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# Student-centered, humanities-guided teaching of the “Medical Practical English” course and its assessment

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## Abstract

**Objective:** Medical English holds increasing significance for medical students in non-English speaking countries. To foster self-directed, active learning among these students, we introduced innovative teaching methods that emphasize student-centered learning, with humanities integrated into this education.

**Methods:** Guided by a student-centered educational philosophy, this course incorporated hybrid online-offline teaching models. By harnessing contemporary educational technologies, this course focused on practical application, thereby enhancing the effectiveness of the course and honing comprehensive skills in listening, speaking, reading, and writing. Concurrently, this course explored the integration of medical humanities within the curriculum, while establishing a multi-dimensional grading system including self-assessment, peer evaluations, and instructor reviews.

**Results:** Three unique survey questionnaires were designed to gather feedback. Post-course evaluations indicated a significant rise in students' receptivity to medical English. Additionally, there has been a notable enhancement in both application skills and medical knowledge pertaining to medical English.

**Conclusion:** Based on student-centered learning, students acquired integrated systematic thinking through the course, developed clinical thinking patterns, improved doctor-patient communication and collaboration skills, and enhanced their ability in paper reading and writing. The exploration of the “Medical Practical English” course

provides an excellent example of student-based humanities education modes in medical curriculum design.

**Keywords:** medical practical English; student-centered education; multi-dimensional grading system; medical humanities education

## Introduction

As globalization continues to advance, medical English has become an increasingly crucial tool for communication and learning among contemporary medical professionals and students in non-English speaking countries. As a bridge, medical English facilitates learning for medical professionals from around the globe and amplifies China's voice in return. However, several issues have been identified in current teaching modes, especially the challenges some students face when applying classroom knowledge to practical scenarios such as clinical communications and thesis writing. Beyond the practical requirements, medical humanities education is also of great importance in the medical English courses. These two aspects are intrinsically linked and mutually reinforcing [1, 2].

Previous research indicates that traditional English teaching predominantly involves passive engagement with relevant literature reading or case studies [3–5]. There is a scarcity of student-centered explorations in current medical English education. Furthermore, the assessment systems for medical English in certain institutions remain traditional, with a primary focus on written examinations. This approach does not align with the evolving teaching methodologies or the comprehensive educational objectives.

In light of these issues, we integrated practical project modules into the traditional medical English teaching process to open a new course called “Medical Practical English”. Based on student-based theory, the new course innovates teaching methods, such as flipped classrooms, introduction of ancient Greco-Roman mythologies, and development of online self-study platforms. Moreover, we emphasize medical humanistic education to reinforce the development of students' humanistic qualities.

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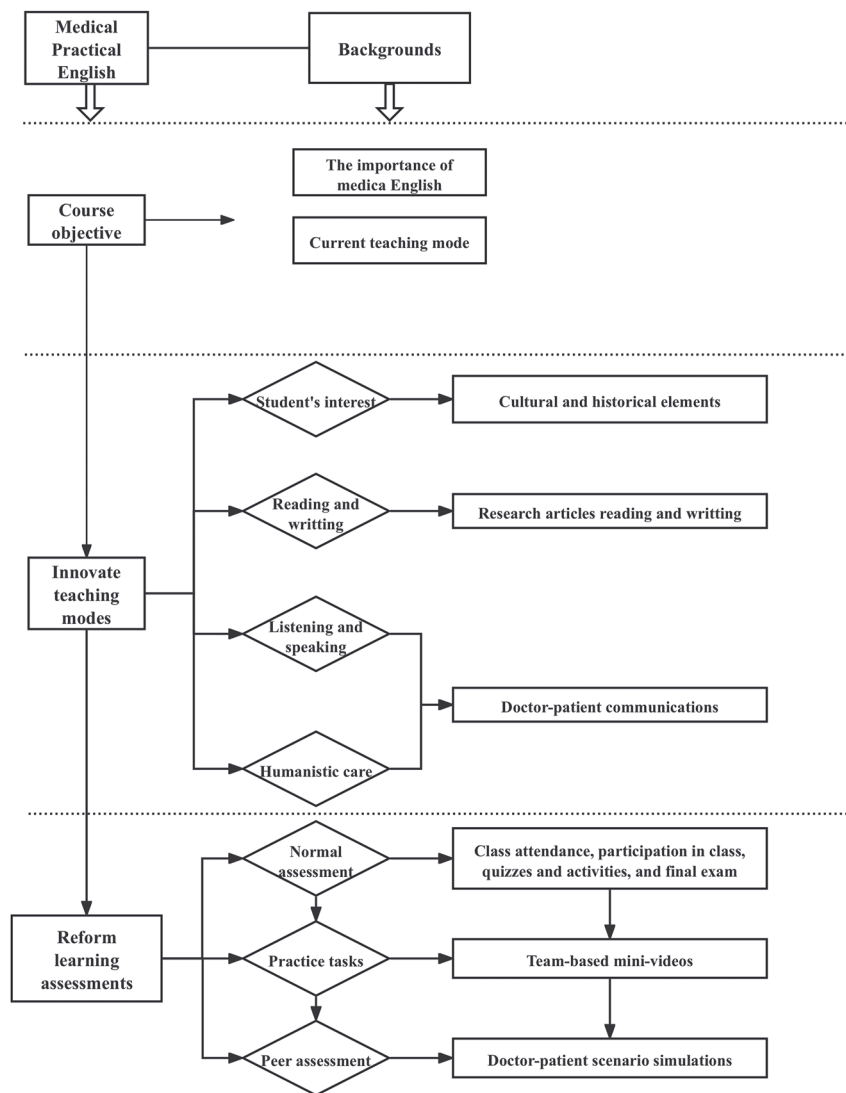


Figure 1: The course design flowchart.

## Methods

### Course objective design

“Medical Practical English” has been developed based on the philosophy of student-centered education to fulfil the needs of humanistic education (Figure 1). This course is structured around three core teaching objectives: (1) to facilitate the accumulation of medical English knowledge and foster academic advancement; (2) to cultivate clinical communication skills and enhance reading and writing proficiency in medical articles; and (3) to nurture a scientific mindset and expand intellectual horizons.

### Students’ preparation course information

A total of 112 students were included. All these students have completed the following courses that prepare them for this course: (1) Humanities and Social Sciences courses; (2) public fundamental courses, such as College English, Mathematics, Physics, Basic Chemistry, Organic Chemistry, Fundamentals of Programming, and General Psychology; (3) basic medical science course, such as Life Sciences Introduction, Medical Genetics and Embryonic Development, Metabolic Biochemistry, Host Defense and Immunity, General Pharmacology, Pathology, and General Physiology. Meanwhile, all students have finished the course of early clinical exposure and begun clinical probation.

## Enrich offline and online resources

Medicine is not only a subject steeped in tradition but also keeps pace with current affairs. Real-time updates from English-language media platforms serve as excellent educational resources. By integrating these medical news items into our curriculum, we enhance the learning process. For instance, an animated video elucidating the mechanisms of novel coronavirus pneumonia was introduced in the classroom, resonating with students and honing their medical English “reading and listening” skills amidst the ongoing COVID-19 pandemic.

In addressing the “writing and speaking” skills required for medical English proficiency, and acknowledging the scientific, professional, and systematic nature of modern Western medicine, we impart scientific writing techniques anchored in recent research findings. Students are then tasked with writing on designated topics to hone their composition skills and cultivate a sense of scientific rigor. Additionally, team-based mini-videos on popular medical research topics are created, encouraging students to engage more frequently in English conversation and overcome their apprehension towards spoken English during the filming process. Concurrently, this collaborative video production guides the development of students’ teamwork abilities and multi-faceted capabilities in new media editing and post-production.

## Innovate teaching modes

### Incorporate cultural and historical elements to explain the development of medical English and increase students’ learning interest

Storytelling is a prevalent approach in foreign language acquisition. An intriguing and accurate tale can expand students’ perspectives and arouse their curiosity in learning. Medicine inherently offers a rich tapestry of cultural narratives, both colorful and time-honored. To address the challenge posed by the intricate vocabulary of medical English, its cumbersome pronunciation, and the difficulty in committing it to memory, we adopted a multi-faceted strategy. By recounting the historical evolution of medical English, incorporating ancient Greek and Roman mythologies alongside traditional Chinese sagas, and integrating captivating plots with engaging cartoons, we deconstruct the etymology of roots and affixes. This method facilitates a profound understanding of numerous medical English terms, enabling students to appreciate the distinctive attributes and learning strategies of medical English

and heightening their enthusiasm for the subject. Concurrently, we juxtapose the categorization of roots and affixes with various dimensions and scopes, such as human anatomy, physiological systems, and clinical contexts. This allows students to associate relevant roots and affixes with real-world applications rather than perceiving them as isolated, impersonal jargon.

### Guide students to think differently and enhance their humanistic care in the practice of medical English by integration of doctor-patient communications

Through a student-centered educational approach, while ensuring that specialized knowledge is thoroughly taught, we allocated ample time for student engagement, prioritizing their needs and preferences. In accordance with the syllabus requirements, the majority of medical English vocabulary is categorized into distinct medical cases. We utilized group activities where students simulated “doctors and patients” roles, immersing themselves in specific clinical scenarios. This integration of humanistic care and ideological education fosters diverse thinking and assists in elevating students’ humanistic qualities.

## Reform learning assessments

Utilizing the online intelligent education platform, we automatically generated a multi-dimensional grading system encompassing individual self-assessment, peer mutual assessment, and teacher review. This assessment system develops a diverse, incremental process-oriented evaluation with an emphasis on stimulating learning motivation and professional ambition. The evaluation criteria are distributed as follows: 10 % class attendance, 10 % participation in class quizzes and activities, 20 % English mini-reviews, 20 % team-based mini-videos, 20 % doctor-patient scenario simulations, and 20 % final exam (Table 1).

We have expanded our evaluation method to include assessments of popular science video production and mock thesis writing, introduced in our previous teaching reforms, to provide students with feedback during the evaluation process. Recognizing that every student enrolled in the course possesses a strong foundation in English, we prioritized student action, allowing them to “practice” first and then adapt our teaching to their diverse situations and challenges. Consequently, we maximized our time to address each student’s weakness in medical English writing, translation, and spoken communication. This course also integrated the requirements of humanistic education by innovatively introducing a clinical “patient evaluation system”

**Table 1:** The reformed multi-dimensional grading system.

| Part name                           | Proportion/% | Scorer                  | Details                                                                                                                                                                                                                                        |
|-------------------------------------|--------------|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Class attendance                    | 10           | Online AI teacher       | After each class, the AI teacher scores automatically                                                                                                                                                                                          |
| Class quizzes and activities        | 10           | Teacher                 | Objective questions are published online by the class, and students are required to complete them within a specified time frame. Once the time is up, the platform automatically scores their response, which helps reinforce memory retention |
| English mini reviews                | 20           | Teacher, students       | Based on the professional knowledge and skills acquired in class, students will independently compose a review. Subsequently, the teacher will provide a grade, and the classmates will engage in mutual evaluations                           |
| Team-based mini-videos              | 20           | Teacher, students       | The team-based video projects will be evaluated and graded by both teachers and fellow students                                                                                                                                                |
| Doctor-patient scenario simulations | 20           | Teacher, students, self | The “doctors” can be scored by “patients”, other students and the teacher                                                                                                                                                                      |
| Final exam                          | 20           | Teacher                 | The exam including multiple-choice questions (30 %), fill-in-the-blanks (10 %), translation (20 %), reading comprehension (20 %), and composition (20 %)                                                                                       |

as the assessment mode. In clinical settings, the evaluation of a doctor largely depends on patient satisfaction, including whether their doubts and issues are resolved. This demands not only rigorous scientific knowledge but also humanistic communication skills. By constructing authentic clinical scenarios, we encouraged students to learn independently, enhancing their autonomy and teamwork. During self-assessment and peer evaluation, “patients” appraised “doctors”, measuring not only students’ mastery and application of medical English knowledge but also their communication skills. Meanwhile, students observing from the sidelines also acted as examiners to pose questions during each case. Thus, every student actively engaged in accumulating relevant medical English expertise, integrating it with personal reflection. This exchange of differing opinions and viewpoints on medical English knowledge fosters deeper understanding and promotes thoughtful consideration of medical humanities.

## Feedback on achievement

Three distinct survey questionnaires were meticulously designed to garner comprehensive feedback on student achievements.

The initial set of questionnaires, replete with detailed descriptions, was disseminated universally among all students. Its primary objective was to delve into the motivations behind their enrollment in the course, encompassing factors such as career advancement requirements, credit acquisition, personal interests, and preparatory needs for future studies abroad. To facilitate a nuanced comparison,

these questionnaires were collected both prior to and after the course’s conclusion.

The second set of questionnaires, equally rich in descriptive detail, was administered with the intent of gathering self-assessments from students regarding the array of medical English competencies necessitated by the course. In alignment with the first set, these were also gathered at the course’s inception and denouement to enable a comparative analysis of progress and perception shifts.

Lastly, a targeted approach was employed for the third set of questionnaires, which were randomly distributed among a selected group of six students. This strategic sampling aimed to elicit specific, granular feedback pertaining to the course’s various facets. By doing so, it ensured a holistic evaluation of the course’s efficacy and its impact on student satisfaction, thereby enriching our understanding of its overall success and areas for potential enhancement.

## Results

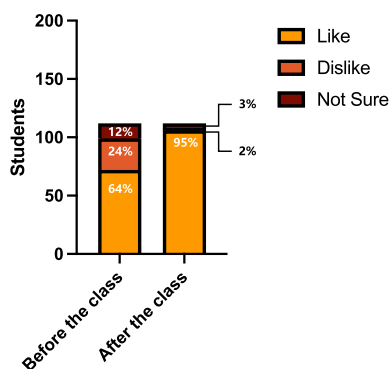
### Analysis of students’ sentiments and interests at various stages: before, during, and after the course

The initial research phase is dedicated to comprehending students’ needs, thereby informing the course design. Mid-course evaluations facilitate adjustments based on intermediate feedback, while end-of-course assessments consolidate and reflect upon the cumulative student input, serving as a benchmark for enhancing future course iterations and fulfilling the commitment to continuous improvement.

Statistical outcomes revealed a universal acknowledgment among students of the paramount importance of medical English, accompanied by a significant rise in their interest in applying English language skills to medical practice throughout the course. Prior to the classes, merely 10 % of students enrolled due to personal interest, a figure that surged to 76 % post-classes. Additionally, the majority of students (96 %) post-classes acknowledged the critical role of medical English in their career development. Furthermore, there was a 10 % increase in students expressing a desire for international exchanges and advanced studies following the course (Figure 2, Table 2).

### The progression of students' self-reported proficiency in medical English

This course adopts a student-centered approach, tailoring the curriculum to resonate with their interests and sentiments towards the subject matter, all while emphasizing the enhancement of comprehensive skills in listening, speaking, reading, and writing within the medical English context. Students are encouraged to independently reassess and rate their own competencies in medical English both before and after participating in the class. By harnessing educational psychology principles, this method



**Figure 2:** The survey results of students' attitudes toward medical English before and after class.

**Table 2:** Students' motivations for enrolling in the course (multiple selection, %).

|              | Career development requirements | Earning credits | Personal interests | Future study abroad needs |
|--------------|---------------------------------|-----------------|--------------------|---------------------------|
| Before class | 70                              | 84              | 10                 | 14                        |
| In class     | 94                              | 92              | 54                 | 14                        |
| After class  | 96                              | 90              | 76                 | 24                        |

enables students to self-acknowledge their learning milestones, thereby boosting their sense of achievement in mastering medical English. Simultaneously, it assists the course in identifying areas requiring reinforcement and supplementation. Overall, there has been a marked improvement in both practical skills and medical knowledge among medical English majors as a direct consequence of this course (Table 3). Specifically, the writing ability score escalated from 71.1 to 86.3 (a 15.2 % increase), the reading and translation ability score rose from 76.4 to 91.2 (a 14.8 % increase), the listening ability score improved from 73.2 to 87.1 (a 13.9 % increase), the speaking ability score went up from 68.3 to 82.7 (a 14.4 % increase), and the clinical communication ability score augmented from 64.8 to 80.3 (a 15.5 % increase).

### The enhancement of English skills within a medical context, along with the program's overall value

We facilitated unstructured discussions to glean insights into students' post-class experiences. A synthesis of the student feedback regarding improvements in English proficiency for medical scenarios and associated competencies is outlined as follows: (1) augmented understanding of humanities and cultural nuances; (2) consolidation of foundational language skills; (3) exposure to research methodologies and clinical practices that nurture innovative capabilities pertinent to their specialized fields (Table 4).

## Discussion

Previous studies have identified four primary pain points in current medical English courses, all of which have been

**Table 3:** Self-assessment of students' abilities before and after the class, with a perfect score of 100.

|                         | The average score before class | The average score after class | p-Value |
|-------------------------|--------------------------------|-------------------------------|---------|
| Roots and affixes       | 73.87 ± 9.80                   | 87.72 ± 10.31                 | <0.0001 |
| Writing                 | 72.60 ± 9.58                   | 85.96 ± 10.84                 | <0.0001 |
| Reading and translation | 77.02 ± 9.80                   | 89.52 ± 9.76                  | <0.0001 |
| Listening               | 74.29 ± 10.00                  | 86.54 ± 10.68                 | <0.0001 |
| Speaking                | 70.40 ± 8.94                   | 82.70 ± 11.55                 | <0.0001 |
| Clinical communication  | 67.94 ± 8.20                   | 80.44 ± 11.62                 | <0.0001 |

All values are presented as mean ± SD. p values were calculated using Student's *t*-test (paired).

**Table 4:** Students' feedback on the course (translated from Chinese).

| Number | Student ID   | Detail feedback                                                                                                                                                                                                                                                                                                                                                                      |
|--------|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1      | 1207****0482 | I have long perceived medical English as a challenging subject. However, after attending this course, I feel that I have effectively grasped the terminology related to medical English, making the learning process much easier! It's truly an excellent course!                                                                                                                    |
| 2      | 0187****0512 | This course has been immensely beneficial for me. Apart from acquiring a wealth of new knowledge, I have also enhanced my learning skills. For instance, I learned to employ associative strategies to remember words that are easily confused, and to leverage the historical narratives behind various concepts to deepen my understanding. I eagerly anticipate the next lesson!  |
| 3      | 0187****0503 | This class has significantly piqued everyone's interest in the medical English course. Initially, I assumed it involved mere rote memorization of terms and affixes, but it turned out to be vibrant and engaging. I strongly recommend that Mr. Wang offers online classes on Bilibili, enabling more medical students to immerse themselves in the enthusiasm of learning English! |
| 4      | 1207****0483 | By utilizing roots and affixes, this course has made complex words simpler, boosting memory efficiency and fostering a greater interest in medical English. The instructor's use of examples during class is particularly vivid, enhancing the learning experience. Engaging in exercises during the lessons has improved our mastery of the pertinent knowledge                     |
| 5      | 31****9023   | The practical English teaching course profoundly impacted me, yielding substantial benefits. It not only enhanced my medical English vocabulary efficiently but also changed my perception of learning medical English as an easy and enjoyable endeavor                                                                                                                             |
| 6      | 31****9093   | The medical English course has been incredibly rewarding for me. I've discovered that learning medical English extends beyond the classroom, opening doors to a broader worldview. Concurrently, I've come to see medical English learning as an intriguing endeavor                                                                                                                 |

effectively addressed in our “Medical Practical English” course.

First, the content is often dry and highly specialized, leading to a widespread fear of difficulty and a prevalence of rote memorization among students. Surveys indicate that while the majority (over 90 %) acknowledge the importance of medical English, students' interest remains low due to its specialization and dull content [6, 7]. Only 17.5 % of students find learning medical English intrinsically interesting, with most regarding it as a perfunctory course requirement [8]. Our study proved these data that merely 10 % of the students enrolled in this course due to personal interest according the questionnaire. However, by incorporating cultural and historical elements to explain the development of medical English and increase students' learning interest, the figure surged to 76 % post-class. In fact, the “Medical Practical English” course represents only a small portion of medical students' exposure to medical English. In such short time, this teaching approach has already led to a significant increase in students' interest in medical English. It is believed that in the future, as they use similar methods to learn medical English outside of class and in their daily work and lives, their interest in medical English will further increase.

Second, there is a conspicuous deficiency in comprehensive practical skills across the “listening, speaking, reading, and writing” spectrum. Numerous studies have underscored Chinese students' aptitude for reading and

writing but relative weakness in auditory comprehension and oral communication [9]. Modern medical English pedagogy should prioritize language application, aiming to endow students with integrated professional “listening, speaking, reading, and writing” competencies. In our “Medical Practical English” course, we incorporated practical scenarios for students, such as doctor-patient communications and article writing, to enhance their comprehensive abilities. Self-reported proficiency indicated a significant improvement in both practical skills and medical knowledge among medical English, especially in writing (a 15.2 % increase) and communication ability (a 15.5 % increase).

Third, medical English is frequently disconnected from specialized knowledge, offering limited advancements in clinical and research capabilities or enhancements in overall competencies, and lacking in humanistic practical skills. Traditional instruction, with its focus on vocabulary explanations and teacher-led article readings, struggles to engage students, resulting in a dearth of practical skills. Moreover, the medical discipline's inherent duality – balancing scientific precision with humanistic care – necessitates an approach that fosters both rigorous scientific awareness and a cognizance of evolving frontiers, alongside an emphasis on empathetic patient interactions and doctor-patient ethics. Additionally, contemporary educational objectives mandate a focus on students' achievement of holistic competencies, including autonomous learning abilities, teamwork skills, and new

media proficiency – capacities not cultivated by conventional medical English lectures. In this course, we integrated both offline and online resources to provide up-to-date information. Additionally, our multi-dimensional evaluation system mandates that students complete team-based assignments, such as creating mini-videos. Both of these elements contribute to the comprehensive development of the students.

Fourth, the evaluation system for medical English education is overly uniform and stereotyped, failing to adequately gauge students' practical skill enhancement through medical English courses. Innovative teaching methods such as flipped classrooms, introduction of ancient Greco-Roman mythologies, and development of online self-study platforms have been explored to address the aforementioned issues [10–12]. However, corresponding adjustments to the assessment system, equally crucial as pedagogy, have seen minimal exploration. Even when classrooms incorporate enriched content and integrate humanistic elements, final evaluations remain limited to written examinations, insufficiently reflecting students' multi-faceted “listening, speaking, reading, and writing” capabilities or their mastery of medical humanities and practical understanding. In this course, we have revamped learning assessments and utilize the online intelligent education platform. A versatile grading system, corresponding to the diverse teaching modes in this course, further aids in nurturing students' comprehensive competencies. In fact, it's not just effective; many students after the course have also reported that this diversified evaluation system not only reduces their exam stress but also makes learning more engaging and enjoyable, motivating them to complete their tasks. Medical education innovation should focus not only on reforming teaching methods but also on reforming the evaluation system. Only by integrating both aspects can we truly promote innovative course development.

## Conclusions

By leveraging rich teaching content and diverse instructional methods, this course enabled students to engage in enjoyable and culturally enriching learning experiences. With the support of student-centered education, it fostered independent learning, enabling students to enhance their comprehensive medical English skills through practical application. The course emphasized practice-guided education, reinforced the development of students' humanistic qualities, and benefited student interactions and exchanges, thereby holistically shaping the advanced humanistic values of future doctors. Further analysis revealed that this

“Medical Practical English” course had seamlessly integrated medical English into medical students' competency frameworks, enhancing patient communication skills, and boosting their overall quality and clinical capabilities.

**Research ethics:** Not applicable.

**Informed consent:** Not applicable.

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**Use of Large Language Models, AI and Machine Learning Tools:** None declared.

**Conflict of interest:** The authors state no conflict of interest.

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