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# Survey of Medical Students' Opinions Regarding their Training in the Discipline of Infectious Diseases

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## Abstract:

**Introduction:** Infectious diseases occupy a central role in medical education, bridging multiple clinical disciplines. Effective teaching methods in this field are crucial for developing competent future physicians.

**Aim:** This study evaluated the satisfaction of fifth- and sixth-year medical students at the Faculty of Medicine, Trakia University, Stara Zagora, with current teaching methods in Infectious Diseases.

**Materials and Methods:** A total of 202 students completed a 25-item electronic questionnaire assessing attitudes toward classical and modern teaching approaches. Data were analysed using descriptive statistics.

**Results:** Most respondents (94.1%) found the subject interesting, and 69.3% regularly attended lectures. Although 97.5% approved of traditional didactic teaching, students favored greater interactivity. Educational games and role-based simulations were positively rated by 78.7%, while 90.1% supported short quizzes or discussions after lectures to improve retention.

**Conclusion:** Students expressed strong interest in the discipline and high satisfaction with teaching quality but emphasized the need for more active, visually enriched, and case-based learning methods to enhance engagement and long-term understanding.

## Key Words:

Infectious Diseases, Game Teaching Methods

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Infectious diseases are an important part of medical science. Placed at the crossroads between many other specialties, they compile clinical presentations of pathology from internal medicine, pediatrics, neurology, intensive care, dermatology, epidemiology, clinical laboratory and microbiology. The constant emergence of new and resurgence of old infectious diseases keeps the relevance of this discipline at a high level. Infectious diseases as a subject in the educational system of medical students in higher education institutions are studied in the fifth and sixth year. In the fifth year, trainees have practical exercises in a hospital environment at the bedside and a theoretical lecture course. Their knowledge is tested by a practical and theoretical semester examination. In the sixth year, students undertake practical placement in a clinical setting, culminating in a state examination. The way in which medicine is taught during the training process is key to the successful practice of future medics. Existing classical methods of theoretical teaching in Medicine include:

1. Didactic lectures, also called "Socratic" lectures, are the gold standard and most common method in traditional teaching and

learning practice. This method depends on the qualities of the habilitated person who teaches a large amount of information with minimal student involvement<sup>1</sup>.

2. Evidence-based medicine (EBM) provides students with the tools needed to study, understand, and evaluate the medical literature. EBM promotes focused thinking and the formation of long-term memory and, by allowing judicious application of available medical evidence in making decisions about patient care<sup>2</sup>.
3. Case-based learning. Students are given the opportunity to examine real cases where actual contact with the patient, patient history, signs, symptoms along with clinical and laboratory findings are provided. Challa KT, et al. consider that medical education must be flexible enough to accommodate and incorporate multidisciplinary learning models effectively and appropriately at the right time and context, starting from the preclinical years<sup>3</sup>.

Modern techniques of teaching and learning in medical education provide opportunities for

collaborative learning, promoting effective communication and teamwork among future health professionals<sup>3</sup>. They include:

1. Simulation-based method. It allows students to cultivate their practical clinical skills in a controlled environment where realistic scenarios are enacted, recreating real-life situations. It develops their abilities to put their theoretical knowledge into real actions, make quick decisions, and work in teams<sup>4</sup>.
2. Flipped classroom involves prior preparation of students on the topic at hand, with discussion, discussion of practical cases, and expression of opinions during the lecture, suggesting higher-order reasoning<sup>5</sup>.
3. Problem-based learning. This is a test-based approach that encourages students to actively explore clinical problems and apply knowledge to solve them. It promotes independent learning, critical thinking, and problem-solving skills<sup>6</sup>.
4. Digital platforms and e-learning. Modern computing capabilities provide flexibility, accessibility and the ability to integrate multimedia elements that enhance engagement and knowledge retention based on quality assured digital resources<sup>7</sup>.

**The aim** of the present study was to determine the satisfaction of medical students in the 5th and 6th year of the Faculty of Medicine, Trakia University, Stara Zagora with the way their training in the discipline of Infectious diseases is conducted. Summarizing the responses to a survey administered for this purpose aims to identify key patterns, insights, and potential areas for improvement in both teaching methods.

**Materials and Methods:** A total of 202 students from the Faculty of Medicine of the Thracian University, Stara Zagora, participated in the study, which was conducted in 2025. For this purpose, a 25-question survey was developed and provided electronically to all participants. Their responses were evaluated using the methods of descriptive statistics with the statistical program SPSS, v.23.

**Results:** 94.1% of the students surveyed found the Infectious diseases course interesting. 2/3 of them attend the lectures regularly - 69.3%. However,

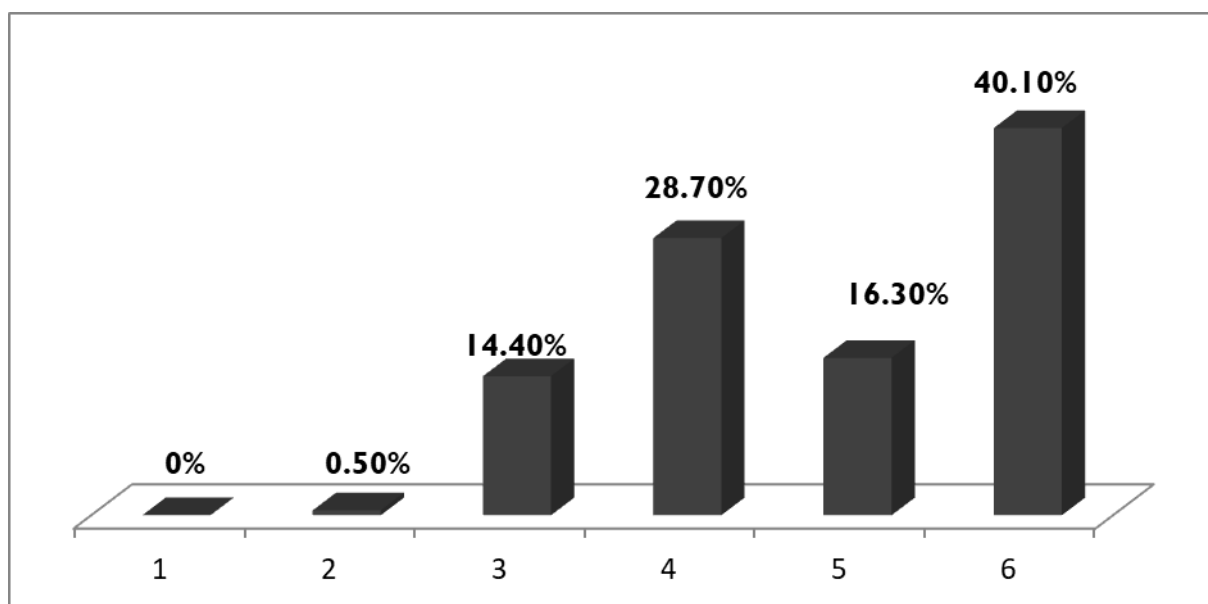
attendance at lectures is not compulsory, which is why, especially recently, academics often give presentations in half-empty academic halls. When asked why they do not come to listen to the Infectious Diseases lectures, students reply that they are scheduled in an inconvenient afternoon hour, at which time they already feel very tired. 1.48% find the Infectious Diseases lectures boring, 26.4% - almost 1/3 - report that they are prevented because they are working and the lectures coincide with their work schedule, or that they are engaged in a free elective class at the same time. 97.5% of the respondents like the classical model of theoretical teaching, but in fact they do not know any other. Classical lectures, lasting two hours or 90 minutes, are associated with the presentation of a large amount of information, although illustrated with multimedia cause a drop in attention and loss of interest after the first 30 minutes. Students are stationary and only listen, they have no options to actively participate, to show knowledge, opinions and attitudes. They appreciated the high quality of the infectious diseases lectures, but noted that the volume and density of material presented made retention of information challenging. 2.97% of respondents expressed a preference for interactive questions during the lecture, indicating that it would better encourage their attention and participation in the learning material.

Whether to have a test at the end of each lecture received an affirmative response from 90.1% of the students. They thought that it would help to activate their attention during the lecture and contribute to the consolidation of their knowledge. The others expressed concern that frequent quizzes might be an unnecessary pressure, suggesting instead interactive discussions as less stressful but equally effective alternative for verifying perceived information.

The classical method of teaching through oral lectures was rated good<sup>4</sup> to excellent<sup>6</sup> by 87.6% of the students. The étude games we use in the course of theoretical training in infectious diseases appeals to 78.7% of the students and is perceived by 78.2% of them as useful in enhancing the quality of their input and overall attentional engagement in the course of learning. Figure 1.

| No  | Question                                                                                                                         | Yes % | No % | No  | Question                                                                                                                 | Yes % | No % |
|-----|----------------------------------------------------------------------------------------------------------------------------------|-------|------|-----|--------------------------------------------------------------------------------------------------------------------------|-------|------|
| 1.  | Are you interested in the subject Infectious Diseases?                                                                           | 94,1  | 5,9  | 14. | Do you think pre-assigning roles for the next lecture would be better?                                                   | 65,3  | 34,7 |
| 2.  | Do you regularly attend lectures on Infectious Diseases?                                                                         | 69,3  | 30,7 | 15. | Why?                                                                                                                     | X     | X    |
| 3.  | If your answer is no, please explain why?                                                                                        | X     | X    | 16. | Do you like your academic lecturer in Infectious Diseases?                                                               | 80,7  | 19,3 |
| 4.  | Do you like the classical method of teaching?                                                                                    | 97,5  | 2,5  | 17. | Do you have any recommendations for your academic lecturer?                                                              | X     | X    |
| 5.  | How would you rate the classical method of teaching through oral lectures from 1 to 6?                                           | ?     | ?    | 18. | Do you like your assistant in Infectious Diseases?                                                                       | 72,3  | 27,7 |
| 6.  | Do you find it appropriate to conduct a test after the end of each lecture?                                                      | 90,1  | 9,9  | 19. | Do you have any recommendations for your assistant in Infectious Diseases? Please fill them in free text!                | X     | X    |
| 7.  | Please motivate your answer to the above question!                                                                               | X     | X    | 20. | Do you like the discipline Infectious Diseases?                                                                          | 90,1  | 9,9  |
| 8.  | Do you like the teaching method based on a study game?                                                                           | 78,7  | 21,3 | 21. | Are you afraid that you might get infected with an infectious disease during your studies?                               | 56,9  | 43,1 |
| 9.  | How would you rate from 1 to 6 the teaching method based on a game-based study?                                                  | ?     | ?    | 22. | Which infectious disease scares you the most?                                                                            | X     | Z    |
| 10. | Do you think that the teaching method based on a game-based study enriches you?                                                  | 78,2  | 21,8 | 23. | Would you like to specialize in Infectious Diseases?                                                                     | 11,4  | 88,6 |
| 11. | Do you remember the main points of the lecture more easily because of the use of a game-based study on the topic of the lecture? | 80,7  | 19,3 | 24. | Please motivate your last answer!                                                                                        | X     | X    |
| 12. | Have you participated in a sketch étude games?                                                                                   | 59,4  | 40,6 | 25. | What would you suggest to make Infectious Diseases lectures more interesting and engaging, informative and entertaining? | X     | X    |
| 13. | Would you like to participate in a sketch game?                                                                                  | 61,9  | 38,9 |     |                                                                                                                          |       |      |

**Table 1:** Questionnaire on students' opinion about the teaching process in infectious diseases in relation to their medical education. Answers with an X indicate a free text response.

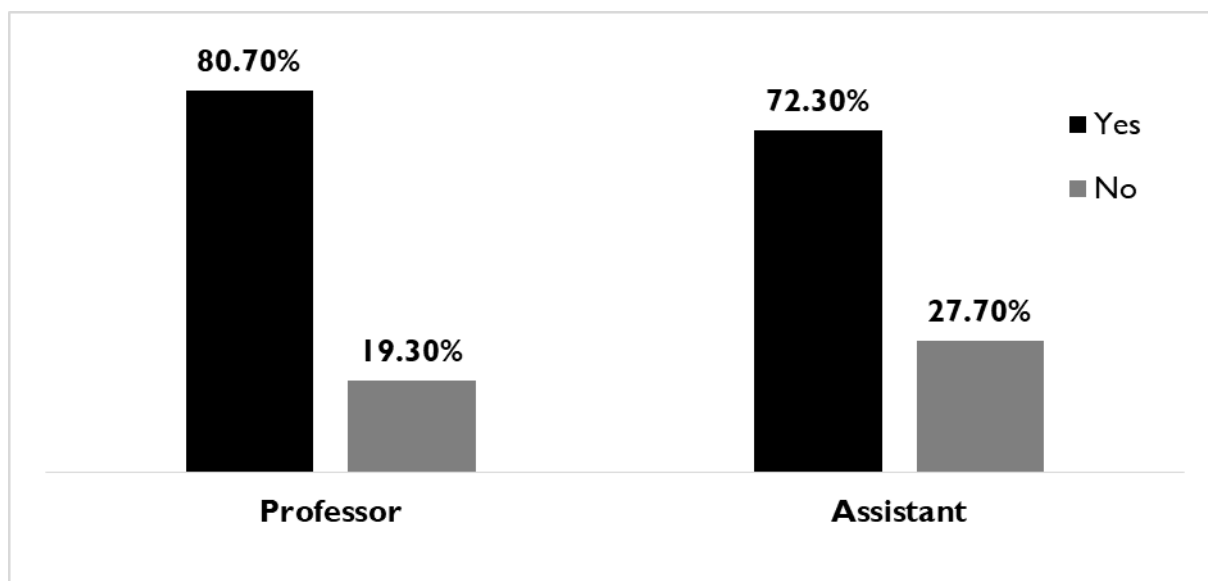


**Figure 1:** Students'evaluation of the etude games from 1 to 6

Most 65.3% prefer to have pre-set engagements so that they can develop their presentation in more detail and at ease.

Of the respondents, 80.7% like their academic lecturer, the same answer was given by 72.3% for

the ways to protect themselves from possible infection during their practical contact with patients. Fear of possible infection with an infectious disease during their training was expressed by 56.9% of the students. These concerns reflect an awareness of the occupational risks inherent in clinical training,



**Figure 2:** Answers to the question: Do students like their teachers?

their assistant professor. **Figure 2.**

Unfortunately, few of them expressed any recommendation - one would like their assistant not to repeat the lecture, but to show them more practical cases. Always at the beginning of the infectious diseases training students are explained

especially in settings prone to exposure. Among those expressing concern, the most frequently mentioned diseases included tuberculosis (TB), human immunodeficiency virus (HIV), Q fever, scarlet fever, rabies, and various unspecified viral infections. When asked if they would specialize in infectious diseases, most students gave a negative

answer. Their motivation is that they have another specialty in mind, which they are targeting, and they say most often that these are cardiology, endocrinology and AG. They are probably influenced by personal interests and career goals. 11.4% responded "YES", and they in turn indicated that this desire was based on the increasing importance of this topic of medicine in relation to infections arising from global travel, increasing antibiotic resistance, and the challenge of testing in extreme conditions. To prepare for the exams, students indicated that they will use available textbooks, lecture notes, online resources, and attendance at practical sessions. As part of the learning strategy, peer group collaboration was mentioned for students to review key topics to reinforce understanding and bridge knowledge gaps. These responses suggest that learners take a proactive and multifaceted approach to preparing for examinations, using a variety of learning sources to ensure their success. Students were asked to suggest ways in which infectious disease lectures could be made more engaging, informative and fun.

The responses reflect a wide range of preferences, but they can be grouped into a few general recommendations:

1. Increased use of clinical cases and real-life examples.
2. Interactive learning tools.
3. Visual aids such as images, videos and visual representations of disease progression.
4. Discussion-based instruction on didactic reading. Students expressed a preference for lectures to have a more conversational or discussion format.
5. Incorporate case narratives and humour. Most students state that they are satisfied with the current format of the lectures, describing them as "informative" and "good".
6. Satisfaction with the current format.
7. Concerns about role-playing activities One student pointed out that the use of role-playing games during lectures causes anxiety when attending lectures. In conclusion feedback shows a strong preference for active, visually enriched and clinically oriented learning sessions. Responses indicate that students benefit most from interactive, discussion-based lectures based on real-life clinical cases.

**Discussion:** The lecture material offers students a historical look at the past, when devastating pandemics claimed many lives, while at the same time showing them the modern picture of the spread of infectious diseases. The dramatic course of the clinical course of infectious diseases allows the theater of their imagination to build a picture of the reality of the pathology.

According to the Regulations of the Thrakia University, concerning the obligations of students in training, medical students must regularly attend the classes provided in the curriculum and complete all assigned tasks, course projects and practical classes on time<sup>8</sup>. However, attendance at lectures is not compulsory, which is why, especially recently, academics often give presentations in half-empty academic halls. Medical education in the higher education institutions of the Republic of Bulgaria is only full-time, which means that students have a continuous cycle of study, which excludes the possibility of being absentees and organising their own time to attend both theoretical and practical classes. For the classes missed due to the alternation with the epidemiology classes, they have the chance to make up their absences by arrangement with the teaching assistant. Usually this is done at the expense of the latter's free time or when he/she is engaged in schedule duty. In both cases, this absence causes considerable inconvenience, given that the lecturer receives no additional remuneration for these extra hours. In our opinion, the lack of adequate supervision and control over attendance is the cause of this inadequate behaviour. Chang SL et al point out that while early studies used classical compartmental modeling with self-learning games, in recent years there has been a significant growth of network-based modeling with imitation games and game-based learning theory is an effective tool for modeling decision making<sup>9</sup>. Lecturers need to be aware of the needs of learners and devise additional activities to the learning process to meet these needs with an emphasis on motivation. Building a motivational atmosphere, professional growth and cognitive benefit. Undoubtedly, the implementation of modern training methods will facilitate the acquisition of knowledge and skills.

Case-based learning is used extensively in the acquisition of practical knowledge and skills by 5th year medical students during their practicals as well as their state infectious disease clerkship. They develop their good communication skills to take a history, become accustomed to using the methods of objective examination, reflect on diagnosis and differential diagnosis, and express opinions on therapeutic approaches. The inconvenience arises from the reluctance of some patients to cooperate, despite having signed an informed consent to the contrary on admission to the clinic for treatment.

Given the rapidly evolving global landscape marked by increased international traffic on the one hand and the resurgence or emergence of new infectious diseases on the other, the need to update and adapt teaching content is continuous. This includes incorporating the latest developments in etiology,

clinical presentation, diagnosis and treatment approaches. An innovative addition to the teaching methodology is the use of étude games, a role-play format in which students assume specific roles and role-play clinical situations related to the lecture topics. This active learning strategy is designed to stimulate engagement, critical thinking and practical application of knowledge. Overall, feedback indicated a diversity of opinions regarding the methods of teaching the lecture material, with concerns largely focused on cognitive fatigue and stress, while suggestions were made aimed at promoting engagement through interactive teaching strategies. The étude games we use in the course of theoretical training in infectious diseases are related to role allocation involving bilateral engagement - as patients and as physicians.

We would point out that by the time they were surveyed, the students had already received training in nosological entities which they are afraid of, and should know that they cannot contract Q fever and rabies by talking to and physically coming into contact with patients with these diseases. In fact, students should take care of obtaining their own personal protective equipment such as masks, gloves and hand sanitizers as these are not provided by the training institution. In relation to these deficiencies in the provision of infection control resources potentially contributing to increased personal safety concerns, the need for enhanced infection prevention protocols and the provision of basic protective equipment of the type mentioned above to maintain both the physical safety and psychological well-being of medical students should be emphasized.

About the students' recommendations many students emphasized the value of including clinical case discussions, real-life scenarios of diagnostic problem-solving exercises with problem patients, and. These elements were seen as effective in linking theoretical content to practical application, thereby increasing engagement and retention. They gave the suggestions include the use of real-time quizzes, surveys, and short étude games during lectures to encourage active participation and sustain attention. They thought that visual aids such as images, videos and visual representations of disease progression were also referred to in order to make abstract concepts more tangible and memorable.

Students expressed a preference for lectures to have a more conversational or discussion format. Such passive delivery of information can lead to reduced concentration and engagement, especially

on long academic days. They suggested open discussions, guided explanations and self-presented parts of the lecture topic as more effective alternatives. Several respondents mentioned that storytelling, the use of patient narratives and even light humour could make lectures more enjoyable and improve focus and retention.

Although most students state that they are satisfied with the current format of the lectures, describing them as "informative" and "good", but minor improvements are still suggested, such as the use of selected YouTube videos to enrich the material and improve understanding.

**Conclusions:** Medical students enjoy the course "Infectious Diseases". Feedback shows a strong preference for active, visually enriched and clinically oriented learning sessions. Responses indicate that students benefit most from interactive, discussion-based and real-life clinical case-based lectures. They like the educational games, finding them useful for easier memorization of the material. What is needed is a skillful upgrade of the existing base by integrating new techniques to engage their attention and stimulate their long-term memory, as well as adequate readjustment of the teacher himself to these innovative methods. Feedback shows a strong preference for active, visually enriched and clinically oriented lessons. The responses show that students benefit most from interactive, discussion-based and real-life clinical case-based lectures.

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