



**SPECIFIC ASPECTS OF DEVELOPING DIAGNOSTIC COMPETENCE IN MEDICAL STUDENTS BASED ON THE DD (DIAGNOSTIC DIVERGENCE) MODEL.**

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**Abstract:** This article explores the pedagogical potential of the Diagnostic Divergence (DD) model as a tool for developing diagnostic competence among medical students. The DD model emphasizes the process of comparing and contrasting multiple differential diagnoses through critical analysis of clinical presentations.

**Keywords:** Diagnostic Divergence model, diagnostic competence, differential diagnosis, clinical reasoning, medical education, simulation, reflective practice, case-based learning, critical thinking.

**Introduction**

In the age of information, constantly evolving knowledge and technologies have increased the need for new educational approaches. Educational institutions across the globe are implementing modern technologies, methods, and pedagogical approaches aimed at fostering a deeper understanding of medicine. Improving teaching methods, particularly in subjects like infectious diseases, is of great importance. Innovations in teaching reflect the clinical approach and pedagogical skills of the instructor, which require the introduction of new methodologies into the learning process.

At the same time, opportunities for integrating general education, medical, and specialized subjects are expanding, as these disciplines encompass knowledge and concepts that reflect the unity of nature. The cross-disciplinary approach serves as an essential tool in developing students' diagnostic competence, helping deepen their diagnostic knowledge and enhance practical skills. In pedagogical research, it is crucial to design systems of forms, methods, and tools aimed at eliminating fragmentation in teaching and to establish a coherent methodology for the educational process. Developing the diagnostic competence of future physicians is one of the primary priorities in medical education today.

**Methods**

The Diagnostic Divergence (DD) model is an effective pedagogical approach in modern medical education that fosters the deep and critical development of students' diagnostic thinking. The main goal of the model is to guide students to simultaneously consider multiple possible diagnoses, conduct a differential analysis based on similarities and differences, and make clinical decisions accordingly. The DD model emerged from integrating modern teaching technologies into the traditional process of differential diagnosis. It was first introduced in the late 2010s by specialists in medical pedagogy and cognitive psychology through research at institutions such as the Mayo Clinic (USA), McMaster University (Canada), and Leiden University Medical Center (Netherlands).

This model operates through the following four-step structure:

- **Initial Presentation** – The student receives a brief clinical overview of the patient, including anamnesis and symptoms. This stage serves as the foundational basis for diagnosis and

activates logical reasoning.

- **Divergence** – The student reflects on at least two or three possible diagnoses that present with similar clinical features. At this stage, attention is paid to subtle distinctions between conditions, which are critically analyzed.
- **Mapping Differences** – The main differences between the diseases—such as duration, severity, symptom localization, lab results, and pathophysiological mechanisms—are examined. These differences are visualized using tables, diagrams, or conceptual maps to help structure clinical thinking.
- **Decision and Justification** – The student selects the most probable diagnosis and provides evidence-based justification for ruling out the other diagnoses. This step fosters metacognitive reflection, which is the skill of evaluating one's own thinking process.

## Results

The DD model compels a student to simultaneously consider multiple potential diagnoses and to distinguish between them through critical analysis of their similarities and differences. It is not just a diagnostic tool but a system that enhances critical and reflective thinking. The model integrates elements of classical clinical reasoning with insights from cognitive psychology, pedagogy, and communication, making it a comprehensive educational strategy. Its application is highly relevant in fields like infectious diseases, where syndromes often resemble each other. Furthermore, the model can be integrated with other methods such as OSCE (Objective Structured Clinical Examination), PBL (Problem-Based Learning), and case studies, which significantly enhances students' diagnostic accuracy, decision-making speed, and independence. This process is effectively implemented through educational activities such as:

- Analyzing clinical cases.
- Thinking through case-based scenarios.
- Simulating and interpreting diagnostic tests.
- Formulating differential diagnoses.
- Practicing reflection.
- Participating in collaborative decision-making.
- Assessing contextual factors.

These methods help students develop skills in independent reasoning and clinical judgment, preparing them for modern medical practice. The activity-based approach transforms students into active participants who engage with medical knowledge through communication, collaboration, and task performance rather than passive acquisition. This provides an opportunity for students to apply their competencies in practical contexts. The student-centered approach ensures learners take responsibility for seeking information and sharing it with others. By engaging in presentations, discussions, and group work related to infectious diseases, students develop both academic and practical understanding of the subject.

## Discussion and Conclusion

The development of diagnostic competence in medical students is a multi-layered educational objective that requires both cognitive and experiential strategies. The DD (Diagnostic Divergence) model offers a structured framework that encourages learners to engage with uncertainty, consider alternatives, and rationalize clinical decisions with evidence. By integrating this model into medical curricula, educators can cultivate more adaptive, reflective, and diagnostically skilled professionals. The model not only fosters critical thinking and problem-solving but also supports a deeper understanding of pathophysiological processes and patient-centered care. Its systematic nature makes it highly applicable in case discussions, simulation training, and interprofessional learning environments. Ultimately, the systematic development of diagnostic competence creates a foundation for forming well-rounded and clinically responsible professionals. When these activities are integrated holistically, they ensure the student's diagnostic development and support their growth as an active subject of diagnostic practice.

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