AAIM Perspectives

AAIM is the largest academically focused specialty organization representing departments of internal medicine at medical schools and teaching hospitals in the United States and Canada. As a consortium of five organizations, AAIM represents department chairs and chiefs; clerkship, residency, and fellowship program directors; division chiefs; and academic and business administrators as well as other faculty and staff in departments of internal medicine and their divisions.

Nested Domains: A Global Conceptual Model for Optimizing the Clinical Learning Environment

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The Learning and Working Environment (LWE), where educational objectives intersect with direct patient care,

falls under the purview of a range of professional, educational, and clinical organizations.[1–4] National trends, including resident duty hour restrictions, decreased patient length of stay, rapid throughput, observation status, and increased inpatient medical acuity, all threaten the quality of hospital-based medical training. Workload pressures stemming from patient volume, fee-for-service compensation, and documentation requirements have the same effect on ambulatory-based training. The 'quadruple aim' of decreasing cost, increasing quality, improving patient experience, and ensuring provider wellness has simultaneously expanded the scope of content that medical educators are expected to address.[5–8] To complicate the landscape further, each sponsoring institution, medical school, and residency program has a distinct mission and

possesses unique strengths and opportunities. Learners also differ greatly in terms of the optimal environment for their individual growth.

Despite these challenges, it is imperative that the LWE remain the heart of clinical education. There is no single accepted conceptual model for the LWE, let alone reliable or generalizable strategies for assessing and optimizing the LWE to meet both clinical and educational objectives.[9] The LWE has often been described by identifying its parts. Optimization attempts that follow from this modular understanding of the LWE tend to improve each element as an isolated piece of the whole. As a result, improvement efforts are limited in scope and efficacy and may create unintended tension between various regulations or stakeholders. Optimizing the LWE with a systems approach requires a deeper understanding of how the LWE's various elements relate.

To develop guidance, the Alliance for Academic Internal Medicine (AAIM) convened the Collaborative on Learning and Working Environment Optimization. The collaborative aimed to identify or develop a conceptual model for the LWE that would enable a systems approach to optimization.

MODEL DEVELOPMENT PROCESS

Collaborative Formation

In spring 2017, AAIM opened a call for members to participate in its Collaborative on Learning and Working Environment Optimization, charged to "identify the important

> ### PERSPECTIVES VIEWPOINTS
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> - Optimization of the clinical learning and working environment (LWE) requires consideration of the LWE as a complex adaptive system.
> - Currently, there is no broadly accepted conceptual model for the LWE.
> - The Alliance for Academic Internal Medicines Collaborative on Learning and Working Environment Optimization developed a novel conceptual model for the LWE consisting of 4 nested domains that interact as a system.
> - This model supports a comprehensive approach to LWE optimization and promotes communication and collaboration among stakeholders.

components of the learning environment and working conditions that could be leveraged to enhance and promote education and thus optimize the learning environment for all undergraduate medical education (UME) and graduate medical education (GME) learners."[10] Applicants with experience in educational innovation were encouraged to apply. Final membership consisted of 12 physician-educator members across a wide geographical distribution, representing varied expertise in UME, GME, tertiary care, and community medicine. The initial focus elected by collaborative members was to either identify or develop a conceptual model around which to organize an approach to LWE optimization.

Development of a Conceptual Model

A conceptual model, in contrast to a definition, accomplishes 4 fundamental goals—it improves understanding of a system, facilitates communication of system details between stakeholders, provides a point of reference for those seeking to create or improve the system, and documents the system for future reference.[11] A successful conceptual model of the clinical LWE would allow for a nuanced understanding of local environments, link potential improvement strategies to the needs of individual programs, apply specifically to clinical settings as opposed to educational settings more generally, and demonstrate stability across a diverse range of program and learner types.

The collaborative initially favored adoption or expansion of a model already embraced by relevant stakeholder or accrediting organizations. Definitions and models were identified in peer-reviewed literature, meeting proceedings, self-published position statements, and accreditation

Table 1 Existing Models and Definitions Identified by the Collaborative and Breakdown of Their Component Areas

Study	Culture	Physical Space	Curricula	Relationships (Interaction)	Psychological (Personal)	Regulatory	CLER Focus Areas
Schönrock-Adema et al[12]				X	X	X	
Moos[13]		X		X	X		
Josiah Macy Jr. Foundation[14]	X	X		X	X	X	
Flott and Linden[15]	X	X	X	X			
ACGME[16]	X	X		X	X		X
AMA[17]	X	X	X	X	X	X	
AAMC[18]	X			X	X		

AAMC = Association of American Medical Colleges; ACGME = Accreditation Council for Graduate Medical Education; AMA = American Medical Association.

standards. These were supplemented by a representative review of foundational educational literature on learning environments extending outside the clinical arena (Table 1).

Conceptual models of learning environments can be traced back to the 1970s.[12] The most influential framework was developed by Rudolph H. Moos,[13] who proposed 3 underlying domains for any setting where humans live, work, and learn.

- Personal development or goal direction dimensions, which might manifest as both program learning objectives and personal goal setting.
- Relationship dimensions, such as support among students or between students and teachers.
- System maintenance and system change dimensions, which may include aspects of both the educational system and the physical working environment itself.

Many modern statements about the LWE were considered by the collaborative to be definitions or descriptions, not conceptual models. In a 2018 report, the Josiah Macy Jr. Foundation[14] and attendees of a conference focusing on LWE improvement likewise identified the great need for conceptual clarity around the LWE. During a series of meetings, the collaborative identified key questions left unanswered by existing models and definitions.

- How do the components of the learning environment interact with each other? Are they independent or interdependent?
- What is the role of the patient and patient care within the unique learning environment of clinical medicine?
- What role do external factors play, including sociocultural influences and the rapidly changing health care environment at large?
- How do learners differ in their needs within the LWE?
- How can a model of the LWE be practically applied to guide improvement within a unique program or institution or for a specific learner?

To address these questions, the collaborative elected to build on the prior work of these scholars and organizations in crafting a novel conceptual model of the LWE.

RESULTS

The AAIM Collaborative LWE Conceptual Model

The AAIM collaborative conceptual model of the LWE is presented in Figure 1 and Table 2. Four contributing and nested domains (structural, curricular, relational, and personal) are described, along with example inquiries illustrating factors within the domains.

DISCUSSION

The collaborative believes that this conceptual model successfully addresses key factors not incorporated in prior definitions or models of the LWE—namely, the interconnectedness of domains, the role of the patient, the existence of multiple learners, and the influence of the sociocultural context.

Interconnectedness

The AAIM model emphasizes that, for both UME and GME learners, the learning environment and the working environment are intertwined and inseparable. The concept of nested domains is intrinsically synergistic. The personal domain is at the center of the LWE, and the relational, curricular, and structural domains radiate out from this core. They are all interconnected, and each domain influences the others[19]; therefore, a focus on a single domain is insufficient when building or improving the learning environment. Key elements of each domain must be leveraged to optimize the educational experience of a unique learner or group of learners.

To understand and effectively use the model, educators and stakeholders should start with a general understanding of the domains. The correct assignment of a factor to a given domain is less important than remembering to consider all domains and their interactions when approaching a problem or designing a new element within the LWE. For example, the process of learner assessment could be considered curricular, because assessment is a key element of curriculum design.[20] Learner assessment could also be argued to be relational, as it is a process that occurs between 2 or more individuals within the LWE. Neither of these domain assignments is universally correct. Depending on the situation at hand, the relational aspects of assessment may be more important than the curricular aspects or vice versa.

Multiple Learners

In its 2018 Conference Recommendations on Improving Environments for Learning in the Health Professions, the Josiah Macy Jr. Foundation[14] defined "learners" broadly, stating that "in a continuously learning and improving health system, every participant is both a learner and a teacher." The LWE domains are traversed by learners from all stages of the transformative journey of professional identity formation,[21] including learners from all levels of the traditional hierarchies within professions, and those from the myriad of professions encountered during clinical care.

Active movement by learners through the LWE requires a fluidity in the balance of the domains. Different learners or groups of learners may require more support from or may be more heavily influenced by a given domain. The necessary balance is determined by a range of contributing factors, including the level of training of the learner, personal learning preferences, cultural or
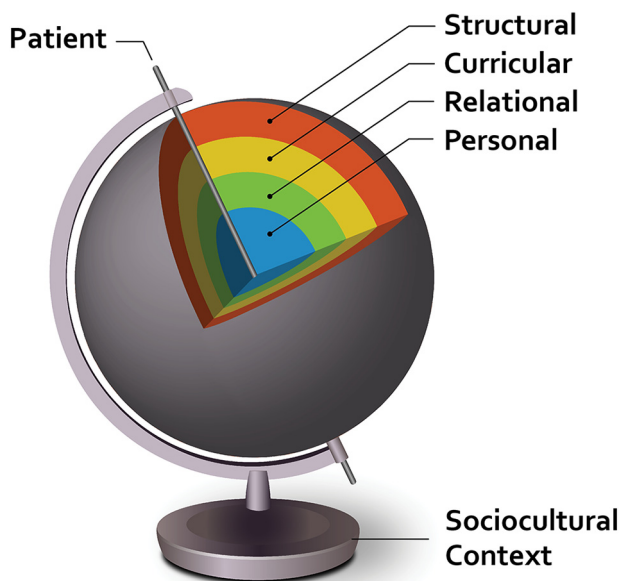
Figure 1 The Alliance for Academic Internal Medicine Learning and Working Environment (LWE) conceptual model in visual form. The Learning and Working Environment is the nesting of personal, relational, curricular, and structural domains as traversed by multiple learners, centered on the needs of individuals or populations of patients, and influenced by the sociocultural context. Domain characteristics with examples for inquiry are presented in Table 2.

generational background, past training experiences, future goals, and cumulative lived experiences. This variation in the balance of domains lends flexibility to the model

across the continuum of medical education and extends beyond physician education to other health professionals. The concept of traversing the learning environment also acknowledges that individual learners are impermanent members of the LWE, each sampling and influencing it, as well as molded by it, for a discrete period.

The Role of the Patient

The patient is the axis of the LWE, as there would be no role for medical education in the absence of patient care. Learning centered on meeting the needs of patients intrinsically links learners to those for whom they care. This juxtaposition underscores the false dichotomy of education (implying a focus only on the learner) vs service (implying a focus only on the patient).[22,23] The AAIM model seeks to resolve this tension. Work on behalf of patients is a means for teaching and learning. The centrality of patients in the LWE model is in keeping with other recent work characterizing specific elements of the LWE, including a National Academy of Medicine conceptual model of provider wellness[24] and the American College of Physicians position statement on the hidden curriculum,[25] both of which emphasize the primacy of the patient and the patient's quest for health in the process of medical education.

Sociocultural Context

When considering the LWE as a system, it is important to define an outer boundary.[26] The boundary to the LWE can be defined by function. Factors with a primary purpose pertaining to the care of patients/populations or the education of learners fall within the LWE. If a factor pertains

Table 2 Definitions of the four domains of the LWE, with example inquiries within each domain. See Figure 1 for an illustration of the four domains.

Domain	Definition	Example Inquiries
Personal	The lens through which a learner experiences the LWE and the set of intrinsic qualities the learner adds to the LWE. Includes the learners self-identification and the attitudes, biases, skills, experiences and vulnerabilities they possess.	• What is the learning style of a medical student or group of students? • How skilled is a resident with kinesthetic tasks? • What is an attending's personal or cultural comfort with autonomy?
Relational	The ways in which individuals or groups interact and the impact of these interactions upon learners and the LWE as a system. Interactions between peers, staff, patients, supervisors, mentors, educators, and personal relationships (e.g., friends, family) are to be considered. This domain encompasses unique relationships as well as LWE culture and behavioral norms.	• Do educators create a safe environment for learners to ask for help? • Is the learner's role on the team clear to patients and providers? • Is social isolation prevalent for a learner or group of learners?
Curricular	Factors relating to formal and informal educational experiences consisting of at least one learning objective and a process of learner assessment and feedback, even if not overtly stated. The hidden curriculum is also part of this domain, though overlaps significantly with the other three domains.	• Does didactic content match the needs of learners and patients? • Are efforts made to create interprofessional learning experiences? • Are ample faculty development opportunities available for educators?
Structural	The organizational, programmatic and physical context within which clinical learning occurs. Components may be specific to the local LWE - such as workspace, the electronic medical record, staffing levels, team structures, and institutional policies or may be externally defined such as work hours, admitting caps, or licensure requirements.	• Are work areas in proximity to patient care areas? • Is the ambulatory schedule conducive to patient panel continuity? • Is there sufficient infrastructure to minimize non-physician tasks?

predominantly to another purpose (eg, health care finance or national disaster response policy), then it is part of the surrounding context. Contextual factors are not internal aspects of the LWE system, although they remain interconnected and exert influence on form and function. Much like the divisions between domains, the division between the LWE and the surrounding sociocultural context is inexact. The most important concept is that the LWE is not boundless. Consider the influence of national policy relating to health care finance, immigration, or student loan repayment. Similar contextual factors influence patients and what they bring into the LWE, including social determinants of health, cultural norms and beliefs, or natural or social disasters. Although educators may engage in advocacy or activism to change the sociocultural context, when working within the LWE, medical educators usually respond to contextual factors by adapting 1 or more of the 4 domains. For example, a program might have to adapt in the curricular domain to reflect specific local public health threats, such as incorporating content relating to lead screening and exposure mitigation in Flint, Michigan. Similarly, programs might modify the LWE structure in response to changes in national policy, such as designing the medical student role to reflect Centers for Medicare and Medicaid Services documentation requirements. Cultural norms might influence the relational domain. When a unique learner brings his or her own cultural expectations into the LWE, he or she does so as part of the personal domain. The incorporation of the sociocultural context into the conceptual model acknowledges the atmosphere that sustains and shapes the LWE while allowing educators to consider some factors beyond their immediate locus of control.

Application of the Conceptual Model

Application of the conceptual model has the potential to engage multiple stakeholders and to create linkage between the assessment of the current state, identification of key factors for success, and the design of optimization strategies. In contrast to existing models and definitions, frontline educators, administrators, and learners are expressly intended as the target audience for this model. We propose that the model can be applied in 3 ways:

- Reactive: Understand the factors contributing to the current state, especially as related to an LWE challenge or adverse event.
- Holistic: Achieve alignment between stakeholders through creation of a shared mental model.
- Proactive: Design new successful programs or improvement strategies at any scale.

These cases differ predominantly with respect to whether the model is applied to analyze past events or to plan for future change. The holistic application is similar to the proactive application in that it involves an assessment of the current state and consideration of a desired future state. These applications differ in their intended outcomes. The outcome of proactive application is a plan for future change, whereas the outcome of the holistic application is greater understanding and empathy between stakeholders. Cases will be explicated fully in a future AAIM Perspectives article.

CONCLUSIONS

Medical educators and our governing bodies constantly contend with challenges in optimizing the LWE in an ever-evolving health care environment. The Collaborative aimed to set the stage for more effective strategies by taking a step back to first conceptualize the entity as a whole. Building on prior descriptions and adding further necessary elements, such as the patient and the interconnected nature of the domains, we developed a conceptual model of the LWE that can be applied to a myriad of learning and working milieus. We envision the use of the model as being a reactive tool in addressing individual or system/programmatic remediation, a holistic tool to describe the current or ideal state, and a proactive tool for educators in creating programs or improvement strategies. Crucial questions such as workload limits, interprofessional workflows, and diverging faculty responsibilities have yet to be answered. We contend that use of this novel conceptual model of the LWE should serve as the foundation for discussions surrounding optimization of the LWE across the continuum of medical education. The model further establishes a collective understanding of ways in which the LWE is more than the sum of its parts—it is a dynamic system of interconnected domains, traversed by multiple learners, influenced by a greater sociocultural context, and revolving around the axis of the patient and patient care.

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