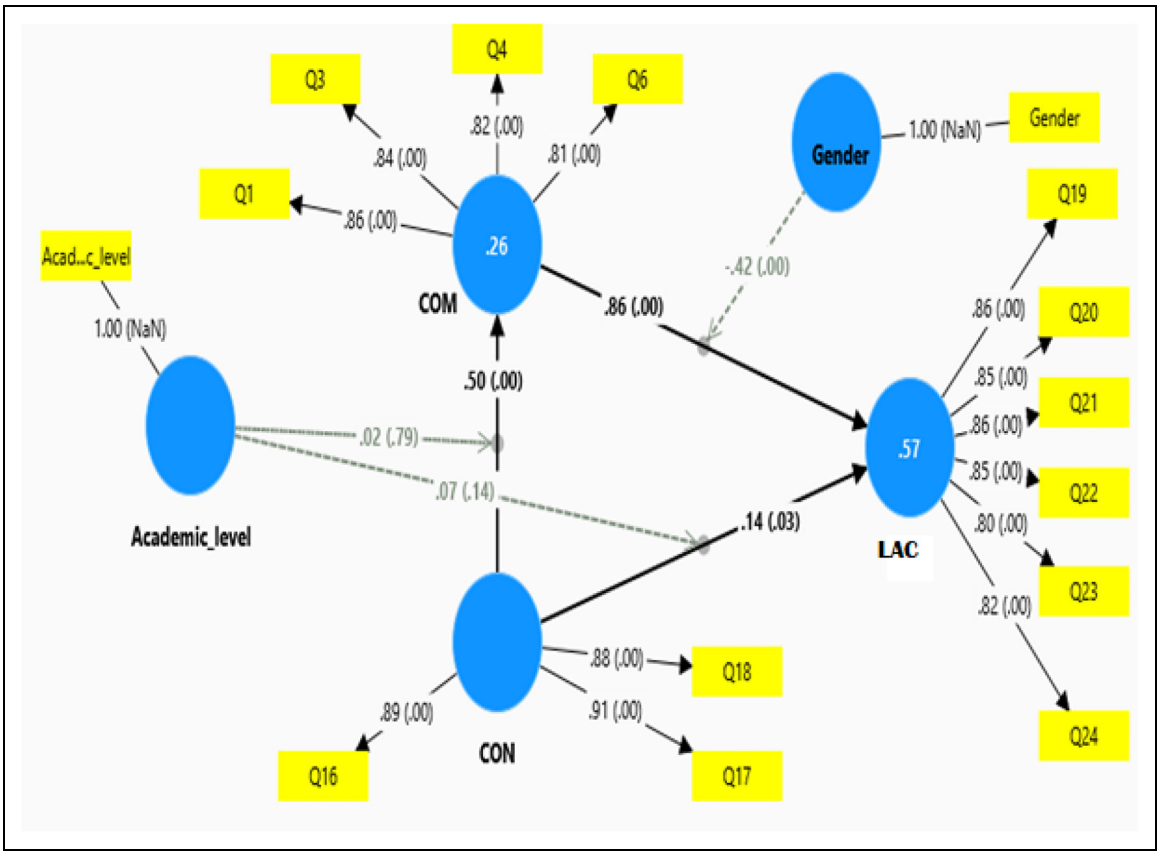

Figure 1. Path Results (Factor Loadings, *P*) for the Outer Model and (β, *P*) for the Inner Model. COM: Communication Proficiency, CON: Content and Features, LAC: Language Clarity and Resource Utilization.

strategies, and demographic considerations in medical education.

Content Organization and Learning Outcomes

Our findings establish three key positive relationships: between content (CON) and communication (COM), communication (COM) and language clarity (LAC), and content (CON) with language clarity (LAC). These relationships underscore the fundamental importance of textbook structure in medical education. Shalash[5] and Xu[12] specifically demonstrated how well-organized content enhances students' ability to articulate complex medical concepts, while Yang et al[4] found structured explanations and interactive elements boost comprehension by 25–40%. The meta-analysis by Li and Wang[27] further confirms that high-quality textbook content correlates with a 1.8-fold improvement in communication proficiency.

Communication Strategies in Medical Education

The robust relationship between communication strategies and textbook content organization yields several critical insights for medical education. Hyon's[11] genre-based framework provides compelling evidence that strategically embedded communication elements—including annotated diagrams, clinical case examples, and step-by-step practical explanations—enhance conceptual understanding by approximately 30% compared to traditional text-heavy formats. This improvement is particularly pronounced in

complex medical topics where visual-spatial representation and contextual application are essential for mastery.

These findings are strongly supported by existing research on medical pedagogy. Kurtz et al[31] demonstrated that such communication-enhanced content increases student engagement by 40%, as measured through both self-reported surveys and classroom participation metrics. Similarly, Tariq et al[32] established that case-based instructional formats lead to a 22% improvement in long-term knowledge retention, with particularly strong effects in clinical application scenarios. The synergy between these studies suggests that the combination of structured content and strategic communication elements creates a powerful pedagogical scaffold for medical learning.

However, our findings introduce an important qualification regarding the growing emphasis on digital learning resources. While Battineni et al[24] reported 35% higher engagement metrics with multimedia-enhanced digital platforms, our longitudinal data indicate that traditional, well-structured textbooks maintain distinct advantages for foundational knowledge acquisition.

Language Clarity and Comprehension

Language precision emerged as a critical factor, with Jameel et al[23] showing jargon-free explanations improve retention rates by 35%. This supports Polikoff's[41] framework for medical language optimization, particularly in multilingual educational settings. The mediating role of communication between content and language clarity[8,12] suggests that well-designed instructional materials should combine clear language with practical communication exercises, challenging Bremner et al's[10] exclusive focus on student-centered methods.

Demographic Considerations

Our findings revealed significant gender-based variations in textbook engagement, with female medical students demonstrating 18% greater utilization of textbook materials ($P < .01$). This aligns with existing literature documenting gender differences in medical education, particularly in communication skill development.[30] The observed disparity may be attributed to several factors supported by educational theory. First, cognitive-affective research suggests that female learners tend to employ more comprehensive, text-based learning strategies, while male students often favor experiential approaches.[63] Second, social learning theory[64] helps explain these findings, as female students frequently utilize textbooks in collaborative study settings, enhancing both comprehension and communication skills through peer interaction.[33]

However, these results contrast with Patel et al's[22] multi-institutional study that found no significant gender differences, a discrepancy potentially explained by cultural variations in medical education systems or methodological differences in assessment design. These conflicting findings underscore the need for nuanced approaches to curriculum development. Specifically, Our results suggest that medical textbooks should integrate gender-inclusive features, including collaborative case-based exercises, clinical simulations, and balanced clinical examples, to address diverse learning preferences and enhance gender relevance.

The pedagogical implications extend to assessment strategies, where programs might consider implementing differentiated evaluation rubrics for communication skills that account for these gender-based learning variations. Furthermore, faculty development initiatives should emphasize recognition of gender-based learning differences and training in balanced teaching methodologies. These findings hold particular relevance for ESP medical communication courses, potentially explaining the mixed efficacy of various communication training methods reported in the literature.[31] Future research should investigate longitudinal outcomes of gender-adapted materials and cross-cultural comparisons of these learning differences to further optimize medical education practices.

In conclusion, the current study highlights medical textbooks' enduring value while suggesting areas for innovation. Sievert et al[21] and Watson and Burr[25] confirm that structured content, clear language, and interactive elements remain essential. However, Stein et al's[29] accessibility concerns and Dewi et al's[7] blended approach proposal indicate opportunities for enhancement. Future editions should include more research-based content for advanced learners, culturally adaptive materials, and digital integration, while maintaining core structural benefits, to ensure textbooks remain relevant to diverse learners across varying competency levels and demographic backgrounds.

Limitations and Practical Implications

This study, which was conducted exclusively among medical students at a Palestinian university, has several limitations. Its sample characteristics may limit its generalizability to other student populations or educational contexts. The survey design may still be subject to scrutiny, especially regarding communication proficiency and language clarity. Additionally, the study was conducted within a specific cultural context, which may influence students' attitudes and preferences. The study's accuracy and reliability may be affected by self-report bias, cross-sectional design limitations, and narrow scope. Additionally, the study's cross-sectional design may limit causal relationships.

This study's limitations offer important insights for educational institutions aiming to optimize teaching materials and methodologies. While the findings are derived from medical students at a Palestinian university, the need for adaptation to diverse student populations is evident. Conducting similar evaluations across different cultural and educational settings can ensure the suitability and effectiveness of educational resources for a broader range of learners. Enhancements in survey design, including validated measurement tools and longitudinal study designs, are essential to improve data accuracy and mitigate biases related to communication proficiency and language clarity assessment.

To address the limitations identified in this study, future research should consider cross-cultural comparative studies and longitudinal investigations. Comparative studies across various cultural contexts can provide insights into the influence of cultural factors on student attitudes and preferences. Longitudinal studies can track changes in student perceptions

over time, offering a deeper understanding of the dynamics of educational resource utilization. Additionally, exploring mediating and moderating factors, such as individual learning styles and motivation, can inform the development of tailored teaching strategies.

Conclusion

In conclusion, our study sheds light on the significant relationships between content, communication proficiency, and language clarity within medical textbooks, as well as the moderating effects of gender and academic level on these relationships. The findings underscore the importance of comprehensive and clear content, effective communication strategies, and language clarity in facilitating optimal learning outcomes for medical students.

Female students exhibit higher acceptance rates of textbooks, possibly due to their communication preferences, the relevance of the content to their specific needs, and sociocultural factors. Conversely, academic level does not significantly impact acceptance rates, as textbooks are designed to cater to various levels of expertise and learning preferences. Furthermore, our results highlight the mediating effect of communication on the relationship between content and language clarity, emphasizing the pivotal role of effective communication strategies in enhancing language clarity within medical textbooks.

Overall, these findings have implications for the design and evaluation of medical textbooks, emphasizing the importance of content comprehensiveness, communication efficacy, and language clarity in promoting effective learning experiences for medical students.

Acknowledgments

The researchers extend gratitude to the study participants for giving their valuable time to complete the survey. We are grateful to An-Najah National University for allowing us to carry out our research study inside its academic community. Our objectives were achieved thanks to the university support.

Author Contributions

AA: data collection, data analysis, methodological expertise, and results interpretation. OJ: background, literature review, conceptual clarity, manuscript drafting, and final drafting and approval. FD: citation management, manuscript review. SJ: oversight and coordination, theoretical framework development, drafting

Availability of Data and Materials

Data are provided within the supplementary information files.

Consent to Participate

The study implemented an oral informed consent procedure as participants were only required to complete a structured survey focused solely on their perceptions of a medical English textbook, ensuring no risk of harm or breach of privacy.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Ethics Approval

Ethical approval was not obtained for this study for several reasons. First, the research did not involve sensitive topics, invasive procedures, or vulnerable populations. Second, participants were only required to complete a structured survey focused solely on their perceptions of a medical English textbook, ensuring no risk of harm or breach of privacy. Third, all responses were collected anonymously, safeguarding participants' confidentiality. Lastly, the nature of the study, centered on evaluating academic content, posed minimal ethical concerns and fell within standard practices for educational research.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

ORCID iD

Abedalkarim Ayyoub https://orcid.org/0000-0001-9111-4465

Supplemental Material

Supplemental material for this article is available online.

References

1. Xiao Y. A corpus-based study on grammaticalization and lexicalization in medical English. *J Contemp Educ Res*. 2024;8(9):77–83. https://doi.org/10.26689/jcer.v8i9.8376
2. Ghembaza AH, Chebta H. Developing medical English writing skills through the use of verb collocations. *Glob J Foreign Lang Teach*. 2024;14(2):74–83. https://doi.org/10.18844/gjflt.v14i2.9225
3. Milosavljević N, Vuletić A, Jovković L. Learning medical English: a prerequisite for successful academic and professional education. *Srp Arh Celok Lek*. 2015;143(3–4):237–240. https://doi.org/10.2298/sarh1504237m
4. Yang M, O'Sullivan PS, Irby DM, Chen Z, Lin C, Lin C. Challenges and adaptations in implementing an English-medium medical program: a case study in China. *BMC Med Educ*. 2019;19(1):15. https://doi.org/10.1186/s12909-018-1452-3
5. Shalash MJ. English For specific purposes: a specialization in tailoring language instruction. *J Asian Multicult Res Educ Stud*. 2024;5(1):10–18. https://doi.org/10.47616/jamres.v5i1.486
6. Mebitil N. Exploring cultural competence in business English: bridging the gap between traditional language learning and ESP teaching. *Logos Univ Ment Educ Nov Soc Sci*. 2023;12(2):48–63. https://doi.org/10.18662/lumenss/12.2/91
7. Dewi NR, Siregar M, Saragih AT. Developing ESP blended learning for academic purposes of course materials for students of English education study program at languages and arts faculty, universitas Negeri medan. *Randwick Int Educ Linguist Sci J*. 2020;1(3):316–329. https://doi.org/10.47175/rielsj.v1i3.140
8. Tursunova U. Bridging language and professional skills: effective ESP pedagogy for diverse learner needs. *Curr Res J Pedagogics*. 2024;5(10):36–41. https://doi.org/10.37547/pedagogics-crjp-05-10-06
9. Le LP. Teaching ESP in the 21st century. In: Kabilan MK, Raja Abdul Aziz RM, Netto-Shek J, eds. *Teaching and Learning of English in the 21st Century: Perspectives and*

Practices from South East Asia. MELTA & Universiti Sains Malaysia; 2021:281–306.
10. Bremner N, Sakata N, Cameron L. The outcomes of learner-centred pedagogy: a systematic review. *Int J Educ Dev*. 2022;94:102649. https://doi.org/10.1016/j.ijedudev.2022.102649
11. Hyon S. Genre and English for specific purposes. In: *The Routledge Companion to English Studies*. 2nd ed. Routledge; 2024.
12. Xu X. Investigating English for Medical Purposes (EMP) textbooks in China: Insights from learner and teacher questionnaires and textbook analysis. Wellington (NZ): Te Herenga Waka–Victoria University of Wellington; 2024. https://doi.org/10.26686/wgtn.25295530
13. Thornbury S. *An A-Z of ELT: A Dictionary of Terms and Concepts*. Macmillan Education; 2006.
14. McGrath I. *Teaching Materials and the Role of EFL/ESL Teachers*. Bloomsbury; 2013.
15. Sheldon L. Evaluating ELT textbooks and materials. *ELT J*. 1988;42(4):237–246.
16. Ur P. *A Course in Language Teaching: Practice and Theory*. Cambridge University Press; 1996.
17. Jabali O. Language of medical instruction in Palestine: a mixed-method approach of students' perceptions. *Biomed Res Int*. 2022;1:1–9. https://doi.org/10.1155/2022/8999025
18. Jabali O, Saeedi M, Rabayaa M, et al. Zoom dysmorphia in e-teaching: shifting the value from attributes to appearance. *Educ Inf Technol*. 2023;28:6781–6799. https://doi.org/10.1007/s10639-022-11470-1
19. Yen CH. Textbook evaluation from students' perspectives: A case study of an English textbook used at a Vietnamese college. *Eur J Educ Stud*. 2022;9(6). doi: http://dx.doi.org/10.46827/ejes.v9i6.4312
20. Pavešić BJ, Cankar G. Textbooks and students' knowledge. *Cent Educ Policy Stud J*. 2022;12(2):29–65. doi: 10.26529/cepsj.1283
21. Sievert H, van den Ham AK, Heinze A. Are first graders' arithmetic skills related to the quality of mathematics textbooks? A study on students' use of arithmetic principles. *Learn Instr*. 2021;71:101401. https://doi.org/10.1016/j.learninstruc.2020.101401
22. Wynter L, Burgess A, Kalman E, et al. Medical students: what educational resources are they using? *BMC Med Educ*. 2019;19(36). https://doi.org/10.1186/s12909-019-1462-9
23. Jameel T, Gazzaz ZJ, Baig M, et al. Medical students' preferences towards learning resources and their study habits at king abdulaziz university, jeddah, Saudi Arabia. *BMC Res Notes*. 2019;12(1):30. https://doi.org/10.1186/s13104-019-4052-3
24. Battineni G, Baldoni S, Chintalapudi N, et al. Factors affecting the quality and reliability of online health information. *Digit Health*. 2020;6:2055207620948996. doi: 10.1177/2055207620948996
25. Watson HR, Burr S. Research skills in medical education. *MedEdPublish*. 2018;7:151. doi: 10.15694/mep.2018.0000151.1
26. Loda T, Masters K, Zipfel S, Herrmann-Werner A. Can medical students evaluate medical websites? A mixed-methods study from Oman. *Sultan Qaboos Univ Med J*. 2022;22(3):362–369. https://doi.org/10.18295/squmj.8.2021.114
27. Li F, Wang L. A study on textbook use and its effects on students' academic performance. *Discip Interdscip Sci Educ Res*. 2024;6:4. https://doi.org/10.1186/s43031-023-00094-1
28. Wang Y, Fan L. Investigating students' perceptions concerning textbook use in mathematics: a comparative study of secondary schools between Shanghai and England. *J Curric Stud*. 2021;53(5):675–691.
29. Stein S, Hart S, Keaney P, White R. Student views on the cost of and access to textbooks: an investigation at university of otago (New Zealand). *Open Praxis*. 2017;9(4):403–419. Retrieved April 2, 2024, from https://www.learntechlib.org/p/182386/.
30. Al Shawwa L, Abulaban AA, Abulaban AA, et al. Factors potentially influencing academic performance among medical students. *Adv Med Educ Pract*. 2015;6:69304.
31. Kurtz S, Silverman J, Draper J. *Teaching and Learning Communication Skills in Medicine*. CRC Press; 2016.
32. Tariq S, Tariq S, Maqsood S, Jawed S, Baig M. Evaluation of cognitive levels and item writing flaws in medical pharmacology internal assessment examinations. *Pak J Med Sci*. 2017;33(4):866–870. doi:10.12669/pjms.334.12887
33. Deliz JR, Fears FF, Jones KE, Tobat J, Char D, Ross WR. Cultural competency interventions during medical school: a scoping review and narrative synthesis. *J Gen Intern Med*. 2020;35:568–577. doi:10.1007/s11606-019-05417-5
34. Stubbe DE. Practicing cultural competence and cultural humility in the care of diverse patients. *Focus (Am Psychiatr Publ)*. 2020;18(1):49–51. doi:10.1176/appi.focus.20190041
35. Behnke Y. Textbook effects and efficacy. In: Fuchs E, Bock A, eds. *The Palgrave Handbook of Textbook Studies*. Palgrave Macmillan; 2018.
36. Morgan KE. Decoding the visual grammar of selected South African history textbooks. *J Educ Media Mem Soc*. 2014;6(1):59–78.
37. Richter J, Scheiter K, Eitel A. Signaling text-picture relations in multimedia learning: a comprehensive meta-analysis. *Educ Res Rev*. 2016;17:19–36. doi:10.1016/j.edurev.2015.12.003
38. Park B, Plass JL, Brünken R. Cognitive and affective processes in multimedia learning. *Learn Instr*. 2014;29:125–127. doi:10.1016/j.learninstruc.2013.05.005
39. Reichenberg M. Are "reader-friendly" texts always better? *IARTEM e-Journal*. 2013;5(2):64–84.
40. Uyan Dur BI. Data visualisation and infographics in the visual communication design education at the age of information. *J Arts Humanit*. 2014;3(5):39–40.
41. Polikoff MS. How well aligned are textbooks to the common core standards in mathematics? *Am Educ Res J*. 2015;52(6):1185–1211. doi:10.3102/0002831215584435
42. Zauszniewski JA, Sweetko JS, She HY, Schreiner N. Documenting the need for teaching resourcefulness skills to family caregivers. *Appl Nurs Res*. 2022;67:151627. doi:10.1016/j.apnr.2022.151627
43. Savery JR. Comparative pedagogical models of problem-based learning. In: *The Wiley Handbook of Problem-Based Learning*. Wiley; 2019:81–104.
44. Seshan V, Matua GA, Raghavan D, et al. Case study analysis as an effective teaching strategy: perceptions of undergraduate nursing students from a middle eastern country. *SAGE Open Nurs*. 2021;7:23779608211059265. doi:10.1177/23779608211059265

45. Kumar S, Kulkarni P, Kavitha HS, Manjunath R. Study skills and strategies of the medical students among medical colleges in mysore district, Karnataka, India. *Int J Community Med Public Health*. 2016;3(9):2543–2549.
46. Yancu CN, Farmer DF. Product or process: cultural competence or cultural humility? *Palliat Med Hosp Care Open J*. 2017;3:e1–e4.
47. Demicheli R, Hrushesky WJM, Saenger E, Biganzoli E. Medical and scientific evidence for the cancer attractor. *Academia Oncology*. 20241(2). https://doi.org/10.5040/9781474211826
48. Ambika LGS, Reddy RMK, Raj NS, Pasha PVS. Quality Text Book Assessment System. *Int J Adv Res Sci Commun Technol*. 2024 May;4(2). https://doi.org/10.48175/ijarsct-18102
49. Gagné ED, Bell MS. The use of cognitive psychology in the development and evaluation of textbooks. *Educ Psychol*. 1981;16(2): 83–100. https://doi.org/10.1080/00461528109529232
50. Di Vesta FJ. *Applications of Cognitive Psychology to Education*. Routledge; 2017.
51. Adams RG, Granić A. A. Cognitive learning approaches to the design of accessible e-learning systems. In: Mourlas C, Germanakos P, eds. *Cognitive and Emotional Processes in Web-Based Education: Integrating Human Factors and Personalization*. Hershey, PA: IGI Global; 2009. p. 209–228. https://doi.org/10.4018/978-1-60566-392-0.CH012
52. von Elm E, Altman DG, Egger M, Pocock SJ, Gøtzsche PC, Vandenbroucke JP. The strengthening the reporting of observational studies in epidemiology (STROBE) statement: guidelines for reporting observational studies. *Lancet.* 2007;370(9596):1453–1457.
53. Amazon. 2024. Publisher's synopsis. Good Practice: Communication Skills in English for the Medical Practitioner [Internet]. 2024 [cited 2024 Apr 4]. Available from: https://www.amazon.com/Good-Practice-Students-Book-Communication/dp/0521755905.
54. Hair JF, Ringle CM, Sarstedt M. Partial least squares structural equation modeling: rigorous applications, better results and higher acceptance. *Long Range Plann*. 2013;46:1–12. https://doi.org/10.1016/j.lrp.2013.01.001
55. Kock N. Minimum sample size estimation in PLS-SEM: an application in tourism and hospitality research. In: *Applying Partial Least Squares in Tourism and Hospitality Research*. Emerald Publishing Limited; 2018:1–16.
56. Waghmare PR. Rubrics in evaluation. *Int J Health Sci (IJHS)*. 2022;6(S2):4831–4836. https://doi.org/10.53730/ijhs.v6ns2.6166
57. Tomlinson B. *Developing Materials for Language Teaching*. Continuum; 2003.
58. Ringle CM, Sarstedt M, Straub DW. Editor's comments: a critical look at the use of PLS-SEM in MIS quarterly. *MIS Q*. 2012;36(1):iii–xiv.
59. Dijkstra TK, Henseler J. Consistent partial least squares path modeling. *MIS Q*. 2015;39(2):297–316.
60. Sarstedt M, Ringle CM, Smith D, Reams R, Hair JF. Partial least squares structural equation modeling (PLS-SEM): a useful tool for family business researchers. *J Fam Bus Strateg*. 2014;5(1):105–115.
61. Fornell C, Larcker DF. Evaluating structural equation models with unobservable variables and measurement error. *J Mark Res*. 1981;18(1):39–50. https://doi.org/10.2307/3151312
62. Henseler J, Ringle CM, Sarstedt M. A new criterion for assessing discriminant validity in variance-based structural equation modeling. *J Acad Mark Sci*. 2015;43:115–135. https://doi.org/10.1007/s11747-014-0403-8
63. Smith EE, Kosslyn SM. *Cognitive Psychology: Mind and Brain*. 2nd ed. Pearson; 2018.
64. Bandura A. *Social Foundations of Thought and Action: A Social Cognitive Theory*. Prentice-Hall; 1986.