InteDashboard™

2026 Student Voices in Team-Based Learning

Essay Collection

Table of Contents

Table of Contents

01 How TBL Equipped Me with AI-Proof Skills

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There is something that happens outside exam rooms at every university. Students spill out, pull out their phones, and immediately start comparing answers. "What did you put for question x? Wait, seriously? I put y" It happens whether or not the institution plans for it. Almost instinctive. A need to process together, cross-check, figure out not just whether you were right, but what the question was even asking. I've noticed it throughout years of university studies. What I had not expected was to encounter a learning format that harnesses that instinct, builds it into the structure, and turns it into something genuinely educational.

I'm a second-year medical student at Deakin University. My TBL experience has been embedded in our Public Health and Medicine theme, introduced by our theme coordinator at the very start of the first session last year. She didn't need to explain much; the InteDashboard platform is intuitive enough that the format speaks for itself. But what these sessions gave me over the past year has shifted how I think about collaborative learning, clinical preparation, and what it means to be ready for a career increasingly shaped by artificial intelligence.

The Part I Almost Missed

There was a particular TBL session in Public Health that I keep returning to. We were working on a proposal, one of

those open-ended application exercises that come after the individual and group readiness tests. I read the prompt, formed a clear direction in my head, felt confident about where I was going. And then my team started discussing it, and a teammate pointed out a part of the prompt I had completely missed. It changed the entire framing of our response. If I had been working alone (which, in a traditional assessment format, I would have been), I would have submitted a well-structured answer to the wrong question. My blind spot would have gone undetected. And I'd have had no way of knowing it.

That moment stuck with me for reasons that go beyond the assignment. In medicine, blind spots don't stay academic for long. They become clinical errors. The difference between a safe clinician and a dangerous one is often not about individual knowledge. It is about the presence of other minds checking, questioning, and catching what you couldn't see. TBL rehearses that dynamic in a low-stakes environment, repeatedly, until collaborative scrutiny starts to feel natural before the stakes are real.

The iRAT-gRAT structure is specifically designed to surface the gap between individual preparation and collective reasoning, creating the productive tension where genuine learning occurs (1). I understood this in theory when the format was first introduced. I understood it differently in that session, sitting across from a teammate who had caught what I'd missed. What I took from it was not just a corrected answer. Something more durable: that confidence and accuracy are not the same thing, and that learning to check that gap habitually, while consequences are still low, is probably one of the more valuable habits a student clinician can build.

Skills That Don't Have a Shortcut

There's a tendency in discussions about AI and the future of work to frame human skills (communication, empathy,

adaptability, critical thinking) as consolation prizes for what machines can't yet do. In medicine, that framing doesn't hold. These are not peripheral competencies. They are the clinical skill set.

Knowing how to have a conversation with a patient who is scared and processing difficult news, that is clinical work. Managing the interpersonal dynamics of a team disagreement under time pressure: clinical work. Recognising that your own reading of a situation might be incomplete and being secure enough to say so. One of the hardest and most important things a clinician can do. TBL develops all of these, but indirectly, which I think is why it works. You're not taught to "communicate better" in the abstract. You're placed in a situation that requires it, under gentle but real accountability, and you work it out.

After years of standard university assessments (including plenty of group assignments I genuinely dreaded, because most rewarded passengers as much as contributors), the TBL sessions in my Public Health theme became my favourite form of assessment. Because they didn't feel like assessments! They felt like thinking. The iRAT-gRAT structure makes individual accountability non-negotiable; you cannot coast on your group's understanding. And the collective phase produces something no individual effort could have reached alone. That combination is difficult to replicate in a traditional exam. It is essentially impossible to replicate with AI.

Two qualities in particular: sound judgment and leadership. Sound judgment (the ability to make a call when information is incomplete, when the situation is ambiguous, and when waiting is not an option) is rehearsed every time a TBL group has to commit to an answer under time pressure without full certainty. That feeling of "we don't have everything but we have to decide" is one of the most clinically realistic things I've encountered in a classroom.

Leadership, meanwhile, doesn't always look like being the loudest voice. In our group sessions, it often looked like structuring what had already been said, synthesising competing ideas, and helping the team find its direction. That kind of leadership, facilitative rather than directive, is precisely what clinical teams need. And it's a role I found myself taking on naturally across these sessions, since the format very comfortably created space for it.

What InteDashboard Actually Made Possible

A lot of what makes TBL effective comes down to feedback density and InteDashboard is what makes that density achievable. The hallway debrief I described at the start (that instinctive post-exam comparison students seek out whether or not the institution designs for it) now happens inside the session, with educational structure built in. The group readiness assurance test turns "what did you put for that one?" from corridor noise into real-time collaborative reasoning. That shift matters so much more than it sounds.

There is also something important about the individual readiness assurance test that precedes it. Going to a session knowing you will be tested individually first changes the preparation mindset entirely. You come in having done the reading, because the cost of not doing it is visible and immediate. That kind of accountability, built into the format rather than policed externally, is one of the more effective things I have experienced in a learning environment.

Beyond the structure, InteDashboard creates a kind of visibility into collective understanding that individual assessment simply cannot provide. When multiple groups within a cohort converge on the same incorrect answer, that is a meaningful signal, for students and for educators, about where understanding breaks down. It produces a more honest picture of what a class actually knows, and points educators toward

where teaching needs to go next. This is especially relevant in medicine, where collective gaps in knowledge about a clinical concept can have the same pattern as individual ones, and are far better addressed when made visible.

The peer evaluation component is something I want to name specifically. At the end of each TBL, teammates assess each other using a structured rubric. The feedback I received across our sessions included specific observations: contributing useful resources, helping structure the group's responses under time pressure, generating ideas that moved the discussion forward. What that feedback tells me is something a grade alone cannot: how I function within a team, and where my contributions actually land. That is a genuinely different kind of accountability than individual performance pressure. Figure 1 below shows the evaluation output from one of our sessions.

The Clinical Future I'm Preparing For

The healthcare environment I am training to enter will be AI-integrated in ways that are still emerging. Diagnostic algorithms, imaging analysis, risk stratification, documentation and note-taking automation: AI already handles tasks it handles well, and will handle more. I don't think the right response to that is resistance. I think AI integration raises the stakes on everything it cannot do.

The clinical situations that will demand these skills are not hypothetical. A hospital ward brings together doctors from different specialties, nurses, pharmacists, social workers, each trained differently, each seeing the patient through a different lens. Presenting a clinical assessment clearly enough to shift that room's thinking is a skill. Making an ethical call about a patient's care when the evidence is ambiguous and the family's values complicate the picture: that requires sound judgment and genuine empathy, not pattern-matching. And when two senior clinicians disagree and a junior has to navigate that

tension without destabilising the team, that is a real leadership moment. None of these are rare in medicine. TBL gave me structured rehearsals of all of them, in the form of public health proposals rather than ward rounds, but with recognisably the same underlying demands: synthesise quickly, communicate clearly, navigate disagreement, make a call.

What AI will not do is sit with a patient who is frightened and help them process a diagnosis they weren't expecting. It will not manage the relational complexity of a multidisciplinary team under pressure, or notice that a colleague is struggling and quietly step in. Complex problem-solving, critical thinking, and collaborative reasoning remain among the most resilient human competencies in an AI-integrated economy (2). In medical education specifically, TBL has been associated with meaningful improvements in clinical reasoning and professional skill development (3), exactly the capacities that remain irreducibly human in a clinical context.

What I'd add from experience is that TBL trains something harder to name: a kind of epistemic humility. The learned willingness to hold your own interpretation lightly enough to let a teammate's perspective genuinely change it. In a hospital team, that translates directly. A junior doctor who can say "I might be missing something here, what do you see?" is a safer practitioner than one who can't, regardless of technical knowledge. TBL gave me enough repetitions of that dynamic that it has started to feel natural. That is not a small thing.

What I'm Taking Forward

I came into medical school comfortable working independently and wary of group work, not because I don't value collaboration, but because most collaborative assessment formats I'd encountered didn't actually assess it. They distributed a task across people and added social friction. TBL was different. It genuinely required the group, made individual contributions

visible and accountable, and produced something collectively that no individual could have built alone.

That experience shifted something. Not just in how I approach assessment, but in how I think about clinical practice. The most effective clinicians, in everything I have encountered so far, are the ones who are genuinely collaborative. Who check themselves, use their teams, stay curious about what they might have missed. TBL has been the most practical preparation I've had for becoming that kind of clinician.

AI will keep improving at the tasks it already handles well. The question for my generation of doctors is not whether to work alongside it, but what distinctly human value we bring to the partnership. I think that value is relational, contextual, and not replicable: the capacity to reason with other people under uncertainty, adapt when our assumptions are wrong, make sound judgments when the evidence is imperfect, and stay present in the parts of healthcare that data alone cannot navigate. TBL gave me a structured space to practice being that kind of thinker. And honestly, it's the first time in years of university that I've genuinely looked forward to an assessment.

02 Learning Beyond the Right Answer

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I have spent the past year learning in a curriculum centered around Team Based Learning (TBL). Through repeated TBL sessions, I have seen how the structure depends on preparation, accountability, discussion, and application. At the same time, artificial intelligence is rapidly reshaping how students learn and study. These parallel developments have made me interested in how medical education can evolve alongside emerging technologies while still preserving the human accountability and team-driven skills that define effective physicians.

This interest led me to participate in a medical education research project examining how pre-clinical medical students use conversational artificial intelligence tools as "virtual study partners." The project explores whether students are increasingly replacing traditional group study and peer discussion with large language models such as ChatGPT. As I became more involved in the project, I began thinking more critically about a difficult question: if AI can summarize information, generate explanations, quiz students, and provide instant feedback, what is still uniquely valuable about learning with other human beings? Over the course of my first year, I realized the answer extends far beyond simply arriving at the correct answer. TBL taught me how to

communicate under uncertainty, listen to competing explanations, build trust through preparation, and accept accountability within a team. These are skills that AI can support, but cannot fully replace.

At OUWB, our TBL sessions begin with an Individual Readiness Assessment Test, or iRAT, where students independently complete a timed quiz based on assigned pre-work. Afterward, we immediately retake the same quiz as a team during the Team Readiness Assessment Test, or tRAT. For our grade, the team portion carries more weight than the individual portion, emphasizing collective accountability over isolated performance. This process reflects the social construction of knowledge: each student brings preparation into a group setting, and the team builds a stronger understanding through discussion and explanation. InteDashboard supports this process by making the structure immediate and transparent. Instead of waiting days for feedback or using older scratch-card methods, our teams submit answers through the platform and receive instant confirmation. That immediate response creates a memorable "moment of truth" for the team, whether it produces validation, surprise, or a collective groan.

The readiness assurance process is only the beginning. After the iRAT and tRAT, much of a two-hour TBL session is spent on application exercises, which are intentionally more difficult and clinically oriented. These exercises follow the core TBL framework of significant problems, same problem, specific choice, and simultaneous reporting. The problems are significant because they require students to apply knowledge to realistic clinical scenarios rather than simply recall facts. Every team works on the same problem at the same time, and each team must make a specific choice before reporting its answer simultaneously to the class. During multiple-choice application exercises, teams physically raise colored answer cards so the entire classroom can

immediately visualize differences in reasoning across groups. During free-response or image based application exercises, InteDashboard further supports simultaneous reporting by displaying team responses in real time, allowing the class to compare interpretations, discuss disagreements, and evaluate different clinical approaches together.

One application exercise during our hematopoietic-lymphoid organ system course fundamentally changed how I viewed teamwork and the limitations of artificial intelligence. It was the first TBL session with my new winter-semester team. During the fall semester, I had worked with a different group of classmates, so this session represented a fresh start socially and academically. The topic for the session was carbon monoxide poisoning. Before class, we had reviewed lecture slides related to hemoglobin physiology and completed supplementary reading from UpToDate discussing smoke inhalation. Like many medical students today, I had also used AI while preparing. I uploaded the supplementary material into ChatGPT and asked it to help identify likely testable concepts and important clinical associations. One recurring idea it emphasized was the association between smoke inhalation and cyanide poisoning. That detail stood out to me, but I did not stop at the AI-generated summary. During my pre-work, I returned to the reading and ensured I understood the mechanism more clearly: enclosed-space fires involving synthetic materials can release cyanide, which impairs cellular respiration and can cause severe toxicity despite oxygen delivery.

The iRAT and tRAT went smoothly. My team worked efficiently, and we reached consensus quickly on the readiness questions. The more meaningful discussion emerged later during an application exercise. The case described a patient involved in a house fire who was being transported to the emergency department. We were asked to identify the most

likely underlying condition or complication affecting the patient. I selected cyanide poisoning, and another student agreed with me. The remaining four members of our six-person team initially favored a different answer, possibly methemoglobinemia. At first, it would have been easy to treat the discussion as a vote and move on. We were outnumbered four-to-two. Instead, I asked whether we could slow down and hear both sides before finalizing our team's specific choice.

That was when the value of TBL became most obvious. I listened as the other four students explained why they preferred the alternative answer. Their reasoning was not careless, but it did not fully account for the clinical details in the case or the supplementary reading. Some had relied more heavily on the lecture slides and had not reviewed the additional material as closely. Rather than insisting I was correct, I tried to respond to their reasoning. I explained why smoke inhalation in a house fire raised concern for cyanide toxicity, how this differed from the alternative diagnosis, and why the context made cyanide poisoning the stronger answer. The discussion forced me to integrate what I had learned from AI-assisted preparation, the assigned reading, and my classmates' objections in real time.

This experience taught me that trust in a team is earned, not given. If I had only said, "Trust me, AI flagged this," I would not have deserved the group's confidence. The more meaningful skill was translating preparation into a clear explanation that helped my teammates understand the reasoning for themselves. In that moment, TBL became a form of peer teaching. I was not just trying to win a debate. I was trying to teach the concept well enough that the group could make a shared decision. At the same time, my classmates were teaching me by challenging my explanation, forcing me to clarify gaps, and making sure our final answer was not based on

overconfidence. The team eventually moved from a divided four-to-two split to a shared decision to select cyanide poisoning.

When we submitted the answer through InteDashboard and saw the confirmation, I reacted before I could stop myself. I remember blurting out, “Let’s go!” almost immediately. I felt relief, excitement, validation, and pride, but I also felt grateful that my classmates had given my explanation a fair hearing. The platform mattered because the immediate feedback reinforced the learning cycle. InteDashboard did not just record whether we were right or wrong. It made the team’s decision visible, timely, and memorable. Once the broader class responses appeared, the discussion naturally shifted from intrateam reasoning to interteam discussion. Comparing answers across groups encouraged us to defend our reasoning, evaluate alternative approaches, and continue refining our clinical interpretation as a larger learning community.

For the rest of the semester, our group discussions felt noticeably different. My teammates did not suddenly assume I was always correct, which would defeat the purpose of collaborative learning. Instead, the experience made our group more willing to slow down, explain reasoning, and listen carefully when someone had a minority view. We learned that productive collaboration is not simply majority voting or rapid consensus. It requires accountability and the humility to consider that a quieter or outnumbered voice may still have the stronger explanation. We also learned that team spirit is built through repeated moments like this, where members contribute, challenge one another, and improve together. Difficult application questions sometimes continued into hallway conversations, bonding us through shared struggle and curiosity.

This experience also helped me understand my research question about AI and group learning more clearly. AI can provide

information instantly. It can summarize textbooks, generate flashcards, create practice questions, and explain concepts conversationally. In many ways, conversational AI models now mimic several educational functions traditionally fulfilled by peers and study groups. Educational literature has demonstrated that peer-assisted learning and collaborative group study can improve engagement, retention, and application of knowledge in medical education.1,2 Researchers have also begun examining how conversational AI models may replicate components of active learning through iterative dialogue, retrieval practice, clarification, and feedback.3 That overlap is what makes AI so exciting as a learning tool, but it also highlights what remains distinct about human learning environments.

My experience in TBL showed me that collaborative learning is not valuable only because it helps students get the answer right. It is valuable because it develops real-time integration of knowledge. During the application exercise, I had to listen to my teammates, analyze their explanations, compare them with my own understanding, and present a counterargument that was accurate and understandable. A chatbot can respond to prompts, but it does not recreate the interpersonal pressure of explaining yourself to five peers who may disagree with you. It does not help you practice earning trust from people who have their own knowledge, doubts, and personalities. It also does not recreate the accountability of knowing that your explanation affects your team's shared decision.

I believe AI will continue transforming medical education for the better. However, my experiences in medical school have taught me that using AI judiciously still depends on strong foundational human skills. Researchers have increasingly warned that while AI can accelerate learning efficiency, students still need reasoning and evaluation skills to assess AI-

generated information and recognize inaccuracies.4I have seen large language models hallucinate citations and confidently provide flawed explanations. AI excels at pattern generation and prediction, but it does not truly understand context or consequence in the way humans do. Ultimately, the value of AI depends heavily on the judgment of the person using it.

Experiences like this are why I believe TBL remains important in an increasingly AI enabled world. TBL develops skills that are fundamentally interpersonal and difficult to automate: communication, accountability, adaptability, leadership, persuasion, emotional intelligence, and what some educators now describe as social quotient (SQ), the ability to work effectively and thoughtfully within human relationships and teams. These skills are central to medicine. Patients will increasingly arrive at appointments having already searched symptoms online or used AI tools to better understand possible diagnoses. Physicians of the future will not simply compete against AI-generated information. They will help patients interpret information, navigate uncertainty, make difficult decisions, and feel understood as human beings.

Modern healthcare also depends on interprofessional collaboration. Physicians work with nurses, pharmacists, therapists, social workers, consultants, administrators, and, most importantly, patients. Clinical decisions often involve ambiguity, disagreement, incomplete information, and competing priorities. In those situations, technical knowledge alone is insufficient. The ability to build trust within a team becomes essential. My experience during that TBL application exercise demonstrated this clearly. The most important part of the session was not memorizing an association between smoke inhalation and cyanide poisoning. It was learning how to prepare well, explain clearly, listen

carefully, teach peers, and earn trust through sound reasoning.

Artificial intelligence may continue evolving into an increasingly sophisticated educational partner. I welcome that future, and I expect AI to remain part of how I learn and practice medicine. Yet the skills that make teams effective, workplaces functional, and physicians trustworthy remain deeply human. TBL helped me recognize that while AI can strengthen many aspects of learning, it cannot replace the experience of working through uncertainty with other people. Learning beyond the right answer means learning how to think with a team, build trust through preparation, and communicate in a way that helps others move forward with you. Those skills will matter long after the next technology changes how students study.

03 How TBL Equipped Students with AI-Proof Skills

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Some of the most meaningful parts of my education have come through Team-Based Learning (TBL). Like many students in medicine, I spend a great deal of time memorizing facts, reviewing mechanisms, and trying to connect classroom material to real patient care. What made TBL stand out to me was that it demanded much more than simple recall. It required preparation, teamwork, communication, judgment, humility, and the ability to make decisions under uncertainty. Those are the very skills that matter most in medicine and, in my view, the same skills that will remain essential in a future where artificial intelligence becomes more common in education and the workplace.

I was introduced to TBL in medical school through courses that used InteDashboard. The structure quickly became familiar: pre-work before class, an individual readiness assessment, a team readiness assessment, clarification with faculty, application exercises, and peer evaluation. That sequence is central to TBL because it moves students from passive preparation to active decision-making with others. Rather than simply asking, “Do you know the answer?”, TBL asks, “Can you defend your reasoning, listen to competing interpretations, and arrive at the best answer as a team?” That is a very different kind of learning, and it is one that mirrors real clinical work.

One of the biggest lessons TBL taught me is that knowledge alone is not enough. In medicine, the strongest student in the room is not always the one who memorized the most facts; often, it is the one who can communicate clearly, recognize uncertainty, keep a group focused, and help others reason through a difficult problem. AI can retrieve information quickly, summarize articles, and even suggest likely diagnoses, but it cannot fully replace the human process of building trust within a team, sensing when another person is confused or hesitant, and adjusting one's communication to help the group move forward. Those interpersonal skills are not extras. They are part of safe and effective patient care.

TBL strengthened my teamwork skills in a way that traditional lectures never could. During individual readiness assessments, I had to commit to my own understanding. During team readiness assessments, I then had to explain why I chose an answer and listen carefully when others disagreed. Sometimes I realized I had misunderstood a concept; other times I had to persuade my team that a tempting answer was wrong. Those moments taught me how to disagree productively. Instead of treating disagreement as conflict, I began to see it as a tool for better reasoning. In a clinical setting, that matters enormously. Physicians constantly work with classmates, residents, nurses, pharmacists, and attendings who may see a problem from different angles. TBL trained me to treat those differences as assets rather than obstacles.

Leadership was another skill that developed naturally through TBL. I do not mean leadership only in the formal sense of being the loudest person or the designated spokesperson. TBL showed me that leadership can also mean keeping the discussion organized, inviting quieter teammates to speak, summarizing the group's reasoning, or helping the team move from confusion to a decision. In some sessions, I led by speaking up early. In others, I led by stepping back and creating

room for someone else who had a stronger grasp of the material. That kind of flexible leadership is especially important in an AI-enabled world, where human professionals will still need to interpret information, set priorities, and take responsibility for decisions that
affect other people. Employers continue to rank analytical thinking, resilience, flexibility, leadership, social influence, empathy, and lifelong learning among the most important capabilities in the coming years, even as AI-related skills rise in importance.

The clearest example of these "AI-proof" skills becoming real for me came during a cardiology-focused learning project centered on ECG interpretation. ECGs are a perfect example of material that can feel intimidating at first. Students often memorize isolated rules without developing a confident, repeatable process for reading the tracing in front of them. In our discussion, the challenge was not simply identifying a diagnosis; it was deciding how to reason through the ECG systematically and explain that process in a way that other students could actually use. Our team debated what beginners struggle with most: rate, rhythm, axis, intervals, or recognizing patterns such as ischemia and conduction abnormalities. Everyone had slightly different ideas because everyone had different strengths and blind spots.

What made that experience valuable was not that our team immediately agreed. We did not. At first, we were tempted to jump straight to pattern recognition because that feels efficient. However, as the discussion continued, it became clear that this approach could make students overly reliant on memorized appearances rather than careful interpretation. We eventually shifted toward a more stepwise method that emphasized consistency: first identify rhythm and rate, then examine intervals, then assess axis, and finally connect the tracing to the clinical picture. That shift only happened

because we challenged one another's assumptions. It required communication, patience, and judgment. AI could certainly generate a clean summary of ECG criteria, but the deeper educational task was deciding how learners build understanding together and how a team can create a framework that is both accurate and teachable.

That project also taught me adaptability. Some teammates wanted a highly technical resource; others argued that the tool needed to be beginner-friendly to be truly useful. We had to reconcile those goals. I learned that being "right" in a narrow sense is not always enough. In medicine, and especially in education, information must also be usable. That means considering audience, context, and the emotional reality of learning difficult material. A first-year or second-year student staring at an ECG for the first time does not only need correct information; they need clarity, structure, and confidence-building guidance.

That is where empathy enters the learning process. TBL helped me understand that effective collaboration is not only cognitive. It is relational.

InteDashboard played an important role in that growth. One reason TBL worked so well in my courses was that the platform supported accountability without interrupting collaboration. InteDashboard is designed to manage the major parts of the TBL process, including IRATs, TRATs, application exercises, peer evaluation, automated grading, and real-time performance data. In practice, that meant our team had structure. We were expected to prepare before class, commit to answers individually, and then justify our reasoning together. Because the platform provided immediate feedback and visible consequences for preparation, it reduced the temptation to coast. It also made team discussions more focused because we could quickly identify where our misunderstandings were and address them in real time.

That mattered to me as a student because one of the hardest parts of group work is accountability. In ordinary group assignments, there can be a tendency for one or two people to carry the rest.
TBL, especially when supported by InteDashboard, felt different. The combination of individual preparation, team discussion, and peer evaluation created a learning environment in which each person's contribution mattered. The technology did not replace human interaction; it improved it. It gave the team a framework within which better discussion could happen. That is exactly how I think technology should function in education and in healthcare: not as a substitute for human judgment, but as a support that makes human judgment sharper, fairer, and more effective.

Another reason TBL feels especially relevant today is that medicine is already becoming an AI-enabled profession. Students and physicians are increasingly surrounded by tools that can summarize notes, suggest differentials, interpret patterns, and automate routine tasks. Those advances are useful, and I do not see them as threats in themselves. However, they make human skills more important, not less important. When information becomes easier to generate, the value of discernment increases. Someone still has to decide whether a suggestion makes sense for a particular patient, whether a plan is ethical, whether a teammate's concern deserves more attention, and how to communicate a difficult decision compassionately. TBL trained me in precisely those areas.

For example, in future clinical practice, I may work on a team caring for a patient whose presentation is ambiguous. An AI tool might organize lab results or propose likely explanations, but it cannot fully carry out the human work of medicine. It cannot sit with a frightened patient and explain uncertainty with empathy. It cannot repair trust after a misunderstanding between team members. It cannot fully appreciate the subtle interpersonal dynamics that

affect whether a team functions well under pressure. It cannot take moral ownership of a decision in the way a clinician must. TBL prepared me for those realities by repeatedly placing me in situations where technical knowledge had to be combined with communication, professionalism, and collaborative judgment.

These skills also matter beyond direct patient care. In any AI-enabled workplace, professionals will still need to work with diverse teams, present ideas clearly, handle disagreement, and adapt when new technology changes workflows. TBL gave me repeated practice with all of those tasks. It taught me how to prepare independently but perform collaboratively. It taught me how to defend an idea without becoming rigid. It taught me that good decision-making often depends on hearing a perspective I did not initially consider. Most importantly, it taught me that strong teams are built not only on intelligence, but on accountability, trust, and mutual respect.

My biggest takeaway from TBL is that it has helped me grow into a more thoughtful and more human learner. It sharpened my critical thinking, but it also made me more aware of how others think. It improved my communication, but it also made me a better listener. It gave me opportunities to lead, but it also taught me humility. In a world where AI will continue to expand, I believe those are the qualities that will matter most. Facts can be retrieved. Patterns can be recognized. Drafts can be generated. But judgment, empathy, teamwork, and moral responsibility still belong to people.

For that reason, I do not see TBL as simply a classroom format. I see it as preparation for the kind of professional I want to become. It showed me that the most durable skills are not just about knowing more, but about working better with others in complex, high-stakes situations. As AI becomes more common in medicine and in the broader workplace, those human capacities will not become

obsolete. They will become even more valuable. TBL helped me build them, and I expect them to shape the way I learn, collaborate, and care for others for the rest of my career.

04 How TBL equipped me with skills that cannot be automated

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There is a particular kind of thinking that only develops when the stakes are real and the clock is moving. I did not fully understand that until I started working at the Poisons Helpline, where a call arrives and you have a few minutes to understand what happened, to whom, and what they need to hear from you right now. Most calls are manageable once you ask the right questions in the right order. Some are not, and on those calls the thing that matters most is not just knowing the pharmacology. It is being able to think clearly while someone on the other end is frightened, uncertain, or moving faster than the situation calls for.

What surprised me later was how familiar that feeling was from somewhere else entirely. I came into medicine at Deakin University with a clinical background. Our MD curriculum introduced Team-Based Learning (TBL) and sitting in a TBL session, watching my individual answer appear on screen before the group had said a word. The two environments are not obviously similar. But both consistently asked me to reason under pressure, commit to a position before I was certain, and sit with the discomfort of being wrong in front of other people. What surprised me was how familiar that feeling from TBL sessions was when I was taking calls at the poisons line. Both environments asked the same thing of me. Commit, reason

clearly, and be prepared to revise. TBL through InteDashboard was where I learned to do that with consistency.

Since 2023, the case that AI will transform knowledge work and helping healthcare delivery is already visible (CSIRO, 2023). What gets said less often is that this makes certain human skills more valuable, not less. I came to see TBL as one of the few parts of medical school that trains those skills directly, rather than assuming they will develop on their own over time. The first is judgment under uncertainty. Michaelsen, Knight, and Fink in 2004 describe TBL's individual readiness assurance process as a mechanism that requires students to engage with material independently before benefiting from group reasoning, creating genuine individual accountability. In practice, this meant I had to commit to an answer before I knew what my teammates thought. At the poisons centre, that is simply how every call works. You reason from what is available and accept responsibility for your recommendation. TBL trained the same discipline in a lower-stakes environment first, which mattered.

The second is revising your position in front of other people without losing your footing. That sounds simple and is genuinely difficult. Medicine carries significant pressure to appear certain, especially early in training. In TBL sessions, my individual answer regularly differed from a teammate's, and working through that disagreement openly was the only way forward. Burgess and colleagues (2020) found that peer discussion within TBL structures supported meaningful critical reflection in clinical training. I found that too. More specifically, I found that saying "your reasoning is stronger" is a skill that has to be practiced before it becomes instinctive rather than humiliating.

The third is empathy as something practical rather than decorative. At the poisons centre, sometimes the hardest

part of a call is not the toxicology. It is slowing the other person down enough to get a clear history, because they are frightened and filling the silence with assumptions. TBL scenarios at Deakin regularly embedded public health questions that was relevant to our clinical learnings inside human contexts that complicated the answer. Working through those with peers from different backgrounds taught me to hold both dimensions at once, which is a habit I now rely on every shift.

Midway through second year, our group worked through a case involving health promotion in rural Victoria community. The clinical question was manageable, but the team dynamic was challenging. One member consistently deferred rather than committing, and another tended to land on an idea early and stay there regardless of new information. I noticed this but had not said anything, partly because the sessions were moving quickly and partly because I was not sure it was my place. What changed was InteDashboard's function of one lead responder on behalf, and no one else could make any change. When the group realised this, each person's answer had to be recorded and communicate these ideas better, and what they advocated for in the group became visible in a way that was hard to ignore.

After the first session, we talked about how the dynamics in that virtual room would reappear at every ward round, in multidisciplinary meetings, in moments where someone stays quiet and a preventable error follows. I remember feeling a little uncomfortable during that conversation, not because it was confrontational, but because I recognised some of those patterns in myself too. Parmelee (2012) argues that TBL develops professional competencies that lecture-based instruction cannot build, because it requires real-time, socially embedded reasoning. That afternoon was a clear example of what they mean. I thought about that session again recently during a

poisons shift. A doctor called about a patient who had received a duplicate dose of digoxin, a narrow therapeutic index medication. I had to ask the right questions, synthesise the information quickly, and give a recommendation clearly enough that the care team would act on it. The clinical knowledge mattered. But so did the composure, the structured questioning, and the willingness to commit to an answer out loud. Those were not things I arrived at medical school already knowing how to do under pressure. They were things TBL trained. InteDashboard mattered more than I expected, because it changed how the discussion actually happened rather than just recording that it did.

The process on InteDashboard where individual student had to go through the questions first, then discussing those answers as a group after meant preparation was a genuine individual requirement before every session. Because every student's answer was locked in before discussion began, the group conversation became a real exchange of competing reasoning rather than a few people talking while others waited to agree. The accountability this created felt different from other assessment formats, closer to how a clinical handover actually works, where you are expected to have thought it through before you walk into the room.

Conducting my medical studies while working clinical shifts has given me an early view of the gap between what AI systems recommend and what individual patients need. At the poisons centre, I use drug databases and clinical decision tools on almost every shift. They are reliable starting points. They are not endpoints. The judgment required to apply a general recommendation to a specific caller, in a specific situation, with incomplete information, is not something any of those tools can provide. That judgment has to come from the clinician, and it has to be trained before it is needed. At the poisons centre, I have seen what happens when a

clinician over-relies on a drug database without applying judgment to the specific patient in front of them. The database is usually right. The patient is always individual. The gap between those two factors is where clinical reasoning lives, and where the skills TBL develops become genuinely important. The World Health Organization's guidance on AI ethics in health is clear that governance of clinical AI systems depends on the judgment and accountability structures of the humans who oversee them, not on the systems themselves (WHO, 2021). In my view, these skills will shape whether AI makes care better, or just quicker.

TBL trains the disposition that makes responsible engagement with AI possible. It teaches future practitioners to resist settling too early, to take individual accountability seriously even when group consensus is available, and to treat disagreement as useful rather than uncomfortable. I do not see these as optional or soft skills anymore. They are part of clinical competence, and they are the part that no implementation of AI I have encountered yet comes close to replacing.

In conclusion, medical education has historically been reliable at producing individuals who know a great deal. It has been less reliable at producing practitioners who function well in the messier, more negotiated reality of actual clinical teams. TBL at Deakin was a genuine attempt to close that gap, and for me it helped. The clinicians who lead well in AI-enabled settings will not just be the ones who understand the technology. They will be the ones who can reason clearly under pressure, hold disagreement without becoming defensive, and take responsibility for decisions made in conditions of genuine uncertainty. I came into medicine thinking I already understood what good professional practice looked like. Three years of TBL sessions, and shifts at the poisons helpline alongside them, have shown me how much more precise that understanding needs

to be. I still think about that group discussion when a caller is waiting and I am about to commit to a position before I am fully certain. The habits TBL built are not ones I will leave behind when I graduate. They are the ones I use most.

05 How TBL Equipped Students with AI-Proof Skills

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Karolinska Institute
Medical Program

My name is Maria, and I am a fifth-year medical student at Karolinska Institute. I was introduced to Team-Based Learning (TBL) during my first year of medical school as part of the new six-year medical program, and this form of learning has followed me throughout my education ever since. My university uses TBL regularly to assess students' level of knowledge as well as to promote discussions between students and specialists within a particular field. The seminars are divided into an individual test (iRAT), followed by a team discussion on the same questions (tRAT). The tRAT is then followed by a panel discussion where teachers discuss and clarify difficult questions. The second part of the TBL seminar involves the application stage, where questions are more complex and require group discussion. Thereafter, teachers encourage a broader class discussion by asking groups to explain their answers.

TBL has been a consistent part of my studies at Karolinska Institute. During the first years, it offered a great way to get to know my classmates and learn in a non-judgmental and cooperative environment. My first TBL group became a comfortable space where I could ask for help during projects, meet new people, and share ideas. It was easier to express my opinions in a smaller group compared to a large classroom

with over 100 students. Since I moved to Stockholm alone, without friends or family nearby, my TBL group became an important support system during the introductory courses. Some of my team members remain my good friends until this day.

In the following years, TBL became an integral part of my education. The iRAT questions were very useful in gauging my level of knowledge in each subject and allowed me to reflect on my understanding of each topic. Furthermore, the tRAT allowed me to learn from my peers as well as share my own knowledge, which further solidified my learning. Working in a group also prepared me for my clinical placements, where teamwork and the exchange of ideas are essential for providing the best patient care. This became particularly apparent during my orthopedic placement, where collaboration between medical students, nursing students, and other practitioners was central. I applied the skills I had developed during TBL seminars in patient rounds, where each practitioner could express their concerns. During an evaluation at the end of the week, I received positive feedback regarding my team leadership and my ability to make everyone feel included.

One aspect I find particularly valuable about TBL is the application portion of the seminar. Our program uses this stage to discuss complex patient cases, which deepens our understanding of the subject. One situation that stands out is a recent seminar on cancer and palliative care, where my group and I were required to discuss complex ethical dilemmas. It was extremely insightful to hear my peers' unique perspectives and personal clinical experiences. The teachers had prepared incredible cases that promoted great discussion within the group. I left that seminar with a deeper and more nuanced understanding of the complexity of many medical decisions.

I have also noticed that TBL motivates me to prepare before seminars, as I am eager to

contribute meaningfully to my group. This has been incredibly useful in providing structure to my studies and ensuring that I go through the recommended material beforehand. I have observed that my peers are equally diligent, which allows for more profound and engaging discussions. During a recent seminar on endocrinology, my peers not only reviewed the required material but also explored additional resources. Their contributions gave me insight into topics that went beyond what was expected. At the end of the seminar my peers reflected that they themselves solidified their learning by explaining concepts to others.

Another skill I have developed through TBL is leadership. I have become more confident in taking on leadership roles during group activities, especially since each seminar assigns new group leaders. This has been extremely valuable in building my confidence not only in academic settings but also in my personal and professional life. Doctors in clinical settings are required to lead patient rounds alongside nurses and other practitioners, which in many ways resembles the structure of group discussions during TBL. I have noticed that I feel more confident taking on leadership roles during clinical placements and find it easier to navigate complex interactions where individuals have different opinions. I have become a better listener which has reflected positively on my learning and interaction with others. TBL has also improved my ability to adapt to new settings, as I am frequently required to work with new group members. This has also benefited me in a clinical setting as am frequently required to move between different wards and clinics. I now find it easier to socialize with new people and adapt to new rules and structures.

Altogether, TBL provides an irreplaceable forum for developing important skills that go beyond theoretical knowledge. Although AI is effective at explaining concepts and can be a valuable learning tool, it cannot replace in-person

discussions and interactions between students. Additionally, being able to meet face-to-face with specialists during panel discussions is a unique opportunity that is difficult to replicate. My program has previously used AI tools in teaching, but I have often found them lacking. For example, a few years ago, students were required to interview a robot about symptoms related to rheumatology. The robot could answer direct questions but the conversation felt dry and poorly imitated real patient interactions (1). While the interaction was insightful, it also reinforced the idea that AI cannot replace the in-person interactions provided by TBL.

Another important aspect that is often lacking in AI-assisted learning is the development of empathy. As mentioned previously this was particularly apparent in the TBL ethics seminar. I believe that group discussions are essential for cultivating empathy. I also believe that AI is limited in its ability to foster critical thinking. Developing this skill requires independently researching topics and evaluating the sources of information to understand their reliability and context. My program has strongly emphasized this, particularly during our exam projects, where students were required to critically review scientific articles.

Using InteDashboard has been a valuable way to apply TBL in a modern format. I particularly appreciate that it allows students to add clarifications when answering questions, enabling teachers to address areas that may be unclear. This also makes it easier for students who may be hesitant to ask questions in front of the entire class. InteDashboard allows students to access all questions digitally without the hassle of handling loose papers. I make sure to screenshot the questions and save them on my computer while annotating teacher clarifications, which helps me stay organized. This also makes it easier to revisit previous TBL seminars and refresh my knowledge. I believe that regularly refreshing

knowledge is extremely valuable to make sure I am prepared to work as a doctor in the future.

InteDashboard promotes accountability and decision-making in a way that differs from many other learning platforms. It provides feedback on individual assessments while also placing strong emphasis on peer learning. Additionally, it offers teachers insight into students' responses and highlights the impact of group discussions on improved overall scores. Time and again, teachers have observed that results improve when students collaborate and work together.

I believe that TBL is essential for developing skills such as teamwork, leadership, communication, and adaptability. These skills are crucial for becoming a competent medical practitioner who can function effectively in a team setting. Doctors often find themselves working in new teams where it becomes increasingly important to learn from team members, handle conflicts and make ethical discussions under pressure. I am incredibly grateful that my university has included TBL in the curriculum, as it strengthens abilities that are otherwise difficult to develop. Throughout my five years in medical school, I have encountered many doctors and often reflect on what it takes to be a good physician. The best practitioners are not always the most knowledgeable, but they are always the most eager to learn, ask questions, engage in discussions with colleagues, and support others within the team. I hope to one day become one of these practitioners who fosters an inclusive and non-judgmental environment.

Finally, I would like to conclude by reflecting on how the skills developed through TBL will remain important as AI becomes more common. I have already observed how AI has simplified work in fields such as radiology and pathology. Many doctors believe that AI will continue to evolve and take over a significant portion of administrative tasks. However, in my opinion, it will never replace doctor–patient

interactions or communication within medical teams. Time and again, I have seen how essential face-to-face communication is, and how social skills—such as those developed through TBL—shape the working environment for everyone involved. Medicine is not only about diagnosing and treating disease; it also involves providing comfort, navigating complex ethical dilemmas, and building teamwork skills that cannot be replaced by AI.

06 Some Things Are (A)Irreplaceable, Some Are Not

Anonymous
Cebu Institute of Medicine
Medicine - II

In Cebu City, Philippines stands Cebu Institute of Medicine (CIM), a medical school deemed as one of the best in the country, and I am among its approximately 400 enrolled students. Currently in the PBL2, this is my team-based learning experience with InteDashboard.

Team-based learning (TBL) was something I have only encountered at the CIM. TBL sessions at CIM are done face-to-face with InteDashboard. Since experiencing it in my first year, I've seen it as an efficient way to interact with other students while also learning in the process. TBLs have become our Friday 'ritual' and we have given a new meaning to TGIF: *TBL grind is Friday*.

After every individual test, we huddle with the same people for the rest of the school year to discuss and rationalize questions through the team-based learning approach. Each question is discussed until a consensus is reached as to what the group's answer will be. Some questions are answered with ease, while some require more brainpower. Human as we are, we don't get all the answers correctly. Yet we don't point fingers at each other, because we have agreed that once the assigned reporter submits, it is no longer the answer of one, but of the whole group.

Recalling the many TBL sessions wherein our group encountered challenging questions, there is

that momentary pause in breathing once the reporter clicks 'submit answer'. Only when the answer is marked correct do we breathe a sigh of relief. Sometimes, our group would even break into fits of screams just because getting the answer right on one question was exhilarating. For us, every point counted during the TBL.

But for the few instances when we don't get the right answer on the first try, a brief period of confusion sets in, then we move on and choose the next best answer. Some questions are so hard that we end up with the right answer only after exhausting all the wrong choices. It is a funny memory now, but deciding on the next best answer and learning to recover after every mistake was something we had developed during each TBL session.

Recalling our TBL session on water bacteriology, our group was really firm on our answer to one question, so we mustered up the courage to make a clarification and supported our answer with our references. It was an act done out of encouragement from the team and the faculty. It made me appreciate how this platform has empowered us to stand for what we believe is correct, and how our faculty have been great listeners to our clarifications. We may have not earned the point, but we learned to have more faith in ourselves and lose the fear of making mistakes if it means learning something out of it.

Although preparedness is important to survive medicine, there are inevitable times when all one can do is show up. No one really admits that they come to the TBL session with unfinished readings. It is something we understand because we have all been in that position at least once in this course. During these times, being in a group reminds you that there are burdens that should not be carried alone, and how just being present in the discussion circle is enough for your team to know that you are trying. There is that mutual understanding that on days that

one teammate cannot give their 100%, it is only natural that the rest of the group compensate. We do not hold it against our teammates, because even during these short TBL sessions, compassion and kindness matter.

I started the year not knowing my TBL group, but with every TBL session, I learn a thing or two about them through how we interact during the TBL sessions. I can tell which teammates come well-prepared, which ones are facing hurdles but still choose to show up, which ones are there to take initiative in directing the discussion, and which ones are great listeners who take time to listen to each teammate. Being grouped with new people pushed me to get to know my teammates and myself better. Through TBL, we have learned to be better listeners, because in every choice, each one deserves the chance to give their rationalization. TBL pushed us to prepare and do better, not just for ourselves but for our teammates, because each one is accountable for what they bring to the table during discussions. TBL taught us to trust in each other, because in times of uncertainties, all that is left is trusting the decision of the group.

Now, in the era of artificial intelligence (AI) where information is just one prompt away, knowledge seems to be easier and more convenient. AI is a great tool for learning, but only to a certain extent. Having everything so easily takes away the fundamental skill of discovery that comes from searching.

At CIM, our vision is to become physicians with a heart. A physician with a heart can encompass many things, and empathy is one important facet. To be a physician with a heart, one has to learn to connect. It is through this human connection that we can understand the needs of our patients, far beyond what words can explicitly convey.

The World Health Organization (2000, as cited in WONCA,

2022) described the concept of a five star doctor: a care provider, decision maker, communicator, community leader, and manager. These are qualities that are formed from years of human interaction, communication, and abstract learning. It is a mystery to me as to how a machine can have these traits, if it is ever even a goal AI wants to achieve. But with the awareness of how fast AI has adapted human-like cognition, it is only normal to question if there is a chance of it replacing us.

The power behind AI comes from its ability to let technology simulate human learning, comprehension, problem solving, decision making, creativity, and autonomy (Stryker & Kavlakoglu, 2024). Over the years, it has evolved into what it is today—a tool that can learn from us so that it can think like us, and as of today, it can create like us.

The use of AI will always beg the question: "Can AI replace us?" As part of the future healthcare workforce, I believe it is not impossible in the future. But it might take a while for AI to learn, because this career requires understanding human language which is not limited to the language that humans speak fluently in words, but the nonverbal language that can only be deciphered by someone who is observant and cares enough.

There is no denying how easy AI has made our lives, but it should never replace human creativity, leadership, and decision-making. In fact, a report by the AI Security Institute (2025) from a study by Heitmann et al. (2025) states that AI still has many technical limitations. AI cannot perform complex tasks that require strategic decision-making and subjective or intuitive judgement. It is also unable to perform long term tasks, and in situations where unexpected obstacles and task prioritization is needed, AI is not flexible enough to handle such an environment.

Despite that, we see today that some things are starting to be AI-replaceable. It is fast, convenient, and easily-accessed. AI has been very much integrated into our

everyday lives that getting rid of it is likely impossible. I agree that having AI is not all bad, and it is natural for us humans to pursue innovation. So maybe the fear-driven question "Am I AI-replaceable" should be seen from a different perspective instead and the better question to ask is "What will I allow AI to replace in my life?" After all, the decision to allow AI to take over our activities and our roles is up to us.

Going back to my TBL experience, it has emphasized that a good physician requires being a team player. Eventually, we will not only handle patients, but also interact with colleagues because patient management is not a one-man job, but a multi-department effort. Through TBL, one learns the value of accountability and participation, because the effort of one person becomes part of the whole, much like the synergistic effect of drugs when they are given together. In times when conflicts arise or the team arrives at a dead end, we adapt and we recover through communication and judgment that we have honed through years of human experiences. Unavoidably, in times when all efforts to solve a problem still leave us unsure and all we can do is trust in our answer as a group, we are reminded of the value of optimism, even in TBL sessions where objectiveness is expected. My experiences in medical school including those I have learned from TBL interactions reassures me that even in the advent of AI, humans will continue to be the more important resource. It can replace some human activities, but cannot completely displace the importance of humans in the world. Its role is to support and improve existing systems so that better outcomes can be achieved.

Two years of TBL showed me that the essence of team-based learning is having the patience to learn from others even if these are concepts we can study on our own. There are people who already know so much, while there are those who still have a lot to learn. TBL connects these

people so that they can benefit from each other. In one session, Dr. Buckley left us a statement that perfectly summarized what TBL is for—"The worst team is still better than the best student alone." Indeed, it is not about being good on your own, but doing better when you are with others.

In the same way that guidelines are merely evidence-based suggestions but are not absolute steps to approach diseases, our lives cannot be dictated by AI because no machine-generated algorithm can perfectly answer all human concerns. AI can learn to think and act like a human and may be able to diagnose like a doctor, but it cannot comprehend the depth of human emotion that requires genuine concern or be in the shoes of a doctor who balances assurance and reality when facing a patient in distress. It may objectively analyze an ethical
dilemma, but it cannot feel the weight of an ethical decision because it lacks empathy. And maybe AI can think like a physician, but it cannot understand all the burdens and sacrifices that it takes to be worthy of wearing the white coat.

07 From Classroom to Communities: Improving Global Access to Care through Team-based Skills

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Doctor of Pharmacy

I am a 4th-year Doctor of Pharmacy (PharmD) student at the University of North Carolina-Chapel Hill. At the school, I serve as the Student Senate President, championing the culture of 550+ PharmD students across two campuses in our state, where these students can have an impact on improving health outcomes throughout the world. I am extremely passionate about career interests in utilizing artificial intelligence (AI) to improve global health outcomes. I have completed a clinical development internship at Eli Lilly, where I analyzed motivators and barriers in clinical trial participation to create a model for tailored recruitment strategies to reach underrepresented populations. Also, I am currently in the process of founding a non-profit organization. It aims to provide student-led free health clinics to underserved areas, with a focus on non-communicable disease screenings for hypertension, diabetes, and mental health. Ultimately, my life mission is to advance global health through meaningful relationships with others for a more connected, healthier world.

I was introduced to team-based

learning (TBL) through InteDashboard to collaborate on in-class application activities, team-based learning, and provide peer feedback through my PharmD curriculum, I utilized InteDashboard to engage in team-based learning in Dr. Zac Noel's pharmacotherapy II course. Prior to our lectures, we completed two assessments: an individual readiness assurance test (IRAT) and a team readiness assurance test (TRAT) to assess pre-class readiness. Each student completed an IRAT as an individual, and then each team of 6 students completed a TRAT as a team. From experience, our TRAT scores were always higher than our IRAT scores; showcasing the power of teamwork. Then, we learned the lecture materials and applied TBL through in-class application activities to apply our knowledge about the lecture topics towards patient cases. Collaboration was essential to come to one decisive answer that accounted for multiple perspectives for our patients. Then, we utilized InteDashboard to provide peer feedback to our team members at the midpoint and end of the semester, regarding their strengths and potential areas of growth in their role on the team. We continued to use InteDashboard for application activities in our pharmacotherapy III course. InteDashboard was utilized throught the entire learning cycle: from pre-class preparation to in-class engagement to post-class feedback.

The skills that I have strengthened through TBL are intangible skills, such as shared decision-making, tailoring to specific patient information, and audience engagement. As future health-care professionals, shared decision-making within an interprofessional team, including the patient, is an integral part of the treatment process. Shared decision-making often includes compromise, empathy, and situational awareness that cannot be replaced by artificial intelligence (AI). Also, understanding your audience is a human skill that is extremely important when presenting information, whether it be to

patients, other healthcare professionals, and peers. For a light-hearted example, in our leadership curriculum, our group was tasked to present about a inspirational book that embodies leadership. We chose to present about the "Power of Positive Leadership" to our peers. As a method to capture the attention of our mid-20 year old peers, we started the presentation out with a skit to "Happy" by Pharell Williams, a song that we grew up on. The awareness of what would engage our peers, allowed for an interactive and productive presentation. However, if we presenting positive leadership to business executives or people struggling with mental illnesses this approach may have been inappropriate. These intangible skills of teamwork and situation awareness started with our didactic curriculum, are continuing to be developed in our experiential learning curriculum and will be utilized in our future careers as we seek to improve health of patients around the world.

Although AI is unable to replace many of these intangible skills, AI can certainly be used to augment our capabilities to advance medicine and improve health. For example, AI can be an additional perspective utilized in shared decision-making that the team can consider towards a final decision or AI can help organize agenda-setting for discussions with various audiences. As students prepare for an AI-enabled workforce, our curriculum includes learning AI integration. AI continues to have a growing influence in educational and professional settings, as 90% of higher-education students report using AI in their studies in 2025.

Despite students' vast use of AI, 58% of students report feeling that they do not have sufficient AI knowledge and skills, and 48% felt inadequately prepared for an AI-enabled workforce. Within our curriculum, we utilized AI to develop our peer feedback, where we used a prompt outlining individual behaviors, strengths, and areas of growth for our targeted recipient. Then, the AI filled out the outline into a

developed message. Dr. Noel conducted research indicating that the AI supported feedback was of higher quality then the entirely self-generated feedback. AI did not replace the student's situational awareness but rather enhanced the final response. A greater understanding of AI's capabilities and limitations is necessary to prepare for our future careers.

AI has a growing impact on pharmacy and pharmaceutical professions. AI has revolutionized drug development through new target discovery and reducing development costs. Typically, R&D is a very long, complex process associated with high costs that often halt's drugs' development before it can even truly begin. Chemical laboratories and pharmaceutical companies have accumulated massive amounts of data in databases, such as the therapeutic target database and PubChem, which provide information about chemical molecules, drugs, targets, and populations. AI can learn this data to understand structure activity relationships and pharmacokinetic/pharmacodyna mic properties of drugs to identify and design possible drug candidates via in-silico modeling, a highly cost-effective computer modeling that can save pharmaceutical scientist about 35% of total cost and time invested in developing a new drug candidate. AI can also accelerate clinical trials through optimizing clinical trial design and analytics, with bottlenecks, such as patient selection, being streamlined by AI. AI can cut clinical research costs by an estimated $28 billion per year and reduce clinical development time by more than half of the original time. AI is currently being integrated into clinical practice to support therapeutic drug monitoring and precision dosing. AI's ability to model concentration and exposure predictions with growing potential to predict concentration-time profiles, monitor drug levels, and recommend needed doses. AI has great potential in improving clinical outcomes through implementation across the

spectrum of drug development to patient care; however, there are also significant limitations to AI. AI is based on future predictions based on training from existing data, which may lead to limitations with traditional experimental methods, scientific writing, or unique patient cases. AI is trained on old data; thus, it may not account for current data or best practice. Generative AI has significant limitations and poor accuracy in pharmacotherapy problem solving and identifying drug interactions. True potential and limitations of AI are still being uncovered; however, the future points to AI providing insights that must be interpreted and validated by human researchers.

A future career goal is to work as a global health pharmacist that creates a business to enable global student-led health clinics for local communities. I am passionate about reducing health disparities throughout the world, and I want to create more equitable global opportunities for students. My career goal as a global health pharmacist is inspired by organizing and leading a free health clinic in Guanacaste, Costa Rica. I visited Costa Rica in December 2025 on a solo adventure trip, and I was able to build relationships with the local community in Guanacaste. I loved my experience in Guanacaste, but I also realized the need for greater health services in an area where 22% of the households live in poverty. Despite the relatively equitable distribution of public primary healthcare in Costa Rica, disparities in low socioeconomic regions persist in the timely diagnosis and treatment of chronic diseases, such as diabetes and hypertension. For our spring break in April 2026, myself, three classmates, and the local physician organized a free health clinic for the community and fundraised $1200 for the clinic. We provided care for 14 patients, where we screened 7 patients for potential hypertension (Blood pressure readings > 135 on two separate occasions) and 2 patients for potential diabetes (Blood glucose

> 200). We gave these patients automatic blood pressure cuffs and/or glucose meters/test strips/lancets, with a BP or BG log, and provided education on how to use the devices and record their measurements for continued monitoring of their condition. All while trying our best in Spanish. 7 patients also received $35 gift card to the pharmacy based on needed medications per the doctor. We also donated Narcan and the rest of our supplies to the clinic for Dr. Belfort's future patients.

Teamwork and team-based learning was essential to enable our Costa Rica experience. First, we had to communicate our capabilities and limitations to the local physician and understand that our patients may have low health literacy and a language barrier. Then, as a student team we had to assign roles based on our strengths and limitations regarding the skills and language capabilities. Ultimately at its core, the clinic was enabled by the power of relationships and trust collectively working together to reduce the health disparities in the community, which these genuine connections and teamwork to tailor roles will not be able to be replaced by AI. However, AI can be utilized in student-led health clinics to identify high need populations, create standardized procedures, provide feedback on the clinics, and identify potential organizations to partner with based on aligned missions. We are working to continue our student-led health clinics through creating a non-profit organization. Our next steps are integrating mental health awareness, and expanding to new locations, identifying Nicaragua and the Philippines as goal next locations. Ultimately, we hope to build more relationships across the world to enable greater access to quality healthcare for underserved communities and to empower students that they can have a great impact on improving access to quality health care.

TBL does not end after school, but rather how we learn, collaborate, and lead continues throughout our careers and our

lives. Skills, such as shared decision-making, empathy, and understanding our local population/provider will shape the future of health and patient-care. As I look forward to launching a non-profit, I recognize that technology can significantly enhance efficiency, but it cannot replace human connection, trust, and purpose-driven leadership. A quote that I live by is from Helen Keller: “Alone we can do so little; together we can do so much.” TBL enables action to create a collective impact for a healthier and greater world.

08 Collaborative Professional Growth Using InteDashboard

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Doctor of Medicine

My name is Sara Dawood and I am a first-year medical student at the Thomas F. Frist, Jr. College of Medicine (FCoM) in Nashville, Tennessee. FCoM opened its doors just two years ago with the vision of shaping medicine through transformative, whole-person care. It is a vision that permeates every dimension of how we are taught and how we are expected to grow. From the first week of my medical school experience and every week thereafter, we have utilized InteDashboard to facilitate our Team-Based Learning (TBL) of real-world clinical cases. Every Friday, we complete an InteDashboard individual case quiz, and afterward, we regroup as a team to answer the same questions collaboratively, with InteDashboard assigning one student to lead the discussion and guide the group toward a consensus answer.

Healthcare is a field in which collaboration is not optional. It is foundational to effective patient care. Without enhancing the skills vital to collaboration and communication, the knowledge we are acquiring every day cannot be utilized effectively once we enter the clinical environment, where teamwork is essential for patient outcomes. For my class and me, TBL has become a key instrument in shaping leaders in healthcare. It has strengthened our communication abilities, deepened our respect for one another, and most importantly,

taught us the profound value of humility: skills that cannot be acquired via artificial intelligence.

One of the most immediate and tangible skills TBL has sharpened for me is communication. More specifically, organized, purposeful, and inclusive communication that moves a group toward a shared goal. During our weekly case quizzes, one of the major roles of the team leader is that of a mediator. Whenever discussions go off track, the leader guides the team back to discussing the question raised. At the same time, the leader makes sure that all team members agree with the proposed solution or answer before going any further. In the case of leading the discussion myself, I chose to conduct the session in such a way that all individuals had one question to read. Anyone who wished could explain their thoughts about the question, while those who needed more time were not forced to speak until they felt ready. What it achieved was two things: first, everyone got a chance to talk, and second, no one felt pressured by the need to answer immediately. Prior to inputting the answer on InteDashboard, I also asked everybody to give me a thumbs-up. This kind of deliberate, inclusive communication, requires reading the room, adjusting tone, and making people feel both accountable and safe at the same time. I valued the ability to lead some TBL sessions as it made me realize that although communication is a skill, there can be structures in place to make communication easier amongst groups.

Additionally, while explaining one's answer, providing a clear path to one's answer and explaining why other answers would not make sense allows for one's own critical thinking to be vocalized in a group setting, something that is not often experienced by learners. It forces one to think of gaps others may have that could have led them astray and address those to then best communicate the correct answer.

Now if communication is the

vehicle of TBL, then respect and self-awareness are the roads that make the journey possible. The principle seems simple: treat others as you would like to be treated. But in practice, especially in the high-stakes environment of medical education, this requires conscious and continuous effort.

During our team discussions, it is extremely important to give the opportunity to each member to voice their opinion, even if an answer feels obvious or you are eager to move on. At times, there are situations when everybody agrees at once, but sometimes there comes a question that sparks debate. In such cases, it is crucial to show self-awareness. There is a natural impulse, when you feel strongly about an answer, to speak immediately, to cut in, or to subtly dismiss a differing perspective; however, TBL has taught me to resist that impulse. Waiting for a teammate to finish their thought completely before responding is an act of respect that deepens the quality of team discussions.

What I have realized from my experience with TBL is that after allowing another person to fully share their point of view, your own thinking sharpens. You realize the nuances in their reasoning, you reconsider your initial assumptions, and you arrive at a more complete understanding together. And when it is finally your turn to speak, there is something quietly powerful about addressing a group of six people who are all listening to you. It builds confidence, but also a sense of accountability to ensure you are not dominating or exploiting your sense of power. Self-awareness involves knowing how you might make someone feel by your participation in the conversation. If you find that you are dominating the conversation rather than giving everyone an opportunity to talk, you are not doing justice to your team.

A physician who cannot listen fully to a patient, or who speaks before a colleague has finished their thought during a critical case discussion risks missing information that could change a

diagnosis. TBL trains us to slow down in precisely the moments when we feel most certain, and that restraint is, I would argue, one of the most important habits a future clinician can develop.

Since our engagement, preparation, and professionalism are monitored by our faculty facilitators at every session, we get to benefit from unbiased feedback that tells us not only whether our work is correct, but also how well we interact with our peers. It is relatively easy to think that we are interacting positively with our peers and that we treat everybody around us in a proper manner; therefore, we benefit from structured advice. Such feedback provides us with an opportunity to take an unbiased look at ourselves, which would be rather hard to accomplish otherwise.

Closely intertwined with respect and self-awareness is the pair of qualities that I believe TBL has developed most profoundly in me: humility and the confidence that accompanies it. Humility and confidence seem to be contradictory concepts, yet are in fact highly complementary.

Medicine contains a vast, ever-expanding body of knowledge, and one of the earliest and most important lessons of medical school is becoming comfortable with not knowing everything. TBL has helped me realize this not as a source of anxiety, but as a liberating framework. I have come to think of our teams as puzzles: each member is a piece, and when we welcome each other's contributions fully, we form a picture that no single person could have constructed alone. One teammate draws attention to a missed clinical detail or another asks questions no one had in mind. These moments remind me that intellectual humility is not a weakness; it is the very quality that makes a team stronger than the sum of its parts.

Confidence, in this context, does not mean having all the answers. It means being secure enough in your own learning process to contribute honestly and remain open to being uncertain or

wrong. Each time I have participated in a TBL session, I have left with a stronger sense of my own voice and my own value to the group. The rotation of teams each block has been particularly valuable in building this kind of adaptive confidence. Working with a different set of peers each month means repeatedly stepping into a new group dynamic and finding your footing again. It is uncomfortable at times, but it closely mirrors the reality of clinical medicine, where you may work with an entirely new team in a new hospital setting and need to function effectively from day one.

With the rapid advancement of artificial intelligence, the ability to synthesize and retrieve medical knowledge has grown exponentially. AI can generate differential diagnoses, flag drug interactions, and surface relevant research in seconds. What AI cannot do is sit in a room with six people who are working to treat a patient. The communication skills, mutual respect, self-awareness, and grounded confidence that TBL cultivates are precisely the qualities that will define excellent clinicians in an AI-enabled future. They are the irreplaceable human layer of medicine that cannot be left behind in the craze of AI. We must not forget the importance of developing our soft skills over hard skills. The dedication of our faculty to administering TBL case quizzes weekly using InteDashboard provides us with an organized, purposeful, and consistent avenue to develop our leadership skills in addition to our scientific knowledge. As a medical school student I hope not only to study medicine, but to train myself to be the kind of individual who will be able to provide the service competently.

TBL has opened my eyes to the amazing power of teamwork, and it has helped me become more conscientious. I am excited to see what another year of TBL holds for our class in our development as future physicians!

09 How TBL Equipped Students with AI-Proof Skills

Anonymous
Regis University
Doctor of Pharmacy

I am a Doctor of Pharmacycandidate at Regis University, and my goal is to be a hospital pharmacist. I am currently in my final year of didactic learning, and will move on to APPE rotations this fall. I am excited to explore my opportunities in healthcare as I apply for residency in the near future. My journey into team based learning, or TBL, began at my interview for Regis, where I was first exposed to the collaborative and discussion driven educational model that this program utilizes. At the time I recognized it as an engaging approach to learning that holds students accountable to study. However, it was not until I began that first semester that I understood how profoundly TBL would shape my learning. Through TBL, I have developed essential collaborative skills such as teamwork, communication, leadership, critical thinking, adaptability, and empathy, all of which cannot be replicated by AI, and skills that are critical in the medical field.

TBL is structured around collaboration, accountability, and application of knowledge. Unlike traditional learning involving lectures, TBL requires students to actively engage with material, participate in group discussions, and defend their reasoning at that point in time. One of the most valuable aspects of this approach is the development of teamwork. Patient care is interdisciplinary, and requires

collaboration with physicians, nurses, and other healthcare professionals. TBL almost mirrors this environment by placing students in diverse teams where each member contributes their perspectives and strengths. Through this process I have learned how to listen actively, respect other viewpoints, and organize information to come up with the best possible decision.

In addition to teamwork, TBL has significantly strengthened my communication skills. Effective communication in healthcare is not only about conveying information, however it involves clarity, leadership, and the ability to adapt a message to different audiences. During TBL sessions, I articulate my clinical reasoning, justify decisions, and respond to questions or challenges from my teammates. This has improved my ability to present complex medical information in a clear and concise way, a skill that will be essential when counseling patients or collaborating with healthcare teams.

Critical thinking and judgment are also important to TBL. Completing applications frequently involves evaluating incomplete or conflicting information to make evidence based decisions. TBL fosters this by presenting questions that require analysis, prioritizating, and clinical reasoning, aside from just memorization. I have learned to approach problems systematically, consider multiple perspectives, and weigh the risks and benefits before coming up with an answer. These are skills that AI can support but not replace, as they require contextual understanding and human reasoning.

Specific moments that highlights the challenges and growth associated with TBL happen during application exercises in class, when my team members and I had differing answers to a question. Each member has their own interpretation of the material, and while this diversity of thought was beneficial, it also occasionally can create tension as we worked to reach a consensus. Initially, it could be challenging to navigate

conflicting viewpoints, particularly when each person felt confident in their reasoning, and still wanting to be respectful. However, this experience ultimately strengthened our teamwork. We learned to approach disagreements constructively by speaking up, asking questions, showing reasoning, and actively listening to each other. Rather than viewing conflict as a barrier, I now see it as an opportunity to deepen my understanding and make more informed decisions. These experiences reinforce the importance of collaboration, respect, and open mindedness. These qualities are essential in healthcare settings where patient outcomes depend on effective teamwork.

Leadership and adaptability are also skills developed during these interactions. In group settings a leader often comes into fruition to guide the discussion, keep everyone focused, and ensure that voices are heard. At times, I have taken on this leadership role, facilitating conversation and helping the team move toward a decision. Otherwise, I support my teammates by contributing ideas and adapting to different communication styles. This flexibility is important in professional environments where team dynamics and responsibilities can shift rapidly.

Technology has played a role in enhancing the TBL experience, including through the use of InteDashboard. This platform streamlines the TBL process by allowing teams to collaborate in real time, track responses, and receive immediate feedback. One of the most valuable features of InteDashboard is its transparency. Team members can clearly see what others are typing, which encourages participation. It also helps establish a clear leader within the group, as someone can take initiative in organizing responses and guiding the discussion. In addition, InteDashboard facilitates efficient decision making by allowing teams to submit answers collectively and compare their answers with other groups. This integration of technology supports elements of

TBL by improving communication and collaboration.

As I prepare for an APPE rotations and residency, the skills I have developed through TBL are directly applicable to my future role. Pharmacists are essential members of the healthcare team, responsible for ensuring safe and effective medication use, educating patients, and collaborating with other providers. In an AI world, technology may assist with tasks such as data analysis, drug screening, and clinical decision support. On the other hand, technology cannot replace the human interaction and skills required to interpret information, communicate with patients and families, and make ethical decisions. TBL has equipped me with these skills, enabling me to work effectively in a team, adapt to new challenges, and provide patient centered care. There are numerous scenarios where the skills developed through TBL are critical. In a hospital setting, pharmacists often participate in rounds where they must present recommendations, address questions, and collaborate with physicians and nurses to optimize patient care. This requires not only clinical knowledge but also confidence, communication, and the ability to think critically under pressure. In addition, pharmacists must counsel patients with diverse backgrounds and health literacy levels, requiring empathy and adaptability. They must also navigate ethical dilemmas, such as balancing patient autonomy with safety concerns, which indicates human judgment and professionalism.

Conflict resolution is another area where TBL skills are essential. In healthcare teams, disagreements may arise regarding treatment plans or patient management strategies. The ability to engage in respectful dialogue, consider different perspectives, and work toward a consensus is crucial for maintaining a collaborative environment and ensuring the best outcomes for patients. My experiences in TBL have prepared me to handle these

situations effectively by fostering a mindset of cooperation and mutual respect.

Furthermore, TBL has enhanced my ability to present ideas clearly and persuasively. Whether I am discussing treatment options with a healthcare team or educating a patient about their medications, the ability to communicate effectively is vital. Through repeated practice in TBL sessions, I have become more confident in expressing my thoughts and supporting them with evidence. This will be particularly important as pharmacists continue to take on expanded roles in patient care, including medication therapy management and chronic disease management.

In a world where AI is becoming increasingly integrated into healthcare, it is important to recognize both its capabilities and its limitations. While AI can process large amounts of data and provide valuable insights, it lacks the human qualities that are essential for patient care. Empathy, ethical reasoning, and interpersonal communication are uniquely human skills that cannot be fully replicated by technology. TBL emphasizes the development of these skills, ensuring that future healthcare professionals are prepared to complement, rather than compete with AI.

My key takeaway from the TBL experience is that learning is most effective when it is collaborative, interactive, and grounded in real world application. TBL has challenged me to step outside of my comfort zone, engage with my peers, and take ownership of my learning. It has taught me that the ability to work effectively with others is just as important as individual knowledge, particularly in a field like pharmacy where teamwork is essential. Lastly, it has allowed me to build relationship and form friendships with my peers. Putting an intense focus on communication in groups has fostered an inspiring and helpful learning environment that has improved my education overall.

As AI continues to evolve, the

skills I have developed through TBL will remain highly relevant. The ability to communicate, collaborate, think critically, and adapt to change will always be in demand, regardless of technological advancements. TBL has not only prepared me for my future career as a pharmacist but has also equipped me with lifelong skills that will enable me to thrive in an AI future.

To conclude, my experience with TBL at Regis University has been vital in shaping my professional development. From my initial introduction during my interview to my ongoing participation in TBL sessions, I have gained valuable skills that extend far beyond the classroom. Through collaboration, communication, and critical thinking, I have learned how to navigate complex problems, work effectively in teams, and contribute meaningfully to patient care. As I move forward in my education, I am confident that these skills will continue to guide me, allowing me to provide holistic, patient centered care.

10 How TBL Changed Me Beyond the Classroom in an AI-Driven World

Anonymous
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Master of Pharmacy

I was introduced to Team-Based Learning through InteDashboard this year when I began my course. Initially, I was slightly sceptical because I was unsure how it would work in practice. Although my lecturers explained the process during our first session, I did not fully understand its value and how it worked practically until I began experiencing it for myself.

Over the academic year, I took part in several TBL sessions, and as the year comes to an end, I can now reflect on how much the experience has shaped me. I realised that while artificial intelligence can support learning, automate processes, and provide information quickly, it cannot replace the human ability to communicate effectively. Neither can it adapt under pressure, listen carefully, work collaboratively with the MDT, and make ethical, human-centred decisions. Through TBL, I have become a stronger communicator and, most importantly, a better listener. These skills have not only supported my development as a pharmacy student but have also influenced how I mentor and support other students within pharmacy and the education sector.

My first ever TBL was on the topic of Professionalism, Attributes and Skills for Pharmacists. Because everything was still new, our conversations at the beginning as a team felt

slightly awkward. Friendships had not yet been formed. However, every week we had at least one TBL session, and over time we formed very meaningful connections, and our conversations flowed much more easily. Our tendency to reason together also grew. No one believed they knew above the team; it was almost natural to conclude that we were a team working together to achieve the best possible grade. This development in both our communication and collaborative skills reflected positively in our results, as we consistently scored 90% or above collectively.

I completely agree with my lecturers engaging us in TBL because it honestly helped me to think through topics with a more logical approach. While also learning alongside like minded people who were open to listening, discussing, and asking questions when they were confused. One skill amongst the many that I think I learnt the most was listening. Many times, we enjoy letting people hear what we know, which is great because sharing opinions is important, but it is equally important to listen to the opinions of others. I decided that I was going to listen more than I spoke and, of course, speak and contribute at the appropriate time, allowing everyone to have their say and conclude as a group. This perspective on life have even helped build my relationships outside of school and during placement. This is not to say that I did not speak during the lessons; in fact, it was quite the opposite. Yet, I grew more consciously aware of allowing people to speak up, fostering a better and more effective learning environment.

During a Team-Based Learning session, my team and I were presented with a case from an out-patients clinic where we had to identify which patients qualified under set criterion. Our task, after identifying them, was to provide a brief justification for our decisions. This case was very complex and required keen attention to details as well as application of knowledge from

previous lessons. This meant that every member was challenged by the quest and had to interpret it according to their own understanding.

Each patient in the scenario presented cases far more demanding than simply memorising content. This was because every patient presented multiple overlapping factors, including alcohol abuse, treatment failure, neurological disorders, and psychiatric illnesses. We debated the topics and discussed the potential inclusion or exclusion criteria. After this, everyone justified their reasoning for whether each patient should be included or excluded from the clinical trial. Members contributed different perspectives and justified their reasoning using the data provided. Before submitting the answers, a member challenged our interpretation. She mentioned that we might have approached the scenarios incorrectly. After carefully listening to her suggestion, we reasoned through it together and realised she was making a very good point. We responded by changing the answers we had not yet submitted. Bearing in mind that we only had five to seven minutes left, that moment during the TBL completely changed my understanding of learning within pharmacy and healthcare. It showed me that effective decision-making was not always about simply acquiring knowledge, but about listening carefully, communicating openly, adapting when challenged, and reasoning collectively as a team. These skills are what make us human and what we need to sustain the quality of healthcare in an increasingly AI driven world. TBL developed the human skills that technology, regardless of its advancement, cannot fully replace, including communication, adaptability, leadership, ethical reasoning, and collaborative problem-solving.

The influence of TBL extended beyond the classroom and influenced how I interacted with and supported other pharmacy students, both within my

university and nationwide. I created an online pharmacy community which aims to support pharmacy students with calculations and OSCE examinations by encouraging daily practice, revision and a more academically focused community. Through availing myself to help students, I learnt that students learn differently and each student has their own personal challenge. Additionally, communication is extremely important when it comes to building confidence in students. I also learnt that students reach out simply for encouragement and a support system. Most students are aware of what they need to do to improve, but sometimes they are unable to achieve this not due to ignorance, but they lack support. I also learnt about accountability and its essential nature in academic growth. Genuine academic accountability keeps students focused, dedicated, and in the best possible position to achieve their goals.

By God's grace, I was also hired as a tutor. There, I was able to apply the skills I learnt through TBL during my teaching lessons. I incorporated these skills during lessons by communicating effectively with students and allowing them to speak and voice what they struggled with instead of speaking all the time myself. By so doing, I realised that the students' grades increased significantly, and they became much more open in sharing their struggles, which meant that I was able to tailor lessons to their specific needs. Collaborative learning from TBL influenced both my teaching style and my supportive temperament.

I also applied these skills in my group teaching lessons, where I encouraged discussions amongst students, teaching them the importance of peer learning and support, almost mirroring the TBL sessions in my lessons through InteDashboard. Sometimes, I asked each student to read out their work and allowed their fellow classmates to critique it and provide feedback. I then encouraged

them to improve their work by applying the feedback and criticism they received.

Although AI can instantly generate explanations and answers, I realised through Daily MPharm that students still value human encouragement, reassurance, accountability, and shared experiences. Many students do not only struggle with understanding concepts; they struggle with confidence, fear of failure, and exam pressure. These are challenges that require empathy, communication, and genuine human connection.

As an aspiring pharmacist, I know that pharmacists do not simply dispense medicines. Instead, they communicate, reassure, reason ethically, adapt, and handle uncertainty professionally and clinically. This is why the skills I developed through TBL are so important. In the future, whether I work in community pharmacy, hospital pharmacy, or industry, I will still need these human skills, skills that AI can never truly replace.

TBL also reflected the multidisciplinary nature of healthcare, where pharmacists must work closely with doctors, nurses, and other healthcare professionals to achieve the best outcomes for patients. During my placement, the pharmacy I worked at had a Meditech robot that picked and brought out requested medicines. AI is no longer foreign within the healthcare system, pharmacies included. However, effective clinical reliance still depends heavily on human interaction.

As previously mentioned, the most important skill I developed during this year's TBL sessions was listening. Listening is a skill that AI cannot truly replace. A person may say that they are fine, but their facial expressions, tone of voice, and general appearance may suggest something completely different. This understanding is deeply intrinsic and human and cannot be fully replaced by AI. Patients do not only need correct answers; they need understanding, reassurance, empathy, and trust.

In a world increasingly shaped by artificial intelligence, I believe human connection will become more valuable, not less. Team-Based Learning taught me that some of the most important aspects of healthcare are not simply about having the correct answer, but about listening, understanding, and supporting people through uncertainty. Those are the skills that will continue to define meaningful healthcare long into the future.

Ultimately, TBL fundamentally changed how I learn, communicate, lead, and support others, and it shaped the kind of healthcare professional and person I aspire to become.

11 Benefits of TBL in Modern Pharmacy Education: Creating AI-Proof Skills and Clinically Meaningful Outcomes

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Regis University
Doctor of Pharmacy

Our School of Pharmacy uses team-based learning (TBL) for most of our classes, and all of the key pharmacology curriculum is taught using TBL. I was definitely skeptical of TBL at first, but during my interview day at Regis we did a short mock TBL application with all the interviewees and it really helped me understand what TBL is and how it can be used day-to-day to learn and develop pharmaceutical knowledge and decision-making skills.

I would say when we do TBL applications, they usually fall into one of two large categories: clinical cases or questions about scientific, factual knowledge. I think TBL is especially amazing in a medical education, like mine, because of our ability to work through clinical cases with teams, similarly to what we will be doing in our careers. This is not to downplay the benefits of being able to discuss and learn from classmates on questions of physiology, mechanism of action of pharmaceuticals, etc., as having teammates explain those complex topics to me has helped

me enormously through school so far. When we get a fictional patient case though, we get to think critically as if we were the pharmacist standing right in front of the patient. We make sure that we are considering everything we need to be to make the best recommendation to them. I don't think it would feel the same to consider cases in a traditional, lecture-style classroom. In TBL, I come up with my own answer, reasoning, and plan of action. I don't just loosely consider what the next step may be, like I imagine I would in a lecture class just being taught about a case; I develop and fully lay out a plan and then defend it to my teammates. I think you can obviously learn so much and be a great pharmacist through either method - traditional or TBL - but through TBL my classmates and I get to individually take on a more analytical lens and practice under the pressure that comes with making a decision and defending it. Further, one of the key benefits of TBL is the way we get to practice so many soft skills by being in teams and collaborating with our classmates to such a major extent.

While I have a lot left to learn, we have been working through much more complicated patient cases as we have been progressing through the curriculum. Some cases will have patients on 10+ medications, multiple complicated disease states, several allergies, many lab values that need to be analyzed, and it is super important to have a real person looking at all the information to make the best recommendation. With cases like these, I feel as though having a trained professional's consideration is essential; artificial intelligence (AI) can make so many mistakes or overlook critical aspects that could differentiate between life-saving treatment and something that would harm the patient.

In real life, patients also can be skeptical and may need a lot of support and problem-solving to ensure the best outcomes. Some patients have beliefs or preferences that don't align with the most logical, first-line,

guideline recommendations. In these cases, I think AI would struggle with creating the best plans and would be less effective in working with a patient to find what will be best for them. For example, I speak with patients at the pharmacy all the time who have unique schedules and cannot take their medications on time. I am then able to ask them about their day-to-day lives and use my clinical knowledge to find the best alternative schedule that they can actually adhere to. I also get to learn about patients and can tailor counselling points to them, ensuring the information I give them in the limited time we have is what is most relevant to them and most likely to have an effect. The relationships that we form and patient-specific considerations we can make with our training and experience allow us to provide better patient care than any AI or computer algorithm could in almost every situation, I believe.

I think most patients also value having human connection in their health journeys. I truly care about how my patients feel and will do everything I can, even if it isn't necessarily the most "by-the-book" approach, to ensure patients get the care they need. I cannot imagine knowing that decisions about my medical care were made by AI instead of by a person who I can look in the eye, who cares about me, and who can see the full picture of who I am as a person, not just as a list of lab values or conditions, and I think most people would agree. Health is so vulnerable and I don't think the value of human connection will ever go away.

Communication skills to help in providing that connection and care is one of the things practiced the most in TBL. I love working with my teammates; they teach me so much, both directly by explaining things in understandable language and indirectly by demonstrating their thought processes and allowing me to consider new points of view. There are definitely times where my classmates and I disagree, though, and this can cause some tension in the team, but I think this has created really important learning opportunities

for soft skills. Once, I was so confident in an answer for a quiz because I remembered just re-reading the materials and seeing the information. All of my teammates thought it was another answer, which was sort of tricky. The answer they were all leaning towards was not untrue, but it was not the best response to answer the question with. In our first semester, my team and I were in the habit of moving super quickly and wanting to immediately submit our answer to know if we were right or wrong. Since I felt so confident though, I asked if we could stop and if I could talk everyone through my answer and allow us all some time to think about the question. In this situation and the many other disagreements that arise during TBL, I have learned a lot about empathizing with my classmates' point of view and how frustrating the learning process can be, standing up for my ideas and finding strong ways to support and communicate my arguments, and de-escalating disagreements, especially those involving miscommunication. Other times, I have been on the other side, thinking a wrong answer was correct, and when nobody is confident or has a strong argument, we get answers wrong. This is where the immediate feedback that we get during TBL using tools like InteDashboard for readiness assurance tests (RATs) is so helpful. We immediately know that our answer was incorrect and can take our next best guess, earning at least some points back. We can also then know what the right answer is within a few more tries, which is great to immediately correct our misunderstandings and get correct information, especially since we can ask for clarification and pose further questions to our classmates and professors right away or during class.

I love that the same technology is also used for applications during the bulk of class time. It makes it much easier to have the question right in front of me on my device, but I still feel very connected with my team since we all have to discuss and come to a consensus before the

reporter puts our answer down. The other features of InteDashboard, like the post-application discussion, where we can see what the other teams answered and their elaborations are so helpful! I get so much more out of class time because everything is so easy to understand and use on InteDashboard and I can focus solely on learning.

The skills that I have gained using TBL and InteDashboard will absolutely translate into daily pharmacy practice and already have for me as I currently work in a community pharmacy. Every day, I talk with patients who are confused and frustrated about their medication therapy or dealing with insurance. Working with people every day in class really helps me better navigate these conversations with patients while being supportive and understanding. The future of pharmacy is definitely oriented in a more clinical direction where pharmacists spend much less time filling and verifying prescriptions and instead manage therapies and work with patients to optimize the benefits of their medications. Skillful patient communication will therefore only grow in importance. Pharmacists also usually work in interdisciplinary teams in clinical roles or communicate regularly with prescribers in community settings. These interactions can be difficult since the parties involved come from different practices with different knowledge and experiences. Navigating any disagreements that arise can be extra challenging since everyone usually has a different opinion on what is best for the patient. Careful communication to explain the rationale for decisions is necessary, and is something I feel so much more confident doing as I practice defending my ideas and finding strong evidence with my teammates daily. I am learning so much in school and am so excited to be a practicing pharmacist in the near future. I am confident that I will be able to provide great patient care, and this confidence is due to the quality of my TBL curriculum, which is enhanced by

technologies like InteDashboard. I am so glad I chose a school that uses TBL, it is something I am sure I will never regret.

12 How TBL Equipped Students with AI-Proof Skills

Anonymous
Regis University
Doctor of Pharmacy

Although humans are not the fastest, strongest, or best shielded animals on the planet we guarantee our success as a species through one trait: teamwork. Our ability to collaborate towards a goal and communicate with each other allowed us to survive harsh environments. Looking at modern times, this trait has not let us as we continue to use teamwork to achieve great feats; such as the International Space Station or the Human Genome Project.

I pursued my undergraduate degree in Chemical & Biological Engineering at Colorado State University. During my time at Colorado State University, I explored the biomedical sciences as well as the pharmaceutical industry. I further explored this in my undergraduate journey by working part-time as a pharmacy technician. After getting my bachelor's degree in chemical & biological engineering I decided I wanted to pursue a doctorate in pharmacy. I heard about an opportunity to apply to Regis University at work. I ended up applying to both Regis University and the University of Colorado. After learning about Team-Based Learning during my interview with Regis University, I decided to attend. I felt I always performed my best when I was accountable not only for myself but for others. My team-based

learning (TBL) journey started on orientation day when we were assigned teams based on questions such as, “how many languages do you speak” or “have you ever travelled outside of the country.” We remained in those teams for our first semester. I found myself creating a close-knit group where we would help each other prepare outside of class. We would prepare the material outside of class and then class time would be dedicated to working on patient cases and applications with our teams. I believe my successes in pharmacy school can all be attributed to the team-based learning environment. Teamwork will be essential to my career in pharmacy whether I’m in the hospital, retail, ambulatory care, or industry.

TBL has helped me strengthen my skills needed to work on a team. The first skill that comes to mind is leadership. Leadership involves knowing when to delegate, soliciting input, and taking responsibility. One classroom moment that comes to mind is during the first semester while we were first learning about different disease states like hypertension. I remember I would ask different people to verify the answer we came up with using our tertiary resources such as Lexidrug™ and Clinical Pharmacology. This, I believe, helps speed up the process of arriving at our answer unanimously while not relying on just one single resource. Something I’ve tried to be consistent with since then has been to solicit answers from people. I feel this has helped build rapport when we get new teams and ensure all thoughts have been brought up so we have a thorough answer. There have been many instances where we caught a caveat in the therapy that wasn’t so obvious because all team member’s thoughts were solicited. Finally, I’ve made it a habit to say “we” instead of “I” when presenting our team’s answer. I believe the difference shifts the ownership of the answer from the presenter to the whole team. I’ve also noticed that it helps others feel comfortable sharing the team answer when using this tone

shift. Another skill that TBL has helped me strengthen is communication. Good communication with the team leads to a stronger team, which reminds me of a group project we did. We needed to make a video for our class, and we only needed an hour to get all the recording done. I believe we were able to get it done so quickly because of all the communication we had beforehand. We used our group chat to assign roles, determine what supplies we needed, and when we would meet. We also had a shared document on OneDrive, which let us collaborate on a script. I've made it a habit with every new team to have a group chat. This allows us to let each other know if we won't be in class or if we're running late. There was one time when there were only 2 of us at the start of class and we knew one person was going to be gone for a trip. We didn't know the whereabouts of our other two members, so it was a little frustrating working on the first question with just two team members. Eventually our other team members showed up, but we initially struggled with the first few questions. Clear communication from our other team members would've resulted in us having better results on the first few questions.

I've touched upon how group messaging and document sharing has supported my TBL journey so far, especially in the communication category. InteDashboard has also played a big role in that journey. InteDashboard is helpful when we have a long patient case. We can sequentially go through the questions as a group and have access to the case throughout. I remember moments when we don't use InteDashboard and it's a case with multiple parts you must make sure you write certain things down or you find yourself asking to go back to previous slides. InteDashboard also allows us to think of the patient case as a whole, as we can answer every question at once and then go over them after. I think InteDashboard also lets us build better answers because we are forced to type it up. For example,

in my literature analysis class there is a pretty good split of multiple choice and free response questions. I've noticed that teams are much thorough when a free response question pops up. InteDashboard is also helpful during discussions because we can see what other teams have submitted. When a person across the room does not present with a loud enough voice, being able to see their response in InteDashboard alleviates some of the guessing. The last thing about InteDashboard that has been helpful is the ability to change reporters. This allows full participation from the group so not one person is stuck typing it all. This also gives us the ability to delegate tasks as some people may be better equipped for certain questions.

The skills I have gained will make me successful in an AI-enabled workplace. AI is growing rapidly and being integrated into everything, but being on a team in TBL has shown me the piηalls of it. tine piηall I've seen is hallucination, where I've seen team members be led astray because the chatbot they used pulled from irrelevant sources or ones that didn't exist. This can be applied to my future career because as a leader I need to be proactive about making an environment where people feel comfortable not having the right 'answer.' Soliciting from fellow coworkers will make them feel valued and less reliant on using AI for an 'answer.' AI can be used to brainstorm ideas, but it shouldn't guide everything. For example, when we were deciding what to do for our business plan project, we used ChatGPT to brainstorm some ideas for the type of pharmacy we wanted to open. It served as a great jumping point. Communication I use in TBL will easily be translated into my career, and I already see examples of it at work. I currently work as a Pharmacy Intern, and we have a group chat between all the pharmacists, interns, and technicians. This allows us to communicate immediate schedule changes and reminders on any training that may be due. I have also shared

documents that my pharmacists can edit for pharmacy use. One of the documents I shared was a template I had ChatGPT make for a printable pharmacy to pharmacy transfer form. TBL has also taught me how to work with a variety of different people and how to handle different situations. This will be applicable to every role I could get in the pharmacy world, such as in the hospital you work with a team of technicians, nurses, dieticians, medical doctors, and social workers.

I believe I have thrived in my studies because of the TBL format. Comparing my time in undergrad, which was lecture based, and my time in pharmacy school; it's almost night and day in the difference. I believe that TBL forces you to not only be responsible for your learning but the learning of others. The two biggest skills I have developed during my time in TBL have been leadership and communication. Those skills have included a lot of trial and error as our teams have changed every semester. I've had to adapt my skills depending on the personnel of the team. I think these skills will be important as we teach others not to be reliant on AI and adapt AI to a more supportive role within the workplace.

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