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On embedding assessments of self-regulated learning into licensure activities in the health professions: a call to action

L'intégration des évaluations de l'apprentissage autorégulé dans les activités d'évaluation dans les professions de la santé : un appel à l'action

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Abstract

How well have healthcare professionals and trainees been prepared for the inevitable demands for new learning that will arise in their future? Given the rapidity with which 'core healthcare knowledge' changes, medical educators have a responsibility to audit whether trainees have developed the capacity to effectively self-regulate their learning. Trainees who engage in effective self-regulated learning (SRL) skillfully monitor and control their cognition, motivation, behaviour, and environment to adaptively meet demands for new learning. However, medical curricula rarely assess trainees' capacity to engage in these strategic processes. In this position paper, we argue for a paradigm shift toward assessing SRL more deliberately in undergraduate and postgraduate programs, as well as in associated licensing activities. Specifically, we explore evidence supporting an innovative blend of principles from the science on SRL, and on preparation for future learning (PFL) assessments. We propose recommendations for how program designers, curriculum developers, and assessment leads in undergraduate and postgraduate training programs, and in licensing bodies can work together to develop integrated assessments that measure how and how well trainees engage in SRL. Claims about lifelong learning in health professions education have gone unmatched by responsive curricular changes for far too long. Further neglecting these important competencies represents a disservice to medical trainees and a potential risk to the future patients they will care for.

Résumé

Dans quelle mesure les professionnels de la santé et les étudiants ont-ils été préparés aux exigences inévitables de nouveaux apprentissages qui se présenteront à eux à l'avenir? Étant donné la rapidité avec laquelle les « connaissances de base en matière de soins de santé » évoluent, les enseignants en médecine ont la responsabilité de vérifier si les étudiants ont développé la capacité d'autoréguler adéquatement leurs apprentissages. Ceux qui pratiquent efficacement l'apprentissage autorégulé (AAR) surveillent et contrôlent habilement leur cognition, leur motivation, leur comportement et leur environnement pour s'adapter à la nécessité de nouveaux apprentissages. Cependant, les programmes d'études médicales évaluent rarement la capacité des étudiants à s'engager dans ce processus stratégique. Dans cet exposé de position, nous plaidons en faveur d'un changement de paradigme vers une évaluation plus ciblée de l'AAR dans les formations doctorale et postdoctorale, ainsi que pour les activités d'évaluation. Plus précisément, nous explorons les résultats convaincants de l'emploi d'un mélange innovant de principes issus de la recherche en matière d'AAR et d'évaluations de la préparation à l'apprentissage futur. Nous proposons des recommandations pour une collaboration entre les responsables de la conception de programmes d'études, ceux de l'élaboration du cursus, ceux chargés de l'évaluation dans les programmes d'études prédoctorales et postdoctorales et les organismes responsables de l'octroi d'un titre de compétence en vue de créer des évaluations intégrées qui mesurent la méthode et la qualité de l'AAR chez les étudiants. Les programmes d'études tardent encore à traduire dans la pratique la reconnaissance de l'importance de l'apprentissage tout au long de la vie dans l'éducation médicale. Continuer à négliger ces compétences importantes ne ferait que nuire aux étudiants en médecine et potentiellement à leurs futurs patients.

Why assessing Self-Regulated Learning processes and outcomes matters in medical education

Nearly every day healthcare and technological changes prompt medical trainees to engage in ongoing, strategic learning activities. For instance, the global coronavirus disease 2019 (COVID-19) pandemic changed the fundamental knowledge needed to care for a substantial portion of the population. Consequently, healthcare trainees and professionals have needed to update their knowledge regarding how to diagnose, triage, and manage patients with suspected or confirmed COVID-19, while also having to learn new policies and workflows associated with shifting infection prevention and control measures. The extent of that learning has surely been variable across professionals. Construing such learning as a self-regulated activity unveils several key processes: interpreting the demand and available sources of information (i.e., task identification and orientation), setting standards for achievement (i.e., goal setting), planning how to access 'sufficient' information (i.e., planning), deploying strategies to access and appraise new and sometimes contradictory information, and adapting learning plans, clinical practices, or both, as needed.[1] During such dramatic shifts, society and individual patients have the right to expect that healthcare professionals are willing and capable of learning what they need to deliver the best possible care.

While medical curricula cannot teach what is unknown, fortunately, the medical education system can strive to develop professionals who can adaptively respond to demands for future learning. Encouraging and evaluating progress towards this objective requires assessing how well trainees have been prepared to respond to these demands. Despite the need for assessment data, only a small number of research teams have explored how to assess Self-Regulated Learning (SRL) processes,[2,3] which may underly trainees' lifelong learning skills.[4,5] How can the medical training system ensure that trainees today will become competent professionals who can recognize, and skillfully address their learning needs tomorrow?

As self-regulating professionals, physicians have the privilege and the responsibility to oversee their individual and collective practices. For self-regulation to be successful, both individual physicians and the regulatory bodies of medicine's self-governance must enact structures to ensure physicians meet the societal expectation of continual learning toward safe, up-to-date practices. From an outcomes perspective, the high quality of care patients receive in Canada might lead some to assume that the current educational system does not need to change (though mixed evidence challenges this view[6]). From a process perspective, however, reports have suggested that many opportunities for improvement remain.[7] We argue that working successfully as a self-regulating professional requires engaging in effective SRL to recognize and respond to demands for new learning. SRL is defined as a strategic process in which learners monitor and control aspects of their cognition, motivation, behaviour, and environment to achieve their academic goals.[1,8,9] If the sands of healthcare are ever-changing, then our patients deserve physicians who have demonstrated that they can competently navigate these shifting foundations. While many medical faculties, postgraduate training programs, and regulatory organizations recognize the importance of competencies associated with lifelong learning (e.g., the CanMEDS 'Scholar' role), those same educational bodies do not always propose instructional and assessment design practices to improve and collect data on 'lifelong learning' as a competency.[5] We argue that evidence associated with SRL, in medical education and beyond, represents a strong foundation for efforts toward defining, supporting, and assessing lifelong learning.[5,10,11]

In this position paper, we argue for a paradigm shift for all stakeholders: licensing body leadership, medical school faculty leadership, clinician teachers, and learners. In the sections that follow, we offer our rationale and select evidence supporting an innovative blend of principles from the science underlying SRL and preparation for future learning (PFL) assessments. We end with recommendations for how undergraduate faculties, licensing bodies, and postgraduate training programs might work together to assess SRL (and, perhaps by proxy, lifelong learning). We posit that making the assessment of SRL explicit for trainees, through curricular change, may lead them to feel more empowered and confident in dedicating energy to their development as self-regulating, lifelong learners.

How do we define SRL?

Like others, we define SRL as a strategic process whereby learners monitor and control aspects of their cognition, motivation, behaviour, and environment in service of achieving their learning goals.[9] Many theoretical models describe SRL as a recursive process,[9,12–14] wherein learners shift from setting goals to implementing strategies for goal achievement, to monitoring their progress towards their

goals, to adjusting their strategic approach if necessary, and lastly, to developing new goals when prior goals have been attained. For example, performance on exams and other assessment activities represent the outcomes of trainees adopting goals, and then using various learning strategies to make progress towards them. Subsequently, trainees might use exam results to set new goals to achieve. Importantly, self-regulating learners pursue goals most times they learn, even when completing learning activities assigned by others and/or when working with others (e.g., educators, supervisors, colleagues, and patients).[13,15] Thus, SRL does not imply independence, given that any time learners are attuned to and pursuing a goal, they have the potential to self-regulate.[16,17] From this theoretical lens, and drawing on the empirical literature,[18] we formulate the following assumptions regarding 'effective' SRL:

- SRL can be considered 'effective' to the degree that learners: (i) set goals that emphasize long-term retention and transfer of knowledge and skills rather than short-term achievement, (ii) use learning strategies commensurate with their goals, (iii) monitor their progress in relation to their goals, (iv) appraise and adjust their approach to learning when necessary, (v) seek out help when required, and (vi) persist towards goal attainment in the face of difficulties, distractions or boredom.
- These processes will occur during a single situated learning task (e.g., studying a 1-hour module on clinical management of weight gain), as well as during and across a series of connected learning sessions (e.g., setting a goal to learn about goals of care discussions with Parkinson's patients during a 4-week geriatric rotation).
- Effective SRL leads to better outcomes, both in terms of relevant learning outcomes (e.g., transfer), and outcomes in future clinical performance (e.g., 'adaptive expertise' in managing patients with complex diagnoses).
- External pressures for learners to be 'accountable' for their own learning success may have the desired effect, though they may also be perceived as a form of external control, which could lead to unintended decrements in trainee motivation, learning, and wellness.

Researchers across many fields, including medical education, have commonly conflated SRL with 'self-directed learning' (SDL).[19] We take the position that SRL is distinct and different from SDL. Two factors have influenced us to prefer SRL as a central construct: the cumulative trajectory of scholars and theories formulated in educational psychology, and the resultant evidence base which emerged from the associated diversity and depth of methodologies for studying SRL processes and outcomes. By contrast, SDL has been most directly linked to problem-based learning activities in the medical education literature.[19] While literature on SDL has insights to offer, we will use SRL to describe goal-directed learning within this position paper.

Context and reflexivity

We originally wrote this position paper in response to a request from the Medical Council of Canada's recent Task Force, which was struck to develop best practice guidelines for integrating many relevant educational constructs into licensing assessment practices (e.g., feedback, summative assessment). Specifically, author RB was approached to consider the questions: "What is the value of embedding SRL more deliberately into licensing activity?" and "When it comes to SRL, what should be assessed, how, when, and why?". To develop a diverse perspective relevant to undergraduate and postgraduate training, as well as to those researching this topic, RB asked the remaining authors to contribute to this position paper.

Our team includes individuals with expertise in assessment of undergraduate medical students, postgraduate trainees seeking licensure, and practicing physicians (ML), licensure/certification activities (ML and IM), assessment and validation (RB and IM), and self-regulated learning (RB and AGG). Our diversity also extends to our training, with expertise in general internal medicine (IM), family medicine (ML), public health (AGG), and medical education research (AGG, IM, ML, RB). We aimed to share our unique perspectives on the confluence of SRL, assessment, and licensure. Rather than being definitive, we intend to initiate a conversation on the opportunities to integrate ideas in this domain.

Philosophical positions underlying our perspectives

How one thinks about the purpose of education, assessment, and the roles of teachers and learners can be encapsulated in one's chosen paradigm of education.[20] Recently, scholars have called for educators focused on assessment to explicitly consider, select, and operate from

a paradigm that aligns with their intentions. These calls aim to motivate educators to align their assumptions, activities, and appraisals when generating data via assessments.[21,22] For example, the designs of most medical licensing exams, like the Medical Council of Canada Qualifying Examination (MCCQE) and the United States Medical Licensing Examination (USMLE), often (though not exclusively) align with a post-positivist paradigm focused on correct answers and recall-based formats.

By contrast, in this position paper, we align our theoretical perspective on SRL with the philosophical position of 'cognitive constructivism'.[20,23] We believe that self-regulating learners construct knowledge via an idiosyncratic 'meaning-making' process guided by internal factors such as their prior knowledge, beliefs, and goals, as well as external factors such as the epistemic culture of educational institutions.[24,25] Situated[26,27] and situative[28] models of SRL, as well as emerging models of co-regulated learning and socially shared regulation,[29] also align with another relevant paradigm of education, 'social constructivism', which emphasizes how learners co-construct knowledge and their own identities through social interactions.[20] With these paradigms as our lenses when considering licensing exams as situated learning activities, we might ask questions like: How do these sentinel events link to trainees' experiences before and after the exams? and, Who do trainees learn with as they prepare for exams, and why and how do they form those networks? Such questions emphasize the social organization that major exams tend to influence, and the consequent social structuring and knowledge-building challenges trainees experience in preparing for and moving on from such events.

Assessment literature informing a focus on SRL processes in licensing exams

Those responsible for curriculum design and assessment practices have preferentially emphasized trainees' mastery of today's knowledge, skills, and attitudes,[30,31] while largely neglecting to teach and assess how trainees learn and adapt tomorrow's information into their health system practices. Put another way, medical educators tend to teach and assess the knowledge acquired today without considering learners' ability to acquire new knowledge tomorrow. We do not intend to place assessing mastery of today's knowledge in competition with assessing tomorrow's learning abilities; instead, we believe the two can be assessed concurrently and synergistically. We do wish to critique that, to date, most organizations within the medical education community appear to address the skills associated with 'lifelong learning' through rhetoric (e.g., lifelong learning is mentioned in many medicine training programs' education goals); however, concrete educational or assessment initiatives are quite rare.

Moving rhetoric into practice presents challenges for all theory-oriented scholarship. A relevant research area to inform a shift from rhetoric to action in how medical educators assess how trainees learn involves 'dynamic assessments'.[32] When assessing dynamically, educators provide resources such as instruction and/or sources of feedback during the testing process, with the assessments focusing on how and how well learners use these resources to respond to test items.[33] That is, these assessments test what trainees know along with the strategies they use to regulate their learning. A recent knowledge synthesis shows that educators have described a variety of dynamic assessments, yet minimal validity evidence exists to ensure each assessment has been optimized for its proposed use.[34]

Preparation for Future Learning (PFL) assessments: descriptions, assumptions, and propositions

A specific form of dynamic assessment, called a PFL assessment, has received much recent attention in medical education. PFL assessments aim to measure how well an individual selects and learns from new resources (e.g., updated guidelines, continuing education materials, colleagues, the internet) in service of using that learning to solve a target problem.[35] Thus, PFL assessments focus on how learners 'transfer in' relevant previous knowledge to help them choose and learn from available resources and on how they 'transfer out' this new learning to solve novel, related problems.[36] Given PFL assessments require new learning, we suggest that they might be particularly useful for capturing learners' ability to effectively self-regulate their learning, which, as we have argued, may provide the foundation for lifelong learning.[5,11] Turning this proposition into reality will require future research that measures learners' strategic actions during PFL assessments, conceptualizes them as SRL processes using relevant theories,[37] and relates them to the outcomes learners achieve on PFL assessments. Then, metrics for capturing such processes can be incorporated into PFL assessments when administered to learners.

Many custom designs of PFL assessments have shown promise across many education studies; however, their abundance and heterogeneity likely leave educators uncertain regarding which design would best align with their objectives. For instance, one PFL assessment design includes an 'embedded resource', in the form of a worked example exam question that learners can study and use to solve the remaining exam questions.[35,36] Subsequent studies have shown that learners will effectively use embedded resources, like worked examples[38] or timely hints,[39] to solve related problems, especially if their initial learning has been designed to prepare them for future learning. As an illustrative example, Steenhof et al.[40] developed multiple-choice questions containing new content in the stem (i.e., an embedded resource), which required problem-solving and learning that facilitated answering other 'target' questions. Notably, SRL researchers have established methods for scoring how learners engage with such embedded content (i.e., what notes do they take? what steps do they follow?),[41] whereas PFL researchers have methods for scoring the accuracy of the eventual answers.[40] We are not aware of studies that have brought these process and outcome measures together. *We argue that the embedded resource PFL assessment would be ideally integrated into licensing examinations that currently use the MCQ format (e.g., the MCCQE); further, to establish continuity across the medical education spectrum, such questions could also be included in formal undergraduate, postgraduate, and continuing education assessments, as well as in preparatory exams.*

As an alternative, we refer to a second PFL assessment design as the 'learn-then-perform' approach. In this design, individuals study a resource containing new information conceptually related to their initial learning (e.g., reading a case report outlining key information about a novel disease), and then apply what they have learned during a subsequent performance-based assessment (e.g., diagnosing or managing three scenarios with patients suspected of having that novel disease).[10,42] As a potential example, a pair of coupled Objective Structured Clinical Examination (OSCE) stations[43] might involve: Station A presenting a patient chart with a difficult problem to resolve (e.g., key information missing), alongside a set of reference materials for trainees to use to solve the problem (no examiner in the room), followed by Station B presenting a patient with a related and novel condition that requires trainees to apply their learning from Station A to diagnose and/or manage the patient's case (an examiner would be present here). The standard OSCE scoring would apply to Station B, while scoring for Station A would be novel and could be informed by covert 'trace data'. Trace data have been framed as 'learner analytics' that provide data on how learners use resources to learn strategically.[44–46] For example, Bernacki et al.[41] collected trace data as learners studied content in a web browser, including how they highlight, their notes taken, which links they click, and how they used interactive components such as reviewing their progress. *We argue that the learn-then-perform PFL assessment, combined with learning analytics data, would be ideally integrated into performance-based licensing examinations. Once again, such stations would be ideally added to the formative and summative performance-based exams currently included in undergraduate and postgraduate education assessments.*

As we note for both types of proposed PFL assessments, successful implementation would require an agreement and coordination of thinking and resources across medical schools, licensing bodies, and postgraduate training programs and their regulatory agencies. That is, we believe all stakeholders would need to be aligned in their paradigms of education and thus in how their systems would be integrated accordingly. As depicted in Figure 1, we imagine a connected system with the coordinated collection of assessment and learner analytics data generated in undergraduate educational activities, the process and outcome data from licensing exams, and the assessment and learning analytics data generated in postgraduate training activities. Beyond adapting all the assessments (which require several considerations discussed below), many of these stakeholders already collect such data, but the system of coordination between them has yet to be formalized and capitalized upon.

To be explicit, we suggest that the proposed PFL assessments can be used to capture the specific SRL-related process of strategy *use*, which would provide educators and trainees with meaningful insights into the quality of underlying strategy *knowledge*. Furthermore, such PFL assessments would provide feedback regarding *domain knowledge*, which can inform the direction of future SRL (i.e., the subsequent goals trainees set). While we appreciate that trainees' variable levels of motivation may also contribute to variability in PFL scores, we do not propose that the approach to PFL assessments outlined above would measure motivational constructs.

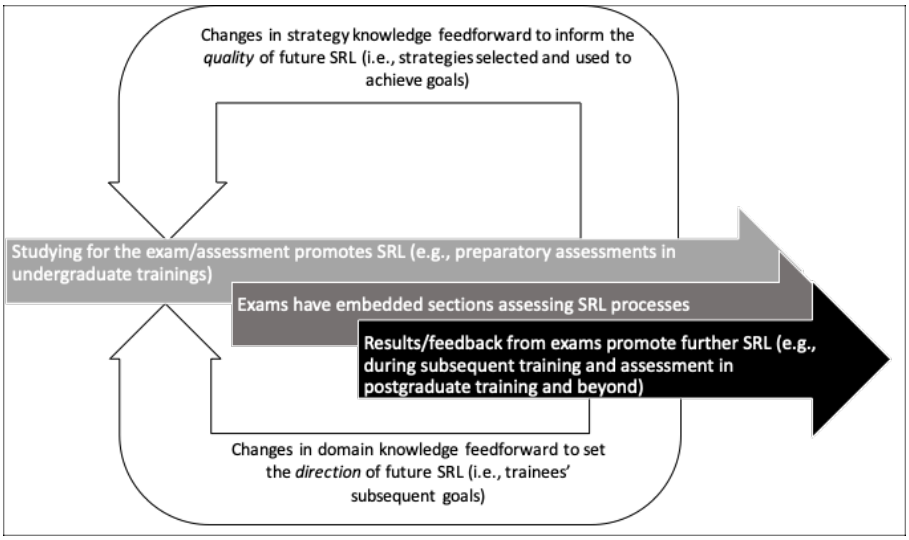

Figure 1. Visualizing how educators can conceptualize integrating licensing body assessments with the surrounding experiences of undergraduate and postgraduate medical training.

Previous evidence on how assessment data often fails to inform SRL across learning situations

Given that new approaches to assessment require time and resources, designing new or modifying current assessment approaches must be justified. Evidence suggests that many current educational practices, especially formative assessments, do not prompt learners to engage in effective SRL. As examples, studies across multiple settings have shown that medical learners tend not to use feedback provided to inform their learning, including not utilizing feedback received during the debriefing that follows simulation-based training,[47,48] and not accessing a purpose-built website with information-laden feedback following an OSCE.[49,50] In another study showing similar potential dismissal of useful feedback following an OSCE, Eva et al.[51] found that medical trainees tended to filter the feedback they received through their own self-assessment. Given the strong evidence-base suggesting that self-assessments are typically inaccurate,[52–55] a key question is whether regular, coordinated, situated cycles of training and assessment focused on SRL and PFL might help learners improve how they access, act upon, and adapt to the assessment feedback they receive? That is, by integrating PFL assessments, we believe that medial educators will signal an important shift to learners: that the system is seeking to become as accountable to lifelong learning as it expects of its learners.

Anticipated benefits of combining situated study of SRL capacity and PFL assessment

By altering our medical training system to explicitly encourage trainees to think about and be assessed on how prepared they are for future learning, educators might also enhance their awareness of their SRL skillfulness.[11] We hypothesize that experience with and awareness of one's own self-regulatory skillfulness can help trainees better prepare for professional practice, and help licensed professionals strategically improve their practice in response to practice-based learning opportunities and new research evidence. We concede that learners' SRL skillfulness has likely been indirectly captured in licensing exams already, given those who engage in effective SRL likely perform better. However, such indirect capture of SRL limits our ability to: (i) identify learners who could benefit from additional SRL support and (ii) evaluate the curriculum design practices at medical schools and postgraduate training programs for how well they support SRL skillfulness.

Turning aspirations into action items: our recommended next steps

In Table 1, we offer our aspirations for how licensing bodies, medical schools, and postgraduate training programs might take steps to integrate our proposals for conceptualizing SRL, designing and using PFL assessments, and collecting and integrating relevant data. Toward achieving those aspirations and navigating the barriers and additional explorations needed to proceed effectively, we

recommend that all stakeholders consider the following proposed actions:

1. Form a scholarly working group to establish the links between SRL skillfulness, SRL process metrics, and PFL assessment outcomes. The group's goal would be to develop and pilot questions for both MCQ-based and performance-based exam formats. In addition to piloting, this working group could concurrently conduct the requisite validation studies mentioned in Table 1.
2. Form a second (or the same) working group to liaise with relevant teams at national agencies (e.g., in Canada, this would include the College of Family Physicians of Canada, the Royal College of Physicians and Surgeons of Canada, and Provincial Medical Colleges). This working group's goal would be to seek out and form innovative connections in existing or new approaches to assessing SRL within the certification requirements for undergraduate, postgraduate, and practicing physicians.
3. Form a third working group to liaise with certain (or all) Faculties of Medicine to discuss alignment with curricula at the undergraduate and postgraduate levels. This working group's goals would be to ensure that changes by the licensing bodies are signalled to the medical schools and to align assessment efforts across settings. We believe the latter would produce ideal conditions for many studies and data-sharing partnerships suggested in Table 1.
4. Invest in research on dynamic assessments and PFL assessments targeting SRL. Such an investment could be made into a special theme or stream in grant funding competitions. We acknowledge fully that all authors of this position paper would likely apply for such funds, though we would certainly not be the only researchers interested in or capable of conducting research in this domain.

Concluding statement

Evidence demonstrates that physicians and medical trainees have the capacity to effectively self-regulate their learning. To fully realize this capacity, the curricula they learn from and are assessed within require refinement. Our arguments and proposals within this position paper amount to a paradigm shift for licensing bodies, for faculty leaders in curriculum and assessment, for clinician teachers, and ultimately, for learners. Our proposals offer a unique way to bring together the science of SRL, the potential of PFL assessments, and the assessment practices and resulting data produced in undergraduate faculties, licensing bodies and postgraduate training programs. To take the rhetoric of lifelong learning seriously—that clinicians are committed to teaching and learning throughout their careers to ensure they always provide the best care for their patients—we must commit to training and assessment systems that endorse and support such claims.

We are not the first to call for an infusion of constructivism into the training and assessments of learners across disciplines.[5,23,56,57] To achieve what we have proposed requires a shared conceptualization of SRL and how to assess it, shared paradigms of education, shared paradigms of systems integration, and a commitment to educate all stakeholders to implement an aligned and coordinated system. Anything short of this represents a disservice to medical trainees and a potential risk to the future patients they will care for.

Table 1. Proposed steps toward integrating conceptualizations of SRL, use of PFL assessments, and integration of data across stakeholder groups.

Aspiration for Licensing Exams	Pros of doing so	Barriers to / Cons of doing so	What else to explore and evaluate before deciding?
Stimulate SRL cycles explicitly during medical training through coordination with Canadian Faculties of Medicine	A harmonized strategy for conducting formative PFL assessments at all undergraduate MD programs would provide explicit links to the licensing body's strategy for including such assessments on one or both examinations. Assessment materials and data produced in undergraduate MD programs would inform each licensing body's efforts when designing summative PFL assessments. Resulting materials and data-sharing agreements between the licensing bodies and Faculties of Medicine would present opportunities for ongoing scholarship.	Institutional inertia and workload may be seen as too significant to initiate such coordinated efforts. Data-sharing may be challenged and/or blocked due to perceived and actual privacy, ethical, or legal issues (e.g., how are data shared? How is privacy respected? Does access expire in an amount of time or in relation to specific events?).	Explore the assumption that the licensing body exams are viewed as learning events by trainees, by their supervisors, and by their training programs (*applies to all rows in this table*). Develop processes for creating meaningful formative and summative PFL assessments.
Assess SRL by including PFL assessments on both MCQ-based and performance-based exams	National- level examinations to emphasize the constructs of SRL/PFL; statistical analyses would permit study of whether SRL/PFL is an independent construct from others assessed by these exams. Collecting data on licensing exams will provide additional validity evidence for PFL assessments and for the pre-existing components of the licensing exams. Could publicly state and promote the exams as addressing 'lifelong learning' competencies uniquely and rigorously. To gain buy-in, PFL assessments could be framed to trainees and physicians as reflecting how they work to create new solutions to "non-routine" problems in their clinical practice.	PFL assessments require developing new approaches to assessment, new materials and thus an investment of time and resources from experts in the field. Examiner training on how to oversee a dynamic assessment (i.e., how not to intervene) will be required. Such training would also be a pro, as examiners would gain further expertise in assessment. Adding assessments adds time to an already packed exam schedule. Standard setting, if required, for an assessment paradigm that is novel. Will require pilot work.	Better specifying how PFL assessments can capture cognitive, motivational, and behavioural facets of SRL. 'Translation' of assessment designs from a primary focus on knowledge toward the comprehensive competencies required in medicine (communication, professionalism). Pilot studies of written and performane-based designs of PFL assessments across relevant medical specialties and content domains. Validation studies, especially regarding which facets of SRL the PFL assessments are sensitive to (vs. other relevant constructs). Validation studies of combining SRL process and PFL assessment metrics.
Establish trainees' receptivity, literacy, and use of exam experiences, data, and feedback to drive their future SRL activity	May opt to initially focus on those who fail the exam to investigate how they respond to such feedback, and how SRL follows. We argue that there will be pros for studying all learners, eventually, as passing this exam is a significant situated event in an eventual series of events (passing does not mean learning has ended). Coordination of data-sharing and efforts extends forward to postgraduate training programs, once again offering opportunities for educational scholarship.	Exam security if releasing feedback data. Ethics of focusing on those who failed (or any specific population, for that matter). Would require formal partnerships with undergraduate and postgraduate training programs.	Changes to the licensing exam formats will likely require explicit re-alignment with medical curricula across relevant jurisdictions.

Conflicts of Interest: All listed authors of this submission declare no conflict of interest (COI).

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