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Empowering Active Student Learning In Medical Education

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Abstract:

Background*: Recent circumstances in medical education have revealed a concerning passivity among students toward educators and learning objectives. The COVID-19 pandemic further deepened this disengagement during online learning, compromising essential skills such as communication, empathy, and active participation—skills vital for future clinical practice.*

Materials and Methods*: To address these challenges, two educational initiatives were implemented at the School of Medicine of the National and Kapodistrian University of Athens. The first involved the formation of collaborative study groups focusing on virtual histopathology slides, where students and instructors jointly analyzed clinical cases, fostering diagnostic reasoning and teamwork. The second initiative was the elective course ―Humanitarian Values and Modern Medicine, which integrated the humanities into medical education through interactive technological tools, such as Mentimeter, to enhance reflective and critical engagement.*

Results*: These initiatives demonstrated increased student participation, improved communication, and greater empathy in academic interactions. Collaborative learning strengthened students' diagnostic and interpretive skills, while the elective course promoted reflective thinking and ethical awareness, bridging technological interactivity with humanistic values.*

Conclusion: *Meaningful engagement, reflective practice, and the ethical use of technology can transform medical students from passive recipients of information into empathetic, critically engaged practitioners, better prepared for the interpersonal and ethical dimensions of clinical care.*

Key Word: *medical education; student engagement; empathy; humanities in medicine; educational technology*

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I. Introduction

In recent years, a phenomenon of increasing concern in medical education is the growing passivity of medical students towards both the representatives of the educational system — their professors —and the core objective of that system, namely, the acquisition of medical knowledge. This passivity hinders meaningful communication with instructors and renders the learning process impersonal, thereby impeding the future development of effective relationships between healthcare professionals and patients, mainly, due to lack of empathy. The more stimuli students receive that encourage communication during their studies, the more capable they become of demonstrating empathy when facing the challenges of their future patients (1).

In keeping with the signs of the times, most young people receive a flood of stimuli through electronic device screens, resulting in them becoming passive receivers of virtual reality, with no desire to actively shape the physical reality around them by producing their own creative stimuli. The excessive reception of stimuli through screens seems to entrap learners within their own egocentric perspectives, fostering a passive attitude toward both knowledge acquisition and life itself. As a result, a person who watches life unfold rather than actively participating in it, develops an observer's mindset. Impersonal lectures that involve mechanical reading of PowerPoint slides containing sterile, decontextualized information unrelated to clinical experience and practice further undermine medical education. Teachers frequently fail to make the connection between theoretical knowledge and how it relates to students' future careers. Consequently, students become disinterest in lectures and routinely tune out, in obvious ways and not, seemingly with the professors' acquiescence.

A passive attitude thus prevails in an educational system where success in depersonalized examinations constitutes the primary driving force for knowledge acquisition. These examinations, the focus of nearly all educational effort, rarely assess experiential understanding or practical skills; instead, they emphasize theoretical knowledge with limited connection to the realities of professional medical practice. Acquiring a

body of theoretical knowledge through success in relevant examinations is, of course, a necessary condition for medical degree acquisition and medical competence —but it is by no means a sufficient one. The formation of a physician requires the parallel cultivation of critical thinking, empathy, and the ability to apply knowledge meaningfully in real clinical contexts (2).

The prevalence of online learning during the recent pandemic seems to have exacerbated passivity (3). Even though technology could make it possible for students and teachers to continue to interact (4), remote learning was unfortunately associated with impersonalized instruction and a lack of interaction—as long as medical teachers were half-hearted about experimenting with and using digital forms of interactive engagement. Therefore, the scope of this article is to present our recent initiatives in medical education aimed to increase student interaction by insightful use of technology.

II. Course Materials & Results

In parallel with the formal curriculum of face-to-face education, we present two pedagogical initiatives designed to foster genuine interaction between learners and educators. Both have been implemented in the teaching of Pathology at the School of Medicine of the National and Kapodistrian University of Athens during the 4th and 5th semesters of study out of 12 semesters overall.

The first initiative involves voluntary interactive groups for synchronous study of histopathology virtual slides (5). Interested students join the group's initial session, where they analyze virtual histological slides of selected patient cases, considering clinical histories and laboratory findings from patient records. Using mobile phones or other electronic devices, students examine the virtual slides synchronously with a pathology instructor, who guides them through each step of the diagnostic reasoning process, mirroring the workflow of a pathology laboratory: correlation with clinical and laboratory data, microscopic assessment of abnormal morphological patterns from low to high magnification, differential diagnosis with the selection of appropriate histochemical, immunohistochemical, and molecular tests, and formulation of a precise final diagnosis and prognosis, along with individualized therapeutic considerations within the precision medicine context (6).

In the group's second meeting, the students themselves—divided into subgroups—present selected cases with brief PowerPoint presentations on the diagnostic entity followed by a discussion of the histologic findings on the virtual slides themselves. By simulating the real-world operation of a pathology laboratory within a multidisciplinary healthcare framework, students come to understand that the pathologist functions as an integral link in a chain of professionals—radiologists, internists, surgeons, oncologists, nurses, psychologists, social workers, and dietitians—all collaborating toward comprehensive patient care (7). Thus, they recognize that pathological diagnosis depends on close interactive collaboration between pathologists and clinicians, just as clinical decision-making relies on the pathologist's interpretive report.

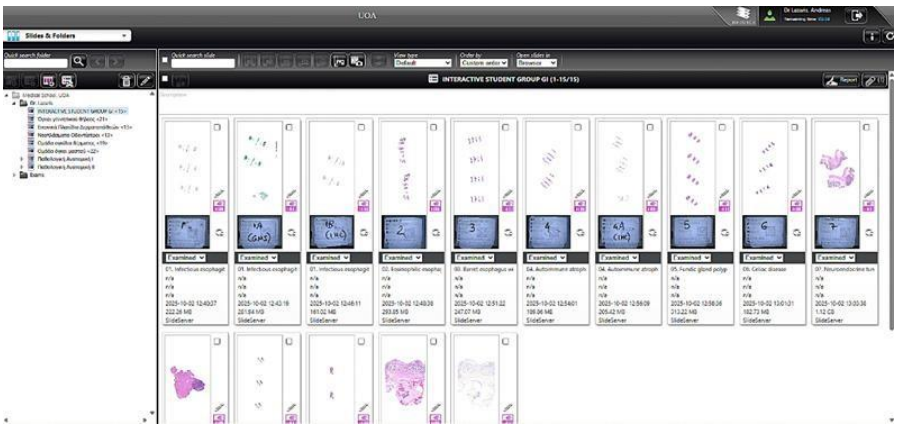

Fig.1:The figure illustrates virtual slides from the Interactive Study Group on Gastrointestinal Pathology, selected by Professor Alexandros D. Polydorides at the Icahn School of Medicine at Mount Sinai, New York.

The second initiative concerns an elective course in the School of Medicine curriculum of the National and Kapodistrian University of Athens, titled ―Humanitarian Values and Modern Medicine, code 500800. This course introduces medical students to concepts drawn from the humanities (i.e., literature, arts, philosophy, and sociology) related to the practice of medicine and aiming to enhance communication skills and cultivate empathy through experiential learning. Among the topics taught are, for example, the doctor's sense of mission in life, the consideration of the equality and otherness of every human being, and the calm acceptance of death. The relevant tangible stimuli transcend theoretical moralization by offering a practical framework that encourages students to break free from passivity and individualism, engaging instead in active co-formation of the course lessons and meaningful communication that can profoundly enrich their future medical practice (8).

An illustrative example of this pedagogical approach involved the use of digital technology through the interactive platform Mentimeter. For one of our latest course sessions, we prepared an interactive quiz that students could easily access via their phones by scanning a QR code. They participated and answered both multiple-choice and open-ended questions in real time, and we were able to see that 68% of the 48 students that were connected, actually responded. The session's objective was to collaboratively create a doctor–patient scenario, and then, in a more structured version of the quiz, role-play alternately as the doctor and the patient. They worked within the confines of a clinical interaction and then reflected on the various dimensions of a practice. There was a highly positive, and we would say, an unforeseen outcome. In addition to the mobile participation, students struck up discussions in spontaneous intervals, many of their comments and reflections relating to the answers they chose. This kind of discussion helped convert an ordinary lecture into a case for interactive learning on the essential elements of empathy, reflective practice, and critical self-awareness. Below, we provide relevant images as a sample that illustrates these interactions and reflections in the clinical learning context.

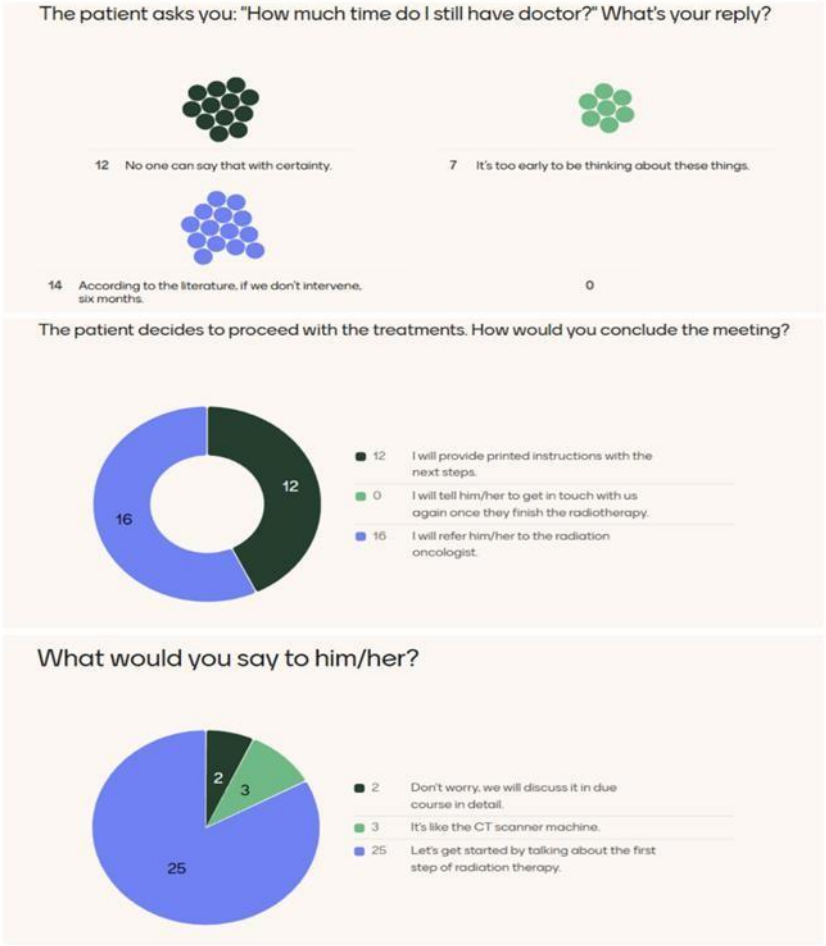

Fig.2: Students' responses to clinical scenario questions during class.

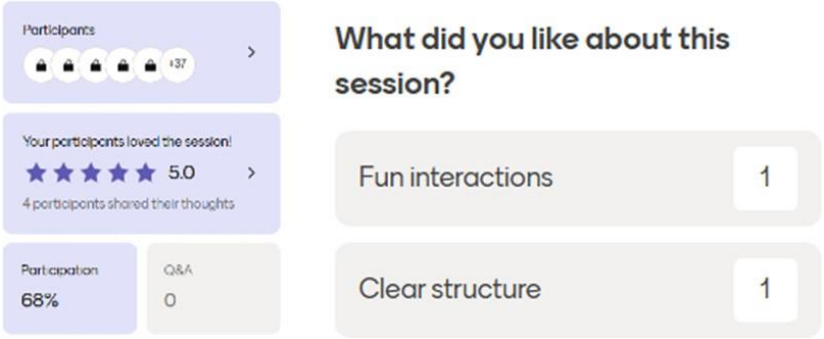

Fig.3: Students' feedback on interactive quizzes.

III. Discussion

It is important that students are taught to see the role of active participation in such learning practices. Activeness turns a learner from passive recipient of given information to co-creator of knowledge: concepts become better understood and more relatable to real-world practice. Thus, within the perspective of medical education, the shift from observation to participation is linked with the development of empathy-building awareness and reflective thinking alongside developing the skills to make decisions according to one's code of ethics. Another important aspect is the ethical use of technology for this purpose. Technologies should not become the key barriers to interaction. Certainly, as Mentimeter shows, technology can even facilitate interaction and dialogue or promote users' inclusivity and collegiality of the shared decision-making process, only when used in a particular pedagogical pattern designed for humans' interaction. In this sense, there is no real educational value in technologies unless they support the further dialogue based on empathy and collegiality – key factors for the physician of the future (9).

However, the value of such sessions is more than just the immediate educational benefits of engagement and interactivity. Reflection teaches students to link the emotional, ethical, and cognitive aspects of medical practice. Hence, medical students learn not just what they ―know‖ as information, but why what they have learned is relevant to the patient (10). Moreover, this reflective process helps to overcome the age-old divide between scientific inquiry and human understanding. Students understand that their future expertise should not be limited to specific technical knowledge but must include its involvement in the cultural and psychosocial context. Organized via digital interactivity and humanities-based learning, this seemingly dual pathway offers a two-in-one educational model that empowers intellectual understanding of science as a first axis and reinforces the emotional area of intelligence as a second axis. In this regard, technology is not a suppressor for the second axis although it undoubtedly works simultaneously as a powerful instrument that strengthens the first one. Used responsibly, it stretches the classroom boundaries and potentially helps professionals develop empathy, collaboration, and ethical decision-making (11).

Participation in shared tasks, such as role-playing and interactive quizzes, encourages the expression of diverse perspectives, helping students to recognize the multiplicity of human experience in illness and healing (12). The development of moral imagination, and the ability to put oneself in another person's state, is essential for providing compassionate medical treatment. Thus, programs such as these ensure that future doctors are as sensitive to the emotional stories of their patients as they are to scientific understanding and accurate diagnosis. Modernizing medical education through proper use of technology may actually restore its humanistic base.

IV. Conclusion

The formerly described initiatives that were set forth by our team at the National and Kapodistrian University of Athens School of Medicine, showcase the prospective for transformation of interactive and human-centered medical education. The unbounded union of digital assets with experiential and humanities- based learning proves that technology is not to demoralize students or detach them from educators and patients. Instead, it can power ever-more meaningful ways of engaging with content, empathy, and reflective consideration. These techniques make students change from passive recipients of information to active participants in an inventive process, thus connecting the boundaries between a general level of understanding and emotion-based clinical practice. Ultimately, the rehumanization of medical education through ethical, interactive pedagogy prepares future physicians to deliver care grounded equally in science and empathy.

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