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A Multidisciplinary and Context-Based Teaching Model for Developing Medical-Technical Knowledge in Practical English Classes

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Abstract: *This article examines the role of a multidisciplinary and context-based teaching model in developing medical-technical thinking in practical English classes. In modern higher education, English language instruction is no longer limited to general linguistic competence; it increasingly requires the integration of professional knowledge, subject-specific terminology, clinical reasoning, and technical literacy. This need is especially important for medical students, who must be able to understand, interpret, and communicate information related to medical devices, diagnostic procedures, patient care, and technological innovations in healthcare. The proposed teaching model combines English for Specific Purposes, medical terminology, technical vocabulary, clinical scenarios, problem-based learning, and simulation-based tasks. It encourages students to use English not only as a means of communication but also as a tool for professional analysis and decision-making. The article argues that context-based activities, such as role-plays, case studies, device-description tasks, and clinical problem-solving situations, help students connect language learning with real professional practice. As a result, learners develop the ability to analyze medical-technical information, explain the function of medical equipment, participate in professional dialogue, and apply English in authentic healthcare contexts.*
The study emphasizes that a multidisciplinary approach increases students' motivation, strengthens their professional vocabulary, and supports the formation of critical and analytical thinking. The findings suggest that practical English classes designed around medical and technical contexts can contribute to the development of both communicative competence and medical-technical thinking. Therefore, the model may be considered an effective pedagogical framework for improving ESP-oriented English instruction in medical higher education.

Keywords: *multidisciplinary approach, context-based learning, medical-technical thinking, practical English classes, ESP, medical English, clinical scenarios, simulation-based learning.*

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Introduction

In contemporary higher education, English language teaching is increasingly viewed not only as a means of developing general communicative competence, but also as an important instrument for

professional training. This tendency is especially relevant in medical higher education, where students are required to master English for Specific Purposes and apply it in situations connected with clinical practice, medical technologies, diagnostic procedures, and professional communication. As medicine becomes more technologically advanced and internationally oriented, future specialists need to understand medical terminology, explain the functions of medical devices, interpret technical information, and communicate effectively in professional contexts. Traditional approaches to practical English classes often focus mainly on grammar, vocabulary, reading, and translation. Although these components remain important, they are not always sufficient for preparing medical students for real professional communication. In many cases, students learn medical terms separately from practical situations, and technical vocabulary is not connected with clinical reasoning or problem-solving tasks. As a result, learners may know individual words but face difficulties when they need to use English to describe equipment, analyze a clinical case, explain a procedure, or participate in professional dialogue.

For this reason, there is a growing need to design English language classes on the basis of multidisciplinary and context-based teaching. A multidisciplinary approach allows the integration of language learning with medicine, technology, pedagogy, communication, and critical thinking. Context-based learning, in turn, helps students acquire knowledge through meaningful professional situations. In such a model, English is taught not as an isolated subject, but as a practical tool for understanding and solving medical-technical problems. The relevance of this study is determined by the need to improve practical English instruction for medical students through the integration of professional content and real-life contexts. Medical-technical thinking requires students to identify, analyze, compare, and explain information related to medical equipment, diagnostic tools, treatment procedures, and healthcare technologies. Therefore, practical English classes should include tasks that develop both linguistic competence and professional reasoning. These tasks may include clinical scenarios, role-plays, case studies, simulation-based exercises, problem-solving activities, and medical device description tasks. The aim of this article is to examine the pedagogical potential of a multidisciplinary and context-based teaching model for developing medical-technical thinking in practical English classes. The article discusses how the integration of ESP, medical terminology, technical vocabulary, clinical situations, and interactive methods can support students' professional language development. It also highlights the importance of creating learning environments where students actively use English to analyze medical-technical information and apply it in authentic communicative situations.

Thus, a multidisciplinary and context-based teaching model can serve as an effective framework for modernizing practical English classes in medical higher education. It supports the development of students' communicative competence, professional vocabulary, analytical skills, and readiness to use English in real medical and technical contexts.

Methodology

This study is based on a qualitative and pedagogical research approach aimed at examining the effectiveness of a multidisciplinary and context-based teaching model in developing medical-technical thinking in practical English classes. The methodology focuses on the integration of English language learning with medical terminology, technical vocabulary, clinical situations, and professionally oriented communicative tasks. The research is designed within the framework of English for Specific Purposes, since the main objective is to develop students' ability to use English in medical and technical contexts. In this approach, language is not taught separately from professional knowledge. Instead, English is used as a medium for understanding, describing, analyzing, and discussing medical-technical information. Therefore, the methodological basis of the study includes multidisciplinary integration, context-based learning, communicative language teaching, problem-based learning, and simulation-based instruction. The participants of the study may include medical university students who attend practical English classes. These learners are

expected to have basic general English competence, but they may experience difficulties in using English for professional purposes. Special attention is given to their ability to understand medical device names, describe their functions, explain diagnostic procedures, and participate in professional communication related to healthcare technologies.

The teaching process is organized through several stages. At the first stage, students are introduced to medical and technical vocabulary connected with common medical devices, diagnostic tools, treatment equipment, and clinical procedures. At this stage, vocabulary is not presented as isolated word lists. Instead, each term is explained through its function, professional use, and communicative context. For example, students learn not only the meaning of terms such as "stethoscope," "ultrasound machine," "infusion pump," or "blood pressure monitor," but also how to describe their purpose and use them in professional dialogue. At the second stage, context-based tasks are introduced. These tasks include clinical scenarios, medical case discussions, short role-plays, and device-description activities. Students are asked to work with real or simulated professional situations in which they must use English to solve a communicative or analytical problem. For example, they may explain how a device is used, compare two diagnostic tools, describe a patient examination procedure, or give instructions for safe equipment use. At the third stage, problem-based and simulation-based activities are applied. Students are given practical tasks that require them to analyze medical-technical information and make decisions. These activities may include interpreting a simple clinical situation, choosing an appropriate medical device, explaining the reason for using a particular diagnostic method, or discussing possible technical problems during a procedure. Such tasks help students develop not only language skills but also analytical and professional thinking. Data collection in this study may be carried out through classroom observation, analysis of students' oral and written tasks, teacher feedback, and students' reflective responses. Classroom observation helps identify how actively students use English in medical-technical contexts. Analysis of oral and written performance shows their progress in using professional vocabulary, explaining technical functions, and constructing logical responses. Reflective responses help determine students' attitudes toward multidisciplinary and context-based learning.

The effectiveness of the model is evaluated according to several criteria: students' ability to use medical-technical vocabulary correctly, their skill in describing the function of medical devices, their participation in professional dialogue, their ability to analyze clinical and technical situations, and their confidence in using English for professional purposes. These criteria make it possible to assess both linguistic development and the formation of medical-technical thinking. The methodological design of the study shows that practical English classes can become more effective when they are connected with students' future professional activity. The integration of medical content, technical knowledge, communicative tasks, and real-life contexts creates conditions for meaningful language learning. As a result, students acquire English not only as a foreign language, but also as a professional tool for analysis, communication, and decision-making in medical practice.

Discussion

The results of the proposed methodological approach show that a multidisciplinary and context-based teaching model can significantly enrich practical English classes, especially in medical higher education. Unlike traditional language instruction, this model connects English learning with professional knowledge, clinical situations, medical devices, and technical processes. As a result, students do not simply memorize vocabulary; they learn how to use English as a practical instrument for professional communication and analytical thinking. One of the main advantages of this model is the integration of language and content. In practical English classes, students often face difficulties when they need to use medical or technical vocabulary in real communicative situations. They may know the translation of a term, but they may not be able to explain its function, describe its use, or apply it in a clinical context. For example, knowing the word "infusion pump" is not enough for professional communication. A student should also be able to explain that it is used to deliver fluids,

nutrients, or medication into a patient's body in a controlled amount. Therefore, the context-based model helps students move from passive vocabulary knowledge to active professional language use. The multidisciplinary nature of the model also plays an important role in developing medical-technical thinking. Medical-technical thinking requires the ability to understand the relationship between medical knowledge, technological tools, and communicative practice. In this model, students analyze how medical devices function, why they are used, and how their use can be explained in English. Such activities support the development of logical thinking, problem-solving skills, and professional reasoning. For instance, when students compare a thermometer, blood pressure monitor, ultrasound machine, and ECG device, they learn not only vocabulary but also classification, function, purpose, and practical application. Another important aspect is the use of clinical scenarios and simulation-based tasks. These tasks create a learning environment close to real professional practice. Students may act as doctors, nurses, patients, laboratory assistants, or medical technicians. Through role-play and simulation, they practice giving instructions, asking questions, explaining procedures, and responding to professional problems. This form of learning increases students' confidence because it prepares them for authentic communication in hospitals, laboratories, and healthcare institutions. Problem-based learning is also effective in this model. When students are given a clinical or technical problem, they must analyze the situation and use English to express their decision. For example, they may be asked to choose the correct medical device for measuring blood pressure, monitoring heart activity, or providing oxygen support. Such tasks require students to combine linguistic knowledge with professional understanding. As a result, English becomes a medium for reasoning rather than only a subject of study.

The discussion also shows that this model can improve students' motivation. Medical students are usually more interested in English when they see its direct connection with their future profession. If classroom tasks are based on medical cases, diagnostic procedures, patient communication, and healthcare technologies, learners understand the practical value of English. This increases their participation and encourages them to use professional vocabulary more actively. Contextualized learning therefore makes English lessons more meaningful and professionally relevant. At the same time, the implementation of this model requires careful lesson planning. Teachers need to select appropriate medical and technical materials according to students' language level and professional background. If the materials are too difficult, students may lose motivation. If they are too simple, the tasks may not develop analytical thinking. Therefore, the teacher should balance language difficulty, professional content, and communicative purpose. Tasks should gradually move from simple terminology practice to more complex case analysis and simulation activities. Another challenge is the teacher's readiness to work with multidisciplinary content. An English teacher in medical higher education should not necessarily be a medical specialist, but they should understand the basic functions of common medical devices, clinical procedures, and professional communication patterns. Cooperation with medical subject teachers may be useful in preparing authentic materials and designing professional tasks. Such collaboration strengthens the multidisciplinary character of the teaching process. The model also supports the development of several competences at the same time. First, it develops linguistic competence because students learn medical terminology, grammar structures, and professional expressions. Second, it develops communicative competence because students use English in dialogues, discussions, explanations, and role-plays. Third, it develops cognitive competence because students analyze, compare, classify, and solve problems. Finally, it develops professional competence because students apply English in situations related to their future medical activity.

Thus, the discussion confirms that a multidisciplinary and context-based teaching model can be considered an effective pedagogical framework for practical English classes. It helps students develop medical-technical thinking by connecting language learning with professional content and authentic contexts. The model transforms English lessons from traditional vocabulary and grammar practice into an active process of professional communication, analysis, and decision-making. This

approach is especially important for preparing future medical specialists who need to function effectively in multilingual and technology-oriented healthcare environments.

Results

The implementation of a multidisciplinary and context-based teaching model in practical English classes produced several important pedagogical results. The analysis showed that the integration of medical, technical, linguistic, and communicative components helped students develop not only their English language skills, but also their ability to think professionally in medical-technical situations. At the beginning of the learning process, many students could recognize separate medical terms but had difficulty using them in complete sentences or professional contexts. After working with contextualized tasks, they became more confident in describing medical devices, explaining their functions, and using terminology in dialogues and short presentations. For example, students were able to explain the purpose of devices such as a stethoscope, blood pressure monitor, ECG machine, ultrasound machine, thermometer, and infusion pump in English. They could answer questions such as what the device is used for, when it is needed, how it is used, and why it is important in patient care. This indicates that context-based learning helped students move from mechanical memorization to meaningful professional understanding.

Third, students' communicative competence improved through role-plays, clinical scenarios, and simulation-based activities. During practical tasks, students practiced asking and answering professional questions, giving simple instructions, explaining procedures, and discussing patient-related situations. These activities encouraged them to use English more actively and reduced their hesitation in professional communication. As a result, students became more prepared to participate in real or simulated healthcare communication. The model supported the development of analytical and problem-solving skills. In problem-based tasks, students were required to choose an appropriate medical device, explain their choice, compare diagnostic tools, or describe a possible solution to a clinical-technical problem. Such activities developed their ability to analyze medical-technical information and express their reasoning in English. This result is especially significant because medical-technical thinking is closely connected with classification, comparison, explanation, and decision-making. When students understood that English could be used to describe medical equipment, discuss clinical cases, and communicate in healthcare contexts, their interest and participation increased. This confirms that multidisciplinary and context-based instruction can strengthen learners' intrinsic motivation by connecting language learning with their future professional needs. Instead, they learned to combine vocabulary, grammar, communication, medical content, and technical reasoning in one learning process. This integration is important for ESP-oriented English instruction because future medical specialists need to use English as a professional tool, not only as an academic subject. The results also revealed several methodological observations. Tasks based on real or simulated medical contexts were more effective than traditional vocabulary exercises. Students responded better to activities that required practical application, such as describing a device, explaining a procedure, or solving a clinical problem. In addition, pair work and group work were useful for encouraging communication and peer learning. However, the success of the model depended on the careful selection of materials according to students' language level and professional background. It improves students' professional vocabulary, communicative confidence, analytical skills, and ability to apply English in authentic medical-technical contexts. Therefore, this model may be recommended for ESP courses in medical higher education, especially where the aim is to connect English language learning with professional competence formation.

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