Enhancing Educational Scholarship Through Conceptual Frameworks: A Challenge and Roadmap for Medical Educators

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ABSTRACT

Historically, health sciences education has been guided by tradition and teacher preferences rather than by the application of practices supported by rigorous evidence of effectiveness. Although often underutilized, conceptual frameworks—theories that describe the complexities of educational and social phenomenon—are essential foundations for scholarly work in education. Conceptual frameworks provide a lens through which educators can develop research questions, design research studies and educational interventions, assess outcomes, and evaluate the impact of their work. Given this vital role, conceptual frameworks should be considered at the onset of an educational initiative. Use of different conceptual frameworks to address the same topic in medical education may provide distinctive approaches. Exploration of educational issues by employing differing, theory-based approaches advances the field through the identification of the most effective educational methods. Dissemination of sound educational research based on theory is similarly essential to spark future innovation. Ultimately, this rigorous approach to medical education scholarship is necessary to allow us to establish how our educational interventions impact the health and well-being of our patients.

KEYWORDS: conceptual framework; educational research; scholarship

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Science and the practice of medicine have been defined by exciting breakthroughs and novel, rapidly emerging innovations that have allowed the application of evidence-based interventions that benefit patients and promote health. Although the pace of progress in clinical care has advanced quickly owing to rigorous bench, clinical, and translational studies, medical education has traditionally been driven by ritual, culture, and tradition rather than theories and evidence gathered through rigorous study.[1,2] When confronting a potential research topic, an educational scholar, like any investigator, must use established theories to define the focus for inquiry, develop a study question and/or generate a hypothesis, and then design the methodology to appropriately address the inquiry. To systematically plan and assess the outcomes of an educational intervention grounded in theory, adherence to best practices allows a scholar to demonstrate the impact of medical education interventions on learning and to understand how efforts to prepare physicians for practice contribute to patient health outcomes.

Conceptual frameworks represent ways of thinking about a problem and are the lens through which one can examine the complexities of educational or social phenomena.[3] Through the use of a conceptual framework, we deepen our understanding of a studied phenomenon and drive original research ideas.[4] In medical education, these frameworks allow us to consider multiple factors that contribute to outcomes—factors related to the teacher, the learner, the assessment, and the context.[5,6] Conceptual frameworks provide the foundation to establish the "so what"—the importance of the work, how it fills an existing gap in understanding the phenomenon, and how it can lead to the "how" of the project—which impacts the choice of educational methods, assessment strategy, and appropriate interpretation of outcomes.

Educators routinely apply accepted methodologies for qualitative[3] and quantitative[4] approaches to educational investigation. The use of conceptual frameworks,

however, has not been explicitly described nor has it been universally applied by researchers in medical education.[7] The lack of a conceptual framework was noted to have contributed to the rejection of manuscripts submitted to major educational journals 62.2% of the time.[7] In a follow up to this study, Cook et al.[8] noted in a systematic review of medical education papers published between 2003 and 2004 that only 55% utilized conceptual frameworks. Most recently, the editors of *Academic Medicine* highlighted the reasons submissions are rejected prior to distribution for external peer review. The lack of a conceptual framework was once again noted; importantly, subsequent steps that rely on the key step of selecting and applying a framework in the design and research process were highlighted as barriers to successful publication.[9]

Although medical education research can often take a nonlinear path, in this article we aim to provide a roadmap for using conceptual frameworks early in the scholarly process as a tool to enhance the design of medical education interventions and research. Although useful in exploratory research that leads to hypothesis generation (ie, cross-sectional, observational, and qualitative studies), we focus here on the use of frameworks to develop a research question, design an educational intervention and study to investigate the question, and evaluate the effectiveness of the intervention. In addition, we touch on how using conceptual frameworks allows one to explicitly situate one's findings in the existing literature. Finally, we share some final considerations from experienced medical education investigators about the selection and use of conceptual frameworks.

Conceptual Frameworks Versus Best Practices

Commonly used conceptual frameworks in medical education are described in the Table. This is not an all-encompassing list but rather a starting point to ground this discussion and serve as a reference. It is important to understand the difference and relationship between conceptual frameworks and established best practices in education. Both are valuable assets in one's work as an educator. Best practices are accepted approaches, with noted exemplars being Kern's 6 steps[23] for curriculum design, the logic model[24] for program evaluation, and Kirkpatrick's framework[25] for measuring multilevel outcomes. Both conceptual frameworks and the application of best practice approaches in the design and evaluation of educational interventions contribute to the rigor of educational scholarship. Figure 1 illustrates the integration of conceptual frameworks and a best practice model in education. In this example, Kern's 6 steps approach represents a widely accepted best practice for curriculum development. Use of a specific conceptual framework helps guide the development of goals and objectives for the curriculum (Kern's step 3) and the selection of an educational intervention (approach or teaching strategy) to achieve those goals and objectives (Kern's step 4). Together, the goals, objectives, and intervention provide the basis for determining the outcomes that will be assessed and the evaluation strategy to use to provide evidence of the success of the curriculum (Kern's step 6).

Selecting a Conceptual Framework

Identifying a conceptual framework is a crucial step in designing an educational research study.[26,27] Frameworks to consider should resonate with the scholar and their beliefs about learning.[6] A thorough literature review to identify potential, applicable conceptual frameworks is a necessary early step in project development. In addition to reviewing the medical education and health sciences literature through databases such as PubMed, reviewing additional search engines that include social science literature can provide other frameworks to consider. Leveraging resources such as a librarian or an expert collaborator can help broaden exposure to alternative frameworks.[28] Often, the term *theoretical frameworks* is utilized in social science literature. Although *theoretical* and *conceptual* frameworks are sometimes differentiated,[29] their application to organizing and enhancing scholarship is much the same, so we use the terms interchangeably. When potentially relevant conceptual frameworks have been identified, continued critical analysis and synthesis of the literature allow the investigator to identify what is already known about the topic and to consider how a specific component of the framework or the use of an alternative framework would be helpful in addressing existing gaps in the literature.[30] The chosen conceptual framework then supports the rationale for the intervention and justifies why and how it will be undertaken.[30]

Importantly, more than 1 conceptual framework may be applied to design a research study and the intervention to address an issue in health sciences education. Because each conceptual framework provides a different platform on which to build a unique question, investigators should choose the framework that they believe is most appropriate to explore an issue. The way in which the choice of conceptual framework guides the design of an educational intervention and corresponding research project is graphically illustrated in Figure 2. In the following section, we use an intervention to promote physician wellness as our case example to demonstrate how selection of a conceptual framework can impact research question development, study design, and assessment strategies.

An Example: Educational Intervention Promoting Physician Wellness

Burnout is a pervasive problem impacting learners across the educational continuum and practicing clinicians, with the reported incidence of medical student burnout in particular ranging from 7.0% to 75.2%.[31] Despite the increased focus on addressing burnout in this population, interventions to date have produced minimal impact.[31,32] Much of the work to combat burnout has focused on promoting wellness and resilience[33] with interventions ranging from school-sponsored programs to

Table. Examples of Conceptual Frameworks Applicable to Medical Education Scholarship

Conceptual Framework	Attributed to	Theory Source	Brief Description	Hypothetical Example of Application for Scholarly Work in Medical Education Research
Deliberate practice[10]	Ericksson	Kinesiology	Teacher/coach plans learning and provides immediate feedback, allowing the learner to incorporate this feedback as she or he continues to refine an approach to achieve a goal.	Simulation-based curriculum Skill acquisition over time
Automaticity and skill expertise[11]	Fitts and Posner	Kinesiology	Skills acquisition occurs in 3 phases: 1) *cognitive phase*, when learners use explicit cognitive processes to understand a skill in a step-by-step fashion; 2) *associative phase*, when learners perform a skill and, based on feedback, modify how the skill is performed; 3) *autonomous phase*, when a skill can be performed automatically without need for conscious attentional control.	Procedural skills curriculum Skill acquisition over time Ability to perform a skill with competing distractions
Cognitive load theory[12]	Sweller, Van Merrienboer, and Paas	Cognitive psychology	Careful attention to instructional design can be used to reduce the cognitive load in learners; heavy cognitive load can have a negative impact on task completion.	Use of low-fidelity simulation to focus on mastery of a specific task prior to practice in the clinical environment
Self-directed learning[13]	Knowles	Cognitive psychology	This process allows learners to take the initiative in diagnosing their learning needs, formulating goals, identifying human and material resources, and evaluating learning outcomes.	Individualized learning plans Tracking of self-directed learning goals and attainment
Social cognitive theory[14]	Bandura	Cognitive psychology	People learn from one another by observing and imitating others' behavior: Pay attention. Retain what you observed. Reproduce the modeled behavior. Remain motivated to continue to imitate the behavior.	Shadowing program Tracking observed behaviors, incorporating them into practice, planning their use in the future
Self-regulated learning[15]	Zimmerman and Schunk	Cognitive psychology	Learners plan, monitor, and evaluate their own learning to achieve a goal.	Individualized learning plan Tracking self-directed learning goals and attainment
Reflective practice[16]	Schon	Cognitive psychology	*Reflection in action:* Experience and reflect on an experience during an event. Decide how to act. Act. *Reflection on action:* Reflect after an event. Think about what you might do differently. Use new perspectives to process feelings and actions.	Debriefings, reflective writing activities Assess for implementation of identified changes following debriefings
Self-determination theory[17]	Deci and Ryan	Cognitive psychology	People have 3 basic needs, which, if met, lead to enhanced self-motivation, performance, personal growth, and vitality. These needs are *competence*, *autonomy*, and *relatedness*.	Problem-based learning, small group learning activities Impact of hypothetical clinical scenario vs anchoring in shared experience
Experiential learning cycle[18]	Kolb	Cognitive psychology	Learning happens through a transforming experience via a 4-stage learning cycle: *concrete experience*, *reflective observation*, *abstract conceptualization*, and *active experimentation*.	Simulation-based curriculum Impact of a structured debrief followed by time for practice prior to further simulation
Situated learning—guided participation[19]	Vygotsky	Sociology	Instructors develop activities to promote more independent learning over time.	Workshops Learning following didactic vs interactive session

(*continued on next page*)

Table (*Continued*)

Conceptual Framework	Attributed to	Theory Source	Brief Description	Hypothetical Example of Application for Scholarly Work in Medical Education Research
Situated learning–legitimate peripheral participation[20]	Vygotsky, Lave, and Wenger	Sociology	Learning can be incidental for a peripheral member of a group who contributes to the overall activities of that group.	Medical student on rounds Assessing impact of time spent on the wards on skills gained
Social capital theory[21]	Bourdieu	Sociology	Individuals acquire a set of "dispositions" that become second nature (including practices, behaviors, attitudes, perceptions) and reflect the social conditions (medical training environment) within which they were acquired. Individuals interact in a specific social context in which positions of power are determined by different forms of capital, including knowledge, skills, prestige, and honor.	Shadowing experiences Impact of community shadowing program on provider empathy
Theory of discourse[22]	Foucault	Sociology	The focus of this approach is on how language is used to establish and impact social power structures.	Language used by senior providers toward trainees Language used by physicians toward patients

Conceptual frameworks arise from a variety of different academic domains, including kinesiology, cognitive psychology, and sociology. This list is illustrative and should not be considered to be inclusive of all frameworks that might be useful in the design and evaluation of scholarly educational work.

protected time to promote individual engagement in wellness activities.[34]

There are numerous approaches an educator could take to attempt to promote wellness among learners. The choice of conceptual framework impacts the design of the intervention and the research question to be studied related to the intervention. For example, if an investigator's beliefs align with Bandura's social cognitive theory, which is grounded in the concept that people learn by observing and imitating other's behavior,[14] this lens would focus the investigator to design and study a learning experience that provides opportunities for observation and emulation of behaviors known to promote wellness.

An investigator may choose this framework after a review of the literature reveals that social cognitive theory has been used by others to develop educational interventions that promote the adoption of new behaviors. The next step is to develop a research question investigating how components of this conceptual framework (ie, attention, retention, reproduction, and motivation) contribute to the adoption of behaviors that promote wellness. Several potential questions could be explored using this conceptual framework—for example, "Does a shadowing program for preclinical medical students decrease the rate of emotional exhaustion reported during the clinical years?" The shadowing program in this case would be designed with the intention to provide opportunities to shadow senior-level clinicians who are known to incorporate wellness activities into their daily practice. The students would be primed to learn from these observations through the provision of information about specific wellness interventions that have been shown to promote wellness. Students would additionally be prompted to reflect on the perceived value of the activities used by the physicians they are shadowing.

The assessment strategies and outcome measures must be selected with consideration of the precepts of the chosen conceptual framework and to provide data that answer the research question. In this case, this would include a measure to document exposure to different wellness-promoting activities during the shadowing experience (attention), an assessment of adoption of the observed behaviors during the clerkships (retention and reproduction), and a determination of the rate of emotional exhaustion of these learners compared with a control population to evaluate the effectiveness of the approach. Options for controls include a historical group (previous classes of students who did not experience the shadowing program), a group of students who shadow physicians not known to incorporate wellness activities in their daily work, or a group of students who were not primed to observe wellness-promoting behaviors and asked to reflect on those observations.

As part of the evaluation strategy, learners could self-assess their use of observed wellness activities during their clinical rotations and reflect on the effect of those activities on promoting a personal sense of wellness in different contexts and patient care settings. They could

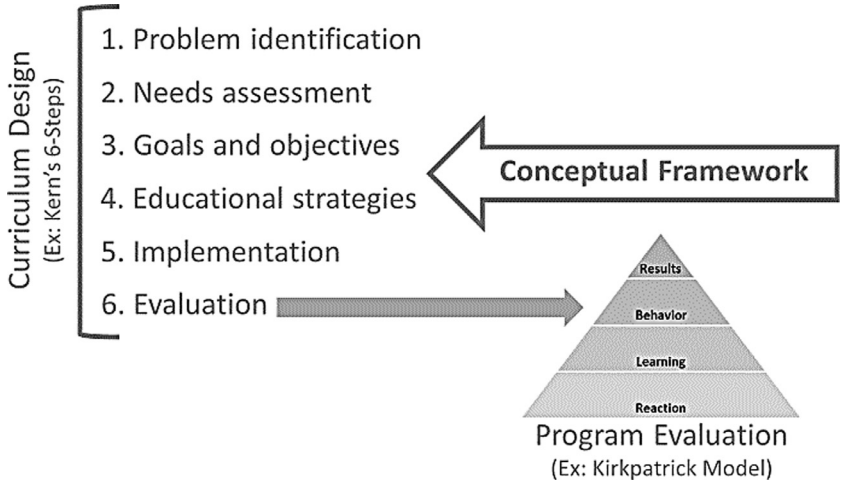

Figure 1. *Scholarly work in medical education requires use of best practice approaches such as Kern's 6 steps to curriculum development and Kirkpatrick's evaluation model. Conceptual frameworks are theories or models used to develop study questions, guide educational interventions, and provide a lens through which results may be interpreted.*

also assess the likelihood that they will sustain certain activities in the future and reflect on why they will continue to use or not use certain behaviors as they progress in their career (motivation). Objective assessment of student emotional exhaustion evaluates the effectiveness of the curriculum and can be tracked over time to evaluate sustained effects of the intervention.

Alternatively, an investigator might select a different conceptual framework, such as the theory of situated learning and legitimate peripheral participation by Lave and Wenger,[20] to determine how to design and study an educational intervention to promote the adoption of wellness behaviors. This conceptual framework posits that learning can be an incidental process that occurs as a learner, who at

Step 1: Problem Identification	High incidence of Burnout	
Step 2: Needs Assessment	Burnout in our institution is 52%, and learners feel they receive minimal guidance on how to manage burnout	
Conceptual Framework Driven Research Questions	**Bandura's Social Cognitive Theory** **Research Question:** Does a shadowing program for pre-clinical medical students targeting clinician incorporation of wellness activities decrease the rate of emotional exhaustion during the clinical years?	**Situated Learning – Legitimate Peripheral Participation** **Research Question:** Does engaging with near peers in activities designed to promote wellness decrease medical student depersonalization and cynicism at graduation?
Step 3: Goals and Objectives	Decrease medical student burnout by increasing knowledge of, and attention to, wellness promoting behaviors	Decrease medical student burnout by increasing opportunity for participation in wellness promoting activities for resident physicians
Step 4: Educational Strategies	Opportunity to observe and emulate behaviors associated with promoting wellness	Provide oppotunities for exposure to organized wellness actiivities
Step 5: Implementation	Medical students are paired with a clinical preceptor whom they observe one-half day each month during the preceptor's clinical activities	Medical students participate in wellness learning community activities and attendance is recorded
Step 6: Evaluation	Third year students complete the Maslach burnout inventory at the start, middle and end of their clinical year. Compare to unexposed students from the prior academic year.	The Maslach burnout inventory is completed by students stratified into groups based on their level of participation in programming. Differences between groups are identified.

Figure 2. *Identification of a conceptual framework for educational research impacts development of the study question, intervention design, and assessment strategy. This table demonstrates how the topic of physician wellness might be addressed differently based on the particular conceptual framework chosen: social cognitive theory[14] or situated learning–legitimate peripheral participation.[20]*

first is peripheral to the group, becomes a member, and is welcomed into a community of practice.[20] Applied to our example, an experience that allows a learner to be exposed to, and engage in, activities that promote wellness for the community, such as exposing medical students on their clerkship to resident noon conferences on mindfulness, might lead to an alternative research question. One potential question is "Does engaging with near peers in activities designed to promote wellness behaviors decrease depersonalization and cynicism in graduating medical students?" The assessment strategy in this case would include measures to document the level of engagement and participation of students in the resident noon conferences and measures of depersonalization prior to graduation to evaluate the effectiveness of the approach.

As noted, conceptual frameworks also inform the development of exploratory or hypothesis-generating studies involving qualitative methodologies. Taking the same wellness example, an investigator could use the 6 dimensions of wellness model (occupational, emotional, physical, social, intellectual, and spiritual)[35] as the basis for developing a questionnaire to explore the perspective of resident physicians about the barriers to, and strategies to strengthen, wellness during training. Using the results of this study, the educator could then implement an educational program that provides residents with the knowledge, skills, and behaviors to strengthen wellness.

These examples highlight the impact of a conceptual framework in grounding and aligning the design, investigation, and scholarly evaluation of an educational intervention. It is critical that the intervention methods, assessment tools, and evaluation approach provide answers to the specific question of interest. This alignment is foundational to applying a scholarly approach that establishes clear goals, uses appropriate methods, measures significant results, and effectively communicates and disseminates an investigator's work.[36]

Advancing the Field

Although addressing education issues locally is often the context through which novel innovations are developed and piloted, dissemination of results is necessary to contribute to the community at large and thereby help to establish educational best practices and advance educational theory. In a presentation or publication, explicit mention of how one utilized a conceptual framework has several important implications for advancing knowledge. The use of an established, evidence-based framework allows reviewers and readers to better understand how the work fills a gap in the literature, to evaluate the rigor of the methodology used in the intervention and study of the intervention, and to interpret the impact of the outcomes and results in the context of how they advance the field. In a scholarly publication, the introduction should include a description of the conceptual framework or best practice used and the reasons the framework was selected to guide the current work. Use of an accepted best practice for the design and assessment of an educational intervention further demonstrates a rigorous, scholarly approach.

In the discussion section of a paper, stating how the results demonstrate the impact of the intervention in the context of the selected framework can support generalizability of the study's findings,[30] help strengthen the theory, and establish a platform on which others can build. Future investigators can test new interventions using the same framework to continue to build a body of evidence, or they could choose a different component of the framework or an alternative framework to explore new approaches to tackling the same educational issue. In this section of a paper, organizing the analysis of results in the context of the framework allows a reader to understand the significance of the findings being described.

Additional Considerations

To allow for the successful implementation of a medical education project, there are several additional key considerations. At the beginning, a careful examination of the resources needed to implement and evaluate the intervention is necessary to ensure that a practical and feasible approach is taken. Suppose that after a review of the literature an investigator crafts a study question using the conceptual framework of deliberate practice, a theory that views guidance provided by an instructor and active learner participation as being essential to learning.[10] An intervention based on this framework would require training instructors to do workplace-based observations, provide feedback, and reassess learner performance over time; however, this may not be feasible given human or fiscal resource constraints. Through careful attention to the resources required early in the design process, an investigator can explore alternative applicable conceptual frameworks and interventions before allocating significant time and energy to an approach that is not possible. However, the ability to reference established educational theory and the use of a conceptual framework will strengthen the rationale for the intervention and could be helpful in making a case for internal or external sources of funding.

Although adequate preparation at the onset of a project is important to developing a study question that is interesting, novel, and relevant,[37] thoughtful reflection at the conclusion of a research study cannot be overlooked. If one finds that the results of a study do not clearly demonstrate the desired outcome, it is critical to identify what factors in the design of the intervention or study may have contributed. The investigator should consider the following questions:

- Were the intervention and methodology aligned with the framework?
- Were the interventions not implemented as planned?
- Were appropriate outcome measures selected?
- Did the assessment approach fail to measure the intended outcomes?

- Were there unrecognized confounding factors?
- Did the results indicate a new aspect about the conceptual framework that requires further exploration?

CONCLUSIONS

We have described the importance of conceptual frameworks and outlined their use to ground one's work and apply a rigorous, systematic, and scholarly approach when developing research questions and a focus for inquiry, designing interventions and hypothesis-driven and -generating studies, assessing outcomes, and evaluating the impact of one's work in education. Developing an understanding and familiarity with conceptual frameworks in education is an important skill set for those pursuing careers that focus on medical education. We now challenge medical educators to apply these principles so that we may continue to advance the field; meaningfully impact learning; and, ultimately, through better education of practitioners, improve the health of our patients.

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