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PERSPECTIVES

Reviving Observation-Based Learning for Zoomers in Medical Education: Looking Beyond Sight and Connecting Dots

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Abstract: The rise of digital technology has significantly impacted students' learning behaviors, resulting in shorter attention spans and decreased focus, especially in medical education. This article explores how the constant engagement with digital platforms contributes to these challenges and emphasizes the need for more effective strategies to counteract these trends. The article presents that while digital tools can enhance learning, they must be balanced with active, observation-based methods to maintain deep concentration and critical thinking. By focusing on the integration of traditional, hands-on learning with modern digital techniques, the article discusses how a hybrid approach could promote sustained attention and improve clinical reasoning skills. Additionally, the article proposes observation-based teaching learning and assessment methods for fostering both scientific and artistic domains of a medical students. The conclusion emphasizes the importance of integrating digital learning tools thoughtfully while prioritizing in-person, experiential learning to equip students with the skills needed for effective patient care and professional development.

Keywords: observation-based learning, silent history taking, silent examination, astute observation, bedside learning

Introduction

Psychomotor skills for observation form an essential part of history-taking and clinical examination as per the Entrustable Professional Activities (EPA1) in competency-based medical education (CBME).[1] However, today's digital world poses challenges to inculcate these skills among students. Generation Z (Gen Z), also known as Zoomers, includes individuals born between 1993 and 2005.[2] This generation has grown up in a digital-first world, with constant access to the internet, smartphones, and social media shaping their communication, learning, and social interactions. Unlike Millennials, who witnessed the transition to digital technology, Gen Z has never known a world without it. They are characterized by their ability to multitask across multiple screens, preference for visual and short-form content, and a desire for instant access to information. Gen Z is also highly diverse, socially conscious, and values inclusivity, mental health awareness, and authenticity in their interactions. In education, they prefer interactive, tech-driven learning experiences and may struggle with traditional lecture-based methods due to the influence of constant digital stimulation.[3,4]

Strong evidence suggests that today's students have shorter attention spans, largely due to increased engagement with digital technology and the virtual world. Research indicates that adolescents who frequently engage in media multi-tasking exhibit more attention problems and are more easily distracted during academic activities. The phenomenon known as "TikTok Brain" suggests that platforms featuring short-form videos may impair children's ability to engage in activities that do not offer instant gratification, potentially leading to reduced attention spans.[5] Research further shows that the average person's attention span when using a digital device has decreased from about two and a half minutes in 2004 to just 47 seconds today—a 68% reduction over two decades.[6] A systematic review found that excessive screen

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time is associated with attention problems, emphasizing the need for parents and teachers to manage screen exposure.[7,8] Additionally, studies including a meta-analysis show that there is a statistically small relationship between children's media use and ADHD-related behaviors.[9,10] Meta-analyses indicate a weak but significant link between social media use and mental health issues like depression and anxiety, though causality remains unclear.[11] Thus, there is a correlation between increased digital media usage and reduced attention spans, underscoring the importance of monitoring and managing screen time to support healthy cognitive development.

Further previous studies have pointed out the decline in empathy among medical graduates.[12] Empathy is a significant aspect contributes to patient-doctor relationship which depends on trust. Trust can be built by proper communication skills and understanding of social and economic aspects of patients. Students are overwhelmed by constant information from social media and notifications, which promotes short bursts of focus rather than deep concentration. This multi-tasking habit can hinder sustained attention on important tasks. Digital platforms encourage quick, surface-level engagement, such as videos and memes, which make it difficult for students to focus on long texts or complex concepts that require deep reading. Instant answers from virtual platforms and AI tools reduce students' patience for problem-solving and deep thinking, making traditional methods like textbook reading feel slow in comparison. In-person learning settings, which include non-verbal cues like body language, are more engaging than virtual environments, where students are more likely to disengage.[13] Shortened attention spans and fewer face-to-face interactions affect critical skills in medical education, such as diagnostic reasoning and patient interaction. The increased reliance on simulations and digital platforms reduces real-world exposure for students. As a result, hands-on mentorship and apprenticeship-style learning are declining. This creates the risk of developing doctors who possess extensive theoretical knowledge but lack practical experience. Blending digital tools with active learning methods can help maintain focus and improve student outcomes. The studies have proposed importance of problem-based learning to enhance critical thinking in zoomers.[14] In this article we narrate importance of observation and propose observation-based learning model with more emphasis on observation skills and also a model for assessing observation skills. This is essential for not only the enhancement of the scientific domain but also artistic domain of medical students.

Observation

Observation in clinical postings refers to the process of actively watching and analyzing patient interactions, clinical signs, and medical procedures to develop diagnostic, communication, and decision-making skills. It involves watching experienced doctors perform history-taking, physical examinations, and procedures professionals.[15] Observation in clinical practice involves noticing key patient symptoms and signs, such as pallor, cyanosis, breathing patterns, and gait, which provide important insights into their condition. It also includes assessing the doctor-patient interaction and bedside manner, which can significantly influence patient care. Additionally, observation helps in understanding clinical reasoning by following case discussions and learning differential diagnosis approaches. Lastly, it allows students to familiarise themselves with procedural techniques before performing them under supervision, ensuring a more comprehensive learning experience.

Dimensions of Observation in Clinical Postings

1. Passive Observation – Watching without direct involvement (eg, observing a surgery).
2. Active Observation – Asking questions, correlating clinical signs with diseases, and engaging in discussions.
3. Bedside Observation – Noticing patient behavior, responses, and non-verbal cues during interactions.

Effective observation helps bridge the gap between theoretical knowledge and practical application in medicine.

Observation While History Taking and Physical Examination

In medical postings, observation plays a critical role across various specialties. In cardiology, it involves assessing jugular venous pressure (JVP), oedema, and heart sounds. In neurology, it includes noticing abnormalities in eye movement, posturing, gait, tremors, and reflexes. In respiratory medicine, observing breathing patterns, the use of accessory muscles, and signs of cyanosis is essential. In infectious diseases, recognizing rash patterns, fever responses,

and signs of sepsis are key indicators. While observation is crucial, it cannot fully replace history-taking, but it serves as an important complement to gather a more comprehensive understanding of a patient's condition (Table 1).

Observation and inspection are related but distinct concepts in clinical practice. Observation involves continuously monitoring a patient's condition, behavior, and response to treatment, using various sensory inputs like sight, sound, and body language. Inspection, on the other hand, is a specific visual assessment focused on external physical features, such as skin color, symmetry, or visible signs of disease, typically performed at the start of a clinical examination. (Table 2) Observation encompasses inspection as part of the broader clinical assessment, with inspection being a specific act of visual examination. While inspection focuses on physical signs, observation also includes other clinical clues, such as those gathered through history-taking and non-verbal patient cues. In medical practice, inspection is a key technique within the broader process of observation, which is essential for developing clinical skills, diagnostic reasoning, and effective patient interactions during medical training.

When Is Observation Useful in Place of History Taking?

1. Non-verbal Patients – Infants, unconscious patients, or those with communication impairments. Observation-based learning plays a crucial role in clinical decision-making, especially in an era where virtual learning dominates medical education. The process begins with initial observation, where the clinician carefully examines the patient, their surroundings, and available medical equipment such as oxygen masks, nebulisers, drugs, reports, and prescriptions. The context of the case must then be established—whether the patient was brought in as an emergency, a planned consult, or a walk-in outpatient visit. Following this, silent history-taking is conducted by closely observing the patient's behavior, responses, and any subtle clues about their condition. This is followed by a thorough clinical examination, which involves assessing the patient systematically and generating differential diagnoses (D/D) based on key observations (Table 3).
2. Deceptive History – When a patient is withholding information (eg, malingering, altered mental state).
3. Acute Emergencies – When there's no time for history, observation helps rapid decision-making (eg, trauma, stroke).
4. Mental Health Assessment – Observing behavior, affect, and thought patterns in psychiatric cases.

Among these we describe a case of non-verbal patient (Supplementary Figure 1) as one such example of a delirious patient. In this case study we explore the possibility of increasing observation skills among students.

Table 1 Salient Feature of Observation and History Taking

Aspect	Observation	History Taking
Definition	The clinician watches the patient's physical signs, behavior, and interactions	Systematic questioning of the patient to gather subjective information
Type of Data	Objective (eg, gait, facial expressions, breathing pattern)	Subjective (eg, symptoms, pain description, history of illness)
Reliability	High for visible signs but limited for internal symptoms	Dependent on patient's recall and communication
Limitations	Cannot assess pain, sensations, or past medical history	Patient responses may be biased or incomplete

Table 2 Key Differences Between Observation and Inspection

Aspect	Observation	Inspection
Definition	Broad, ongoing monitoring of a patient's condition, behavior, and responses	Focused visual examination of the patient's physical appearance
Scope	Includes visual, behavioural, and even auditory cues	Primarily involves the sense of sight
Application	Can be performed over time, during various interactions	Performed as a part of the physical exam, typically at the start

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Table 3 The Framework for Observation-Based Learning for Non-Verbal Patients During Clinical Postings

Steps	Inference
Initial Observation	Observe the place, person, surroundings, monitor, and devices (O_2 mask, nebuliser, etc.); Identify whether the patient was brought as an emergency, for a planned consultation, or as a walk-in OPD case; presence or absence of aids, drugs, reports, prescriptions
Silent History Taking	Gather information without directly questioning the patient initially, based on available cues.
Thorough Clinical Examination	Conduct a comprehensive physical exam and note differential diagnoses (D/D) for each key observation.
Clinical Diagnosis (DX) Based on Key Observations	Formulate a preliminary diagnosis and list differential diagnoses (D/D) for each key observation.
Pyramidal Approach to Diagnosis	Combine all observations and form a pyramid to indicate the relative importance of each component in diagnosis.
Selection of Appropriate Lab Tests	Choose laboratory tests based on key clinical observations to confirm the diagnosis and guide treatment planning.
Selection of Appropriate Treatment (RX)	Identify suitable drugs and treatment strategies based on key observations up to this point.
Formulating a Composite Diagnosis	Integrate findings to establish a final, comprehensive diagnosis
Justifying the Treatment Plan	Provide a rationale for the chosen treatment, ensuring it aligns with the diagnosis and best clinical practices.

With each clinical observation finding, potential diagnoses are considered. For example, confusion and slurred speech might suggest alcohol withdrawal, metabolic abnormalities, or a neurological cause. If the patient is lying supine without signs of respiratory distress, conditions like CHF, pneumonia, or COPD exacerbation become less likely. An upward leftward gaze with a blank stare could indicate hallucinations due to alcohol withdrawal or focal seizures from a right frontal lobe irritative focus. The absence of paralysis but the presence of limb movement suggests that central nervous system involvement is minimal. A patient gesturing for water while having no food tray or NG tube could indicate a planned surgical procedure. Other environmental clues, such as the presence of a monitor, urine catheter, air bed, and IV line, suggest that the patient requires close supervision, accurate urine output monitoring, and possible interventions for infection prevention.

Observations on the monitor provide vital clues—tachycardia (HR 110/min), hypotension (BP 80/50 mmHg), reduced tissue perfusion (MAP 60, CRT 4 sec), and normal respiratory rate (RR 18/min) suggest a state of shock. The combination of unexplained tachycardia, hypotension, and sepsis-related immunosuppression raises suspicion for septic shock, possibly leading to multi-organ failure (MOF) affecting the kidneys and brain. Clinical examination further refines these impressions—absence of fever does not rule out infection in an immunosuppressed alcoholic patient. The presence of cellulitis and septic arthritis, along with malnutrition-related edema, suggests a heightened risk of infection.

A detailed physical examination of the face, neck, chest, abdomen, and limbs allows for further refinement of the diagnosis. The face reveals confusion, thirst, and occasional grimacing, indicating pain of uncertain origin. Neck examination rules out significant lymphadenopathy, elevated JVP, or airway compromise. The chest findings—bilateral symmetrical movement, normal breath sounds, and absence of murmurs—exclude conditions like CHF, pneumonia, asthma, or COPD. Abdominal findings, including the absence of distension, hepatosplenomegaly, or tenderness, rule out peritonitis, cirrhosis, and ascites. Examination of the upper and lower limbs highlights erythema, tenderness, and asymmetrical warmth, suggesting cellulitis and possible septic arthritis of the left ankle, as well as DVT of the right leg. Neurological assessment indicates confusion, potential Korsakoff psychosis, and alcohol withdrawal symptoms like tremors and insomnia.

With these observations, the bench-to-bedside connection is established. The priority diagnosis includes septic arthritis leading to sepsis and septic shock, accompanied by multi-organ damage, malnutrition, immunosuppression, and alcohol withdrawal syndrome. The selection of appropriate lab investigations follows: blood cultures, joint aspiration studies, CRP, procalcitonin, and imaging for infection, along with renal and hepatic function tests to assess systemic

involvement. Additional investigations such as Doppler imaging for DVT, MRI for potential brain involvement, and nutritional assessments are also warranted.

The final composite diagnosis integrates the anatomical, pathophysiological, and etiological components: septic arthritis with sepsis and septic shock, multi-organ dysfunction, malnutrition-related immunosuppression, alcohol withdrawal with possible Korsakoff psychosis, and risk of DVT. Justifying the treatment plan involves addressing the underlying infection, providing supportive therapy, managing comorbidities, and ensuring long-term interventions such as alcohol counseling and nutritional rehabilitation.

In medical education, structured observation-based learning enhances clinical reasoning by reinforcing the importance of meticulous observation, logical deduction, and evidence-based decision-making. In an age where virtual learning is increasingly prevalent, training students to develop keen observational skills remains critical to producing competent and well-rounded clinicians. Hence, we propose the clinical case examination of such non-verbal patients to enhance observation skills for medical students during year 2 and beyond.

Observation Skills and Enhancement of Artistic Domain of Medical Students

Students with higher academic levels exhibited lower social media addiction, while those who were addicted found social media beneficial for enhancing their grades.[16] Further, there is a need for enhancing the artistic side of medicine which seems to be decreasing making it, a pure science.[17] Exposure to drama, humanities, fiction, especially humour-related literature would positively increase empathy.[17,18] However, Fiction influences a reader's empathy, but only when emotional transportation into the story occurs.[19] The Art Rounds, an interdisciplinary program using visual thinking strategies (VTS) and fine art, has been shown to enhance not only observation skills, but also tolerance for ambiguity, and communication among health professional students.[20]

Hence there is need for overhaul of medical education to enhance empathy among medical students and also to prevent emergence of natural stupidity.[21,22] We propose observation-based learning/teaching and assessment for medical students to evaluate empathy and other non-measurable essentials for a doctor.

A real doctor and a doctor robot (LLM-based AI) differ fundamentally in their capabilities, particularly in clinical judgment, empathy, hands-on skills, and ethical responsibility. A human doctor relies on intuition, experience, and case-based reasoning to make complex decisions, while an AI-based system can only generate responses based on pre-existing data without real-time adaptability. One of the most critical distinctions is emotional intelligence and empathy. A real doctor can provide genuine compassion, cultural sensitivity, and patient support, which are essential for building trust and ensuring adherence to treatment. In contrast, a doctor robot may mimic empathetic language but lacks true emotional understanding or the ability to interpret non-verbal cues. Another major limitation of AI is the lack of physical examination skills. A real doctor can perform palpation, auscultation, reflex testing, and surgical procedures, which are essential for accurate diagnosis and treatment. AI, on the other hand, depends solely on textual or image-based data inputs and cannot physically interact with patients. Observation based methods should be employed more to enhance the emotional intelligence and empathy domains of a medical students.

What Can Be Done?

Observation skills are essential in enhancing the soft skills of medical students, as they not only improve clinical reasoning but also foster empathy, communication, and professionalism. Active learning strategies, such as problem-based learning (PBL), clinical case discussions, and hands-on skills training, encourage students to engage deeply with clinical scenarios and practice observation in real-world contexts. Mindful use of technology can help reduce distractions, allowing for focused learning sessions. Hybrid learning models that combine virtual tools with real-world, observation-based education are crucial to maintain a balance. While virtual tools offer valuable resources, they should supplement, not replace, real-time observation, which is indispensable for honing diagnostic skills and patient interaction. Therefore, hybrid models that integrate structured clinical observation with digital learning, along with policies promoting bedside learning and direct patient interaction, are key to enhancing medical education.

Similarly, there are studies emphasizing the Visual Thinking Strategies (VTS) which is a structured, evidence-based method that uses guided discussion of artworks to enhance observation, reasoning, and communication skills, tailored for improving clinical observation.[23] The study found that integrating Visual Thinking Strategies (VTS) and Visual Thinking Activities (VTA) significantly improved medical students' short-term observation skills compared to traditional exercises. While long-term differences in total observations and word count faded after clinical exposure, the intervention group continued to spend more time describing their observations, suggesting VTS may promote deeper reflective engagement in clinical settings.[24] Further, VTS could also reduce the burnout among health professional students.[25] The study found that VTS significantly improved observation, communication, and empathy skills among nursing students and medical residents, while also reducing burnout.[25] The results support VTS as a valuable tool in health professions education.

Assessing Observation-Based Learning

Since Observation-Based Learning (OBL) involves students learning by watching experienced professionals, assessment should focus on their ability to process, analyze, and apply what they observe. Here are different ways to assess this type of learning. The levels of medical students and appropriate assessment methods are summarized in Table 4.

Image-Based Reasoning and Interpretation

Image-based reasoning and interpretation are essential assessment methods for premedical students, offering a valuable approach to developing diagnostic skills. The image-based reasoning exercises can be as the one in Supplementary Figure S1. These type of assessment can be used for premed students to enhance their observation skills.

These assessments foster critical thinking, as students must use their knowledge of anatomy, physiology, and pathology to form hypotheses and make diagnoses. They also simulate real-world scenarios, preparing students for the types of tasks they will encounter in clinical practice. The process encourages attention to detail, as small changes in images can have significant clinical implications. Interactive learning tools may also be employed to allow students to engage with images in dynamic ways, improving spatial awareness and understanding of complex structures. Image-based assessments offer an objective, standardized method of evaluating diagnostic skills, complementing traditional forms of evaluation like written exams. The

Table 4 Observation-Based Teaching Learning Assessment (TLA) Methods to Enhance Scientific and Artistic Domains of Medical Students

	Teaching	**Learning**	**Assessment**
Pre- med	Bed side observation – virtual simulation based	Bed side observation – virtual simulation based	Image-Based Reasoning and interpretation
1st year	Hospital visits- patients/ clinical role model observation based	Observation-Based Learning – Students learn by watching experienced professionals in action.	Learning-Oriented Assessment (LOA) observed by assessors
2nd year	Hospital visits- patients- observation based	Situational Learning – Learning occurs in the actual clinical environment, shaped by real-life cases.	Case-based reasoning and interpretation
3rd year	Silent history taking	Reflective Learning – Students reflect on their experiences to deepen their understanding.	Reflective Assessments Reflective Journals: Students write about key takeaways, clinical reasoning, and how they might apply what they observed. Guided Reflection Questions: Structured prompts (eg, "What was the key learning from this case?" or "How did the doctor approach patient communication?")
4th year	Apprenticeship to duty doctors	Cognitive Apprenticeship – Students learn through guided participation and mentorship	Questioning and verbal assessment Self and peer assessment

method also supports peer learning and collaboration, as students can discuss their interpretations and refine their reasoning. Overall, incorporating image-based reasoning into premedical education enhances students' readiness for medical school and clinical training, ensuring they are well-prepared for future patient care challenges.

Learning-Oriented Assessment

Learning-Oriented Assessment (LOA) focuses on both evaluating and promoting continuous learning. It emphasizes the learning process, encouraging reflection and self-improvement rather than just final outcomes. In medical education, LOA allows assessors to provide ongoing, constructive feedback, helping students identify strengths and areas for growth. It promotes active learning and adaptability, with assessors guiding students through challenges and reinforcing positive learning behaviors. LOA fosters lifelong learning and professional development, making it an essential tool for developing both technical and critical thinking skills in healthcare professionals.

Case-Based Assessment

Case Analysis: Present a similar case and ask students how they would approach it based on their observations.

Problem-Solving Exercises: Give a modified scenario and ask students to identify key steps, decisions, or ethical considerations.

Direct Application & Skill Demonstration in Simulated Practice: After observation, students demonstrate a related skill (eg, patient interaction, diagnosis discussion).

OSCE (Objective Structured Clinical Examination): Students are assessed on their ability to replicate observed behaviors in controlled settings. The direct observation of students in workplace is a realistic assessment of students.[26]

Reflective Assessments

Reflective Journals: Students write about key takeaways, clinical reasoning, and how they might apply what they observed. Guided Reflection Questions: Structured prompts (eg, "What was the key learning from this case?" or "How did the doctor approach patient communication?").

Post-Observation Discussions: Facilitated discussions to encourage critical thinking and self-awareness.

Questioning & Verbal Assessment

Oral Viva or Q&A Sessions: Faculty ask students to explain what they observed, why certain actions were taken, and their implications.

Socratic Questioning: Instructors probe deeper into their reasoning (eg, "Why do you think the doctor chose that treatment plan?").

Self and Peer Assessment

Self and Peer Assessment: Students rate themselves and peers on their learning and interpretation of observed behaviors.

Evaluating Cognitive Apprenticeship involves assessing how well learners observe, understand, apply, and transfer knowledge in real-world settings. Formative assessments play a key role in ongoing evaluation, where mentors observe students in action, provide feedback, and encourage self-reflection. Methods such as reflective journals help students document their learning experiences, while think-aloud protocols allow them to verbalize their reasoning processes, making their cognitive development more transparent.

For summative assessment, performance-based tasks, such as Objective Structured Clinical Examinations (OSCEs) and all types of Workplace-Based Assessment methods and tools, measure how effectively students apply expert strategies in practical scenarios.[27,28] Self and peer assessment further enhance learning, as students critically evaluate their progress and provide feedback to one another. Additionally, mentor-driven evaluations using structured checklists, rubrics, and Socratic questioning help determine whether students have internalized expert reasoning and problem-solving techniques. By combining these assessment methods, educators can ensure that learners are not just passive observers but actively developing expertise through guided experience and progressive independence.

Recommendations

Visual arts training in medical education, especially for preclinical students, shows promise in enhancing observation and diagnostic skills. While methods like VTS are effective, most studies are limited and lack strong evidence for broader outcomes like empathy and communication. Hence there is a strong need for more rigorous research in this arena.[29] Nevertheless, there should also be continued efforts to limit the usage of digital media among medical students to avoid digital depression as suggested by a previous study.[30] Given its pervasive influence, individual-level effects may be difficult to detect, necessitating population-level interventions. For instance, Australia recently enacted a law restricting social media access for youth under 16, offering a unique chance to study policy-driven impacts on mental health. In the same line use of mobile phones need to be restricted during exclusive theory and clinical sessions.

Conclusion

There is a need to place greater emphasis on the vital role of observation-based learning in honing skills, making informed decisions, and promoting professionalism in medicine. Combining observation with active learning is the most effective approach. Passive observation alone is not sufficient. Students should engage by asking questions, correlating findings with real-world cases, and practicing skills under supervision to enhance their learning. Educators and institutions must ensure that real-world observation remains a cornerstone of medical education. It's crucial to mindfully integrate digital learning tools while still prioritising in-person, experiential learning. This balance ensures that students gain the hands-on experience and interpersonal skills necessary for effective patient care and professional growth.

Disclosure

The authors report no conflicts of interest in this work.

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