CHAPTER 15

The role of simulation in EPA-based curricula

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Abstract

Entrustable professional activities (EPAs) form the cornerstone of competency-based health professions education, focusing on the critical tasks trainees must master for their future unsupervised clinical practice. Recognizing the challenges in assessing EPAs, especially those caused by the rarity of some clinical events and the dynamic nature of health care settings, there is an increasing interest in utilizing simulation as a complementary approach. Using simulation modalities, educators can design controlled and relevant settings for learning and assessment, allowing students to apply theoretical knowledge, practical skills, and professional attitudes in a risk-free environment. This chapter delves into whether and how simulation can be integrated into EPA-based curricula to enhance training and preparation for performing EPAs, as well as to provide a controlled setting for assessing trainees' entrustment levels.

We explore the theoretical underpinnings for applying simulation in an EPA-based curriculum, highlighting its potential dual roles in bridging educational experiences with assessment activities, and relating both to real-world clinical practice. While we propose a model for the promising integration of simulation into EPA-based curriculum, we also note that the evidence supporting its efficacy remains preliminary. Further research must substantiate the role and value of simulation in an EPA-based training and assessment modality. Our model describes the possible application of EPAs that progresses from an

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individual's basic skill acquisition to their becoming capable of acting in complex, broader team-based clinical challenges. Incorporating simulation meaningfully into EPA-based curricula represents a transformative approach in preparing health care professionals for the challenges of clinical practice.

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Introduction

Entrustable professional activities (EPAs) undergird many models of competency-based health professions education.[1] EPAs are the tasks trainees must learn to perform effectively in all facets of their professional practice.[2] Most commonly, EPAs are assessed in the actual clinical workplace. However, multiple pressures, such as the low frequency of many EPA-indicated clinical events, have prompted scholars to seek ways to increase the opportunities to conduct EPA-related learning and assessments, including using simulation modalities.[2–5]

Simulation is a technique that creates a situation or environment to allow persons to experience a representation of a real [health care] event for practice, learning, evaluation, testing, or to gain understanding of systems or human actions.[6] Diverse uses, purposes, and technologies have led health care educators and leaders to use various simulation modalities (ranging from, e.g., manikins to simulated patients) for training, assessment, and quality improvement.[7] Simulation provides a controlled yet realistic environment where trainees construct understanding by applying the knowledge, skills, and attitudes essential for professional activities.

As EPA-based curricula become a foundational option across health care training programs and organizations, scholars have started investigating how and why simulation can function effectively in such curricula. Researchers in the EPA and simulation communities have, often separately (they tend to be different scholars), claimed that simulation can fulfill two purposes: functioning as (a) a preparatory setting for teaching EPA skills longitudinally throughout trainees' clinical training years[8,9] and (b) a technique for conducting assessments that inform high-stakes decisions on trainees' clinical competence.[2,4] In this chapter, we review the theoretical rationale and emerging evidence for the claims that simulation techniques can be effectively integrated into EPA-based curricula to provide: (a) tailored learning experiences for developing competencies that underpin EPAs, and (b) assessment data for making high-stakes decisions about trainees' performance outcomes.

EPA-based curricula may include an array of simulation learning settings, ranging from classroom-like activities in simulation centers to dynamic in situ scenarios in actual clinical contexts. We must consider the implications of using simulation across these diverse environments, including how and why this educational modality can effectively bridge the gap between educational experiences and real-world practices. We note that the theoretical rationale for linking EPAs and simulation currently outweighs the available evidence to evaluate the value of simulation's role in EPA-based curricula.[10] Thus, we aim to explore whether and how integrating EPAs and simulation-based training can enhance the quality and efficacy of health professions education.

Role of simulation in EPA-based curricula

We propose a central tenet that simulation should not be confined solely to the assessment of EPA performances; it may be equally or more potent as a learning modality. When designed well, simulation scenarios engage trainees, hone their skills, enhance their clinical reasoning, and build their confidence. In this way, simulation modalities become a key tool in educators' toolboxes as they design, implement, and evaluate EPA-based curricula. For example, in workplace settings, translational simulation (i.e., simulation scenarios that occur in the actual clinical setting) has become a refined use of simulation for evaluating whether individuals, teams, and the systems they work within require an educational intervention.[7] Likewise, in undergraduate and postgraduate settings, simulation has shown great potential as a modality for refining clinical competencies and preparing health care professionals for their future clinical practice.

The core components framework of competency-based medical education represents a potential blueprint for designing EPA-based curricula in health professions education.[11] Educators would begin by defining EPAs and then designing instructional activities and curricular sequences that support the required competencies for each EPA.[11] While classroom-based and workplace-based learning can fulfill many of the requirements of such a curriculum, simulation-based training can fill key gaps, enhancing the EPA-based curriculum with structured, comprehensive design and tailored learning experiences.

EPAs can be closely linked to simulation training activities: educators could use each EPA description written using the eight-item framework[12] as a 'mini curriculum' to inform their design of simulation scenarios. In particular, the framework's second item, 'specification and limitation,' and the fourth item, 'required knowledge, skills, attitudes and experiences' (KSAEs), both provide a foundational blueprint for designing simulation scenarios for EPA-based curricula. Specification, for instance, involves elaborating the EPA with chronological, bulleted subset tasks that could guide the designed components for the simulation scenarios. At the same time, KSAEs delineate the criteria for educators to cover during the debriefing, which typically follows simulation scenarios. In sum, we suggest that using EPAs to guide simulation design allows for tailored training programs aligned directly to identified needs in the curriculum blueprint. Involving experienced simulation educators would ensure that the complexity of scenarios is appropriately titrated to the perceived competence levels of trainees.

Role of simulation in assessing entrustment

Educators in health professions education set entrustment levels to determine when and how a trainee can be entrusted to subsequently perform clinical responsibilities unsupervised.[3] Simulation scenarios can conceivably be designed to align with each entrustment level, allowing educators to observe and assess trainees' performance in a controlled environment. Some authors suggest that if strong links between simulation-based and workplace-based assessments can be established, trainees' performance in EPA-related scenarios could complement or even replace high-stakes real-world assessments.[2,13]

To successfully assess entrustment levels on par with real-world practice, simulation-based assessment scenarios would have to be meticulously designed to have many features.[13,14] First, the designers would need to be clear about how the construct of interest (e.g., the competencies underlying a specific EPA) will be activated through the use of a simulation scenario (e.g., a manikin with actors role-playing colleagues). Second, the broad range of trainees (i.e., with different prior knowledge and varying levels of self-efficacy) must all be consistently stimulated to perform the EPA as expected. Third, those responsible for assessing the performance of the EPA must be trained to engage in a systematic and standardized observation of each trainee's performance. Fourth, the assessors must also be trained to translate their observations into a 'level of supervision' and, more importantly, to provide meaningful feedback according to previously established criteria. The extent to which simulation center staff and their clinical partners have the foundational skills and training to enact these features likely varies considerably across different health professions and health care organizations. Ultimately, significant and rigorous validation studies[14] would be needed to determine whether simulation could fulfill the role of complementing or even replacing real-world assessments. Many training programs are drawn to simulation for its potential to ease the assessment burden of EPAs in the workplace.[2,4,5,8,9] If the assessment of EPAs conducted in the simulation setting correlates highly with the assessment in the workplace, as with procedural/psychomotor skills,[13] then the many positive features of simulation—safe for patients, psychologically safe for trainees, effective for a range of clinical skills, highly controllable, highly flexible, and so on—become ever enticing.

Evaluating evidence: simulation's impact on EPA-based training and assessment

We reemphasize that conceptual papers severely outnumber empirical papers on integrating simulation into EPA-based curricula and assessments. That said, trends are emerging in how different medical education research teams have been reporting on using simulation modalities for EPA-based training and assessment.

Several groups have been using simulation-based activities as a 'capstone' method for training and for assessing entrustment readiness as learners (mostly medical students) approach the end of their training. For example, teams have investigated the use of simulation for assessing multiple EPA outcomes in medical students transitioning to residency.[15,16] Two other groups have extended this idea into a multiday formative and summative capstone course in medicine[17] and in pharmacy.[18] Hence, these researchers have identified simulation as a type of 'assurance,' checking to see that trainees have been adequately prepared for significant career transitions.

Researchers have also used simulation as a testbed for generating validity evidence for EPA-based assessments. Several studies have investigated whether simulation-based and workplace-based EPA assessments correlate quantitatively,[4,19,20] with the evidence showing moderate to no correlation for observable skills, like resuscitation. One explanation for these mixed findings may be found in an interview study, in which the same physician raters provided EPA ratings of polypectomy skills for the same trainees in the simulation-based vs. real-world endoscopy suite; notably, the raters reported defining and judging entrustment quite differently across the two settings.[2] Others have constrained assessment only to the simulation-based setting to understand how best to implement entrustment-supervision scales into existing processes like the Objective Structured Clinical Examination[21] or to examine the correlation between 'levels of supervision' and other relevant competency-based outcomes.[22] In all these studies, simulation appears to be viewed as most useful when researchers have identified EPAs that relate to directly observable skills, especially procedural skills and communication competencies.

The state of the evidence prompts us to advocate for a targeted research agenda that aims to establish the dual role of simulation in both EPA-based curricula and assessing EPAs. With these clear purposes as the foundation, researchers can build upon each other's work by conducting well-defined studies that contribute meaningfully to our collective knowledge advancement rather than conducting disparate studies that do not add to our foundational understanding. By examining the experiences and outcomes of institutions that have embraced simulation, researchers can provide educators with insights into the potential benefits and challenges of implementing simulation in their EPA-based curricula.[19]

Integrative model of simulation in EPA-based curricula

Based on the available literature, we have identified two major trends. First, reviews indicate that up to three times more studies focus on creating EPAs than on implementing EPA-based curricula.[23] Hence, our proposal that simulation can be used to implement EPA-based training and assessment has yet to be fully and systematically explored beyond theoretical proposals. Second, where empirical studies have been conducted on implementation, researchers tend to focus on the use of simulation for the assessment of EPAs rather than its use as a preparatory component to train for EPAs. Here, we challenge the simulation and EPA research communities to consider a provocative recommendation: that all trainees be required to experience every EPA and its related competencies, where those can be effectively delivered by educators using simulation, in a simulation-based setting before they are entrusted to perform the EPA on a patient.

Simulation-based education, as a modality for training and assessment, can involve scenarios that evolve from targeted, analytical tasks to holistic, real-world clinical scenarios, mirroring the

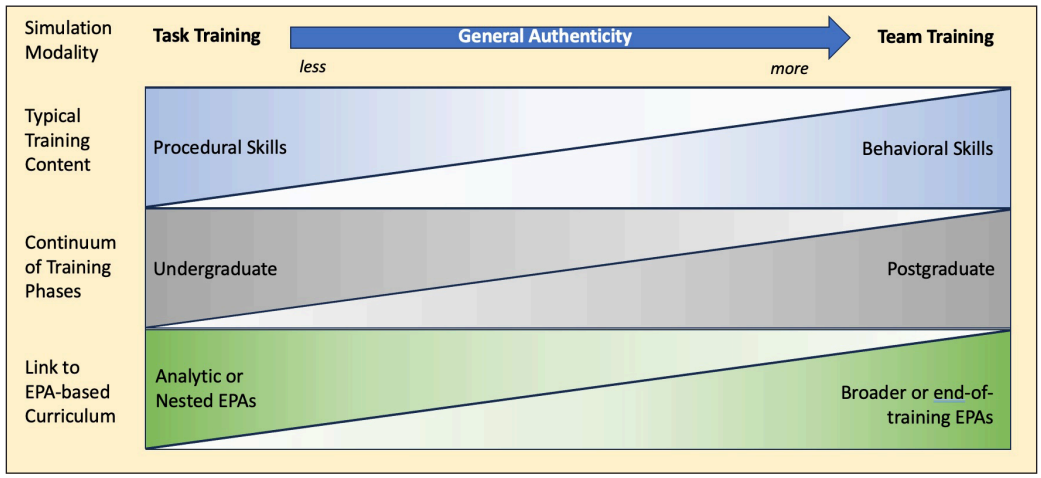

Figure 15.1: The role of simulation in an EPA-based curriculum.

progression of health care training from early learning to advanced practice.[24] In writing this chapter, we developed a preliminary model for educators to consider the pivotal role that simulation could play in developing trainees' competence in an EPA-based curriculum (Figure 15.1).

Early training—analytic and granular focus

In early training settings, simulation could be used to help trainees to independently hone granular tasks and essential procedural abilities. Educators might design part-task simulations with the aim of helping trainees to build core skills, like suturing or basic life support, in controlled settings. These activities correspond to analytic or nested EPAs (see Chapter 10), which focus on mastering specific components of broader professional activities.

Advanced training—holistic and end-of-training focus

As trainees progress from undergraduate to postgraduate programs, simulations would escalate in complexity, integrating technical and behavioral skills (e.g., communication, teamwork, decision-making). At advanced training stages, simulations could present comprehensive, realistic scenarios reflecting full-scale clinical encounters or complete patient care, resonating with holistic or end-of-training EPAs. Here, educators would examine how trainees perform when entrusted with complete professional tasks, simulating real-world practice and fusing procedural skills with the challenges of team-based health care.

Conclusion

Our preliminary model demonstrates how educators can formulate links between training content, trainees' progression, and the simulation purpose and modality best suited to the situation.[25] Our chapter raises and synthesizes key considerations for future directions of how to integrate simulation into EPA-based curricula as the landscapes of health professions education and simulation continue to evolve. We encourage researchers to use established frameworks—either those

we have referenced or their own preferred ones—to systematically design, implement, and evaluate the impacts of using simulation modalities to support trainees' readiness for their future practice. Incorporating simulation into EPA-based curricula represents a transformative approach in health professions education.

Competing interests

The authors declare that they have no competing interests.

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