

# Sustainable Engaged Accountable Learners

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## ABSTRACT

The development of lifelong learners is among the most challenging goals for medical educators. The authors identify two important scholarly works that profoundly altered their understanding and approach to lifelong learning and curriculum design: L. Dee Fink's *Taxonomy of Significant Learning* and Cutrer et al.'s *Master Adaptive Learner* model. By applying these guides to their teaching and related research, three important characteristics of lifelong learning became evident: sustainability, engagement, and accountability. These are abbreviated "SEALS," for sustainable engaged accountable learners. This paper defines these qualities as they relate to emergency medicine training, significant learning, and the development of adaptive expertise. Connections to Fink's and Cutrer's works are offered for each learner characteristic. Educational and psychological theories that support the SEALS model are paired with practical suggestions for educators to promote these desired qualities in their trainees. Relevant features of adult learning are highlighted, including self-regulation, motivation, agency, and autonomy.

The development of a lifelong learner prepared for the evolving landscape of clinical practice is among the fundamental charges and challenges of medical educators.<sup>1</sup> Our authorship team derived a new conceptual model of lifelong learning, inspired by two important educational resources that influence our teaching and research on this topic: L. Dee Fink's *Taxonomy of Significant Learning* and the *Master Adaptive Learner* model for skill acquisition by Cutrer et al.<sup>2,3</sup> Taken together, these resources offer a roadmap for educators to develop emergency physicians who may demonstrate ideal learning skills across the continuum of their careers.

The *Taxonomy of Significant Learning* is a course design framework that facilitates meaningful learning and results in enduring and transformative changes in student thinking, feeling, or behavior.<sup>2,4</sup> The *Taxonomy* describes six domains of learning that must be addressed by teachers for significant student learning to occur: Foundational Knowledge, Application, Integration, Human Dimension, Caring, and Learning to Learn. Fink's *Taxonomy* informs

curriculum decisions that promote significant learning by considering all six domains in the design of every course.

The *Master Adaptive Learner* model describes four interconnected phases of learning used by all master learners: planning, learning, assessing, and adjusting. This model aims to develop adaptive expertise as a central skill in medical trainees.<sup>3</sup> Adaptive experts apply their foundational knowledge to commonly seen cases, and they integrate past experiences and training to solve uncommon or rare problems. For example, emergency physicians apply their knowledge of cardiology when caring for patients with common presentations of atrial fibrillation. In contrast, they integrate their knowledge of electrophysiology and past experiences treating arrhythmias when they encounter their first case of Brugada syndrome, an uncommon condition. Adaptive expertise, the effective use of knowledge to address common and uncommon problems, is the ultimate goal of emergency medicine training.

We believe three ideal characteristics of lifelong learners can be distilled from the *Taxonomy of*

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*Significant Learning* and the *Master Adaptive Learner* model: sustainability, engagement, and accountability. We propose a new conceptual model of expertise in lifelong learning that summarizes these ideal characteristics, SEALs: sustainable engaged accountable learners<sup>5,6</sup> (Figure 1). The model serves to highlight these key characteristics of expert learners, who are well-prepared, disciplined, autonomous, and highly successful in a wide variety of environments, including those unfamiliar and requiring adaptability. Physician trainees can be taught to be lifelong learners who attain similar adaptive expertise if we intentionally optimize their educational experiences and learning opportunities.

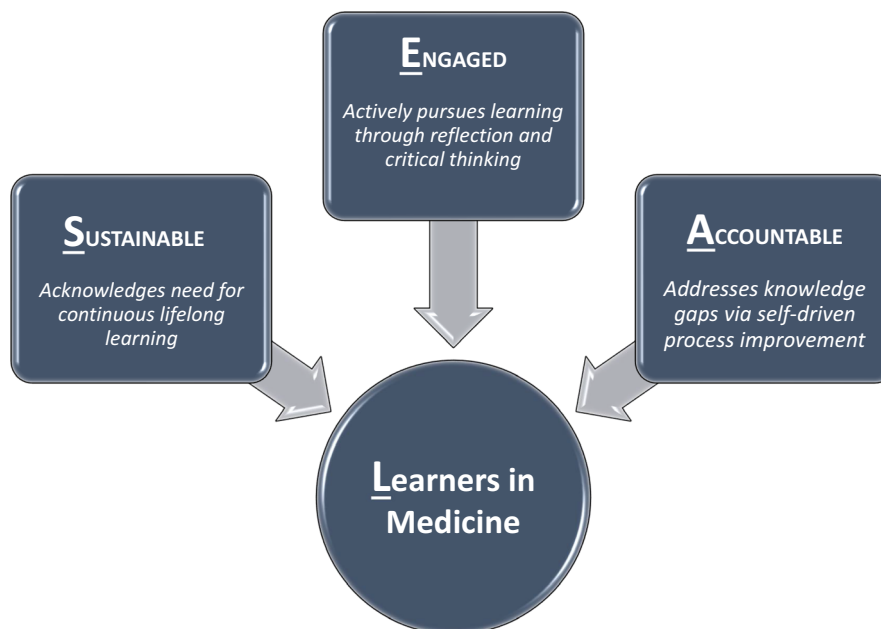
## SUSTAINABLE LEARNERS

Sustainability is a complex term with multiple definitions in higher education. In the sciences, sustainability most commonly refers to the longevity and health of ecosystems and the environment.<sup>7</sup> For medical education, we define sustainable learners as physicians who are expert, lifelong learners. Sustainability is therefore an essential characteristic of trainees who have fully internalized the need for lifelong learning and commit to developing necessary learning skills. Being a “learner” becomes part of one’s professional identity and an inherent element of the student’s nature. Sustainable learners recognize that they will be constantly challenged with new learning goals and

must adapt their practice to remain competent and current.<sup>8</sup>

Sustainable learners understand learning to be a never-ending process that liberates them from a singular focus on discrete learning endpoints, such as tests or course grades. Instead, learning becomes a moral and societal imperative linked to their mandate as a medical professional. This transition is fraught with challenges. Fink’s *Taxonomy* offers an important roadmap for medical educators to assist students’ understandings of “caring” and “human dimension,” highlighting these emotional drivers of learning in medicine.<sup>2,9</sup> For example, Sockalingam et al.<sup>10,11</sup> found that psychiatry residents shared motivations to be lifelong learners due to their emotional desires to deliver high-quality care and their professional responsibilities to society; however, these residents believed they lacked skills for effective lifelong learning. Training recommendations from this study included purposeful role modeling and deliberate teaching of lifelong learning techniques in the residency curriculum.<sup>10,11</sup> Other practical ways to incorporate Fink’s caring dimension in a residency curriculum include the use of empathy measures to reduce physician burnout, the design of “most memorable” case conferences, and the application of the Stanford University Wellness Framework to lifelong learning skills training.<sup>11–14</sup>

The *Master Adaptive Learner* framework similarly describes the requisite metacognitive skills necessary



**Figure 1.** The SEALs conceptual framework: sustainable, engaged, accountable learners in medicine.

to plan, assess, and adjust learning, each required for sustainability as adult learners.<sup>3,15</sup> Knowledge translation shifts, evidence-based medicine follow-up case conferences, reflective practices, and trainee portfolios have been used to teach lifelong learning principles to emergency medicine residents.<sup>16–19</sup> For emergency physicians in practice, an obvious example of sustaining medical knowledge is participation in the American Board of Emergency Medicine Lifelong Learning Self-Assessment for maintenance of board certification.<sup>20</sup>

## ENGAGED LEARNERS

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Engagement emerged as a goal of teaching and learning when Houle<sup>21</sup> investigated the reasons that individuals self-direct their learning. Knowles<sup>22</sup> later theorized that adults are “self-directed,” “active” learners who engage with learning resources based on need, meaning, and context.<sup>23</sup> Engaged learners exercise agency that reflects their personal epistemology and ability “to plan and manage their own learning.”<sup>24</sup> To facilitate student engagement, teachers use a wide variety of instructional methods, technological enhancements within the learning environment, and novel pedagogical approaches.<sup>25</sup> Such efforts to engage learners have clear benefits, including higher academic achievement and perceptions by students and faculty that advanced levels of learning are attained.<sup>26</sup>

The *Master Adaptive Learner* framework is predicated on the principles of reflection and critical thinking, two processes that require active engagement in learning and the development of foundational knowledge.<sup>3</sup> A cycle of self-regulated learning, self-assessment, and adjustment underpins all lifelong learning skills and practices. Self-assessment scales have been used successfully to enhance active learning and critical thinking.<sup>27</sup> Larsen et al.<sup>28</sup> used a highly engaging “weekly learning goals” intervention in a neurology clerkship to teach self-regulated learning skills, which concurrently improved foundational knowledge and reinforced principles of lifelong learning. Wolff et al.<sup>29</sup> described the importance of “informed self-assessment” to promote lifelong learning, which considers the influence of internal performance drivers such as learner engagement, emotion, confidence, and motivation.

Fink echoes the importance of reflection and critical thinking, but also specifically addresses learner engagement in his “Learning How to Learn” and “Human

Dimension” domains. The text *Learning Medicine*, by Wei and Chamesian, is a treatise on medical student engagement in learning science and a rich source of student-derived curriculum design ideas that promote lifelong learning.<sup>30</sup> Richards et al.<sup>24</sup> identified additional factors that determined how students learn to effectively use study materials, reaffirming the importance of learner engagement. Clinician educators may simply choose to anchor all learning activities in Fink’s Human Dimension domain—it is a defining element of our profession, with a mandate for emotional intelligence, self-regulation, and focus on the value of profound relationships to others.<sup>2</sup> These are critical components in any meaningful learning experience in medicine.<sup>3,9</sup> Examples of educational interventions that promote self-regulation and positive interprofessional relationships include “Best and Worst Days” case discussions, use of Skeff’s “Chronology of the Present Illness” framework, and autonomy-supportive changes to the learning climate.<sup>10,31,32</sup>

## ACCOUNTABLE LEARNERS

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Accountability reflects actions or behaviors that respond to individual or group needs, resulting from duty, obligation, or values. Johnson and Johnson’s social interdependence theory states, “outcomes for individuals are affected by their own and others’ actions” and serve as the motivational basis for collaborative learning.<sup>33,34</sup> Numerous modifications of the learning environment demonstrate that accountability can be learned, promoted, and enhanced. For example, individual accountability is thought to be inversely related to the size of a collaborative learning team.<sup>34,35</sup> Optimization of feedback processes between individuals improves social accountability within groups of learners and promotes goal-setting and feedback-seeking behaviors by individuals learners.<sup>36</sup> In a study of nursing students, learners were more accountable to one another when they perceived belongingness and partnership, empowerment, trust, and a balance between clinical and educational requirements.<sup>37</sup>

Professions are defined by accountability. Accountable physicians effectively translate positive behaviors developed through collaborative learning to their daily practice of medicine. They practice accountability—to patients, society, and their own needs through lifelong learning. Adaptive learners develop accountability through steps in the *Master Adaptive Learner* framework that highlight the iterative cycle of learning,

especially actions related to assessment and adjustments of learning. Critical to these steps is the fundamental acknowledgment by the learner that they alone bear the responsibility to maintain their knowledge and skills.<sup>3</sup> Educators may use reflective writing activities with trainees to explore society's trust in physicians; this trust is based on expectations of professionalism, deep foundational knowledge, and accountability.<sup>38</sup> Residents demonstrate accountability when using methods of performance-driven gap identification and community-driven gap identification to plan their learning.<sup>15</sup>

Clinician educators using Fink's *Taxonomy* can reinforce the development of accountable, professional behaviors through the deliberate design of collaborative training experiences and cooperative learning environments. A focus on students making connections with each other, their patients, and their emotions—key elements of Fink's Human Dimension and Caring domains—help educators reinforce accountability within a curriculum.<sup>2</sup> Moreover, student accountability to future patients includes the development of deep foundational knowledge, considered by some to be a moral imperative.<sup>39</sup> Finally, improving physician accountability may be less about discreet curricular activities and, instead, better characterized as the most critical learning outcome of medical training; without accountability, the profession fails.<sup>40</sup>

## SUMMARY

SEALs, sustainable engaged accountable learners, is a model to conceptualize attributes of ideal learners in emergency medicine, inspired by Fink's *Taxonomy of Significant Learning* and Cutrer's *Master Adaptive Learner* framework. SEALs are expert learners who demonstrate an actionable understanding of the key concepts of sustainability, engagement, and accountability. These highly valuable qualities may be developed in emergency physicians through the design of educational experiences that promote significant learning and the development of adaptive expertise.

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