



Bits & Bytes para tu vida

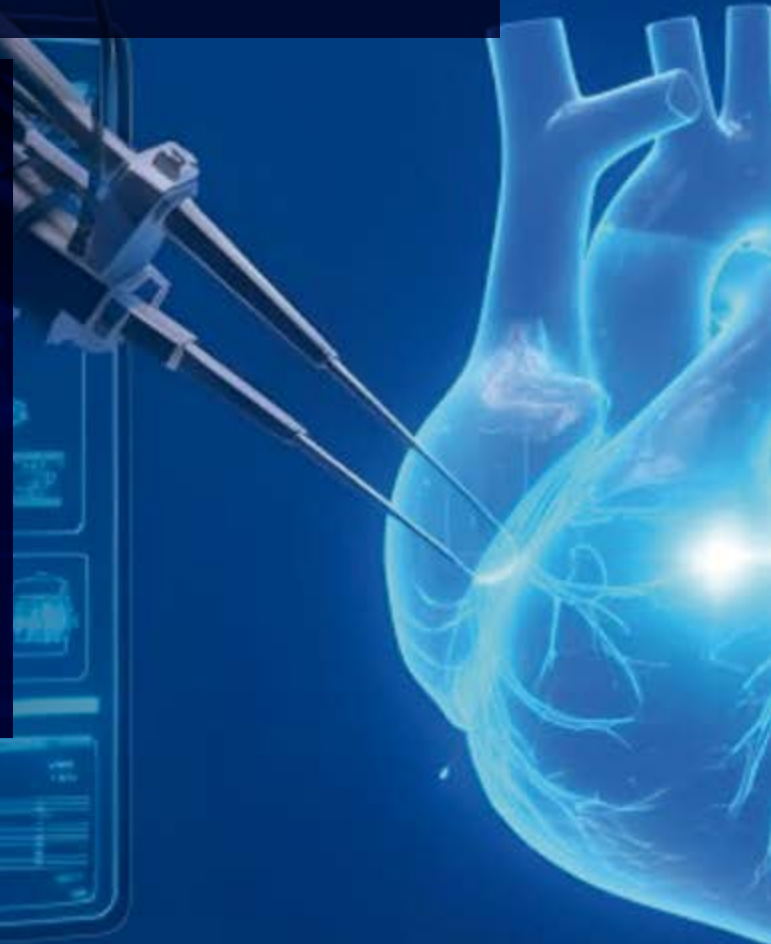
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How close are we to experiencing medical-school-style video games on our phones? Today, medical education can be expanded and enriched through advanced simulators and interactive video games. In this article, we explore how these tools are being used in medical learning.

The concept of “flight time” in hospitals

To understand the impact of these tools, it is important to clarify one point: medical video games and simulators are not intended, under any circumstances, to replace the invaluable real-world experience of interacting with patients. Their true purpose is to provide what the aviation industry calls *flight time*. A pilot would never take control of a commercial airliner full of passengers without first spending hundreds of hours in a flight simulator. Why should medicine be any different?

In medicine, these tools allow students to get closer to the intense experience of “putting on the white coat” and facing the dilemmas encountered by healthcare professionals. It is a bit like stepping into the shoes of *Dr. House*: learning from mistakes without fatal consequences, approaching diagnosis as a detective-style puzzle, mastering the visual art of surgery, understanding how medications work, and collaborating with a team while managing the chaos of an emergency room.



Learning from mistakes without fatal consequences

Medical-oriented video games offer students a valuable gift: the freedom to make mistakes in a completely safe virtual environment. In real clinical practice, the margin for error is extremely small—or nonexistent. Yet achieving mastery paradoxically requires extensive practice through trial and error.

Healthcare professionals must not only be highly competent but also experienced decision-makers. Medical training therefore requires tools that support detailed, focused practice across a variety of skills and learning environments, including internships and residency programs.



Video games are transforming medical training today

out misleading possibilities, and demonstrate an understanding of the mechanisms behind each symptom.

The art of surgery becomes a video game

Few training environments are as demanding and challenging as surgery. If we travel back in time, you may remember the classic children's game *Operation*, a simple analogy for the tension experienced in an operating room. Although far from realistic, it successfully conveyed the pressure of the moment: one imprecise movement with the tweezers on the plastic patient would trigger a red light in the character's nose and an alarming buzz announcing the mistake.

A detailed understanding of human anatomy is essential when making irreversible decisions during an operation. Surgeons must decide which tissue to cut and, more importantly, where and how to cut it to avoid damaging a vital artery that should remain untouched (ouch!).

Diagnosis as a detective puzzle

In everyday clinical practice, diagnosis often resembles a complex detective puzzle filled with misleading clues and hidden variables. Success depends on thoroughly understanding how diseases work at the biological level (pathophysiology), interpreting laboratory results, and applying the knowledge acquired throughout medical school to arrive at the correct diagnosis at the right time.

MedDiagnosis is both a medical simulator and an educational diagnostic game designed for medical students. Through interactive scenarios on a mobile device, learners apply theoretical knowledge in practice. Memorizing symptoms is not enough—the player must connect the dots, rule



An especially useful simulator for this scenario is *Touch Surgery: Surgical Videos*. Available on mobile devices, the platform combines videos of real surgeries with expert explanations and 3D simulations of digital patients. Users can learn specific surgical procedures step by step and receive feedback through quizzes that test their knowledge across multiple medical specialties.

Digital pharmacology in the palm of your hand

Prescribing medication requires both excellent memory and deep understanding. An error in dosage or drug selection can have catastrophic consequences. One training tool designed for this purpose is the mobile game *Prognosis: Your Diagnosis*. It rigorously assesses the user's ability to diagnose a character's illness, select treatments, and observe their effects. All of this is presented through friendly characters guide the experience, while detailed explanations grounded in medical literature help transform mistakes into learning opportunities.

Controlled chaos in the emergency room

Today's simulators can accurately reproduce the size, texture, elasticity, and behavior of the human body under a variety of medical conditions, enabling hands-on learning through touch and applied force. Consider a life-or-death situation: performing CPR (cardiopulmonary resuscitation) on a patient whose heart has stopped. Students must learn exactly where to place their hands on a training mannequin's chest. Technique, compression depth, and rhythm vary depending on whether the mannequin represents a young child, a young adult, or an older adult. Applying too much force can result

in broken ribs—and it is far better to hear that cracking sound from a mannequin than from a real patient. *Abcdesim* simulates an emergency department using virtual patients and more than 200 parameters related to circulation, breathing, and consciousness. The platform creates a highly immersive experience in which users can directly observe the outcomes of their diagnostic and treatment decisions.

For students seeking an even greater challenge, managing the absolute chaos of an emergency room ranks near the top. Here, medical simulators go far beyond memorization; they directly train three of the most important and difficult skills for any physician to master: sharp analytical thinking, decision-making under extreme stress, and rapid problem-solving.

Clinical simulation apps such as *Full Code Medical Simulation* recreate emergency department scenarios. Players can perform actions to simulate the use of equipment that resembles that used on patients and allows for mechanical ventilation. Additionally, the game features avatars who work as a team to provide information about the patient's condition and, based on that, the next action to take. *Ambulance Life* is a PC video game that puts players in the shoes of paramedics responding to accidents. In the game, you quickly arrive at the scene of the accident behind the wheel of an ambulance, with the mission of attending to the injured and providing first aid. Every accident is different, so you'll have to adapt and make the right decisions quickly and effectively. It tests your ability to react to the completely unexpected.

There are many mobile video games—and some for PC—that enable hands-on medical training in various settings, such as doctor's offices, operating rooms, emergency rooms, and accident scenes. They can complement the way doctors train, whether in medical school or on their own. These tools facilitate guided and personalized learning. **D**

References

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